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Products that require extensive and complex information flows among suppliers, intermediary vendors, and customers often pose particular challenges to the vertical marketing system. Using social network theory, the authors investigate buyers' preferences for specific patterns of relationships among buyers, intermediary vendors, and suppliers of complex products. Using a conjoint experiment with actual and prospective buyers of integrated computer networks and services, the authors find that beyond their dyadic interaction with a vendor, buyers take into account the buyer–vendor–supplier triad. Specifically, buyers value sequences of selective strong ties as well as sequences of more numerous weak ties. This is consistent with theoretical propositions that strong ties facilitate the mobilization of support and the transfer of complex knowledge, whereas nonoverlapping weak ties facilitate the gathering of intelligence and the monitoring of new developments. The authors find only mixed evidence that buyers value direct access to suppliers when strong ties exist between the vendor and suppliers, as predicted by the third-party sanctioning argument in social network theory. In addition, they find that interaction intensity and valence do not always have the same effects, thus providing criterion validation to the bidimensional nature of tie strength that has been documented in previous research.

Vertical Marketing Systems for Complex Products: A Triadic Perspective

The marketing of complex products and systems often requires extensive exchange of information along the marketing channel. For example, buyers of integrated computer networks often require customized solutions and extensive technical support, such as installation, transfer of applications, and training sessions for user groups and network administrators. Therefore, suppliers often choose to serve their customers through system integrators and value-adding resellers that are more adept at transferring complex knowledge than are traditional resellers. In such go-to-market arrangements, relationships between supplier and vendor (i.e., reseller), vendor and buyer, and supplier and buyer all affect the knowledge flows through the vertical marketing system and thus the buyer's valuation of the products and services offered (e.g., Tempest 1998).

The importance of studying not only dyads but also interactions between vertically connected dyads has long been acknowledged (Achrol, Reve, and Stern 1983). However, empirical research on such interdyadic phenomena in marketing channels is only recent and is still quite rare (e.g., Antia and Frazier 2001; Wathne and Heide 2004). The emergence of such research in marketing parallels the shift in focus in economic sociology from relational to structural embeddedness, that is, from how "economic action and outcomes … are affected by actors' dyadic (pairwise) relations" to how they are affected by "the structure of the overall network of relations" (Granovetter 1992, p. 33). Many of the structural issues can be addressed by shifting from a dyadic to a triadic perspective, and they are not fundamentally altered by further expansion to four or more actors (Simmel 1950). As a result, producer–vendor–customer tri-

ads have emerged as an important research area in both marketing and economic sociology (Baker and Faulkner 2002).

In this article, we investigate business buyers' preferences for specific types of vertical triads that consist of suppliers, a vendor, and a buyer in a technology-intensive market that exhibits extensive knowledge flows. A conjoint experiment in the market for integrated computer networks indicates that beyond their dyadic interaction with a vendor, buyers take into account the buyer–vendor–supplier triad. Our findings suggest that the study of vertical marketing systems from a triadic perspective and broader social network perspective enhances the understanding of organizational buying and marketing channels.

HYPOTHESES

We present hypotheses on buyer preferences for buyer–vendor dyads, vendor–supplier dyads, and buyer–vendor–supplier triads. Figure 1 provides a visual representation of the triadic configurations that we study. The actors are a buyer firm, a vendor firm, and suppliers. We consider the following structural descriptor variables of the triads: the strength of buyer–vendor and vendor–supplier ties, the number of vendor–supplier ties, and the presence of direct buyer–supplier ties ("direct access"). Consistent with prior research findings on tie strength by Marsden and Campbell (1984), Wellman and Wortley (1990), and Frenzen and

Figure 1
TRIADIC CONFIGURATIONS

A. Triadic Configuration: Without Direct Access

B. Triadic Configuration: With Direct Access

Nakamoto (1993), our hypotheses on the strength of ties distinguish between tie intensity (manipulated as the intensity and frequency of interaction) and tie valence (manipulated as the cooperative character of interaction). Before turning to the vendor–supplier dyads and buyer–vendor–supplier triads that are of central interest, we formulate a few baseline hypotheses on buyer–vendor dyads.

First-Order Ties: Buyer–Vendor Dyads

Poor communication and cooperation between vendors and buyers of complex products is likely to result in an inadequate design and in installation and technical support problems. When the resources and knowledge to be transferred between buyers and vendors are complex, buyers benefit from intensive rather than casual ties, because intensive interaction and relation-specific heuristics facilitate the identification, understanding, and absorption of complex knowledge (e.g., Hansen 1999). They also benefit from cooperative rather than competitive ties, because cooperative parties undertake more efforts that aid knowledge transfer, such as the design of new solutions, the provision of technical support, the adaptation of procedures, and the exchange of sensitive information (Frenzen and Nakamoto 1993; Uzzi 1997). Note that tie intensity increases the parties' opportunities and ability to identify, understand, and transfer knowledge and other resources effectively, whereas tie valence reflects the parties' willingness to share their knowledge with each other. Because opportunity and ability as well as willingness are necessary for actual transfer to take place (e.g., Granovetter 1982; Hansen 1999), we expect not only main effects for tie intensity and valence but also a positive interaction between the two. Thus:

H_1: Buyers prefer vendors that have (a) intensive ties rather than casual ties and (b) cooperative ties rather than competitive ties with their buyers.
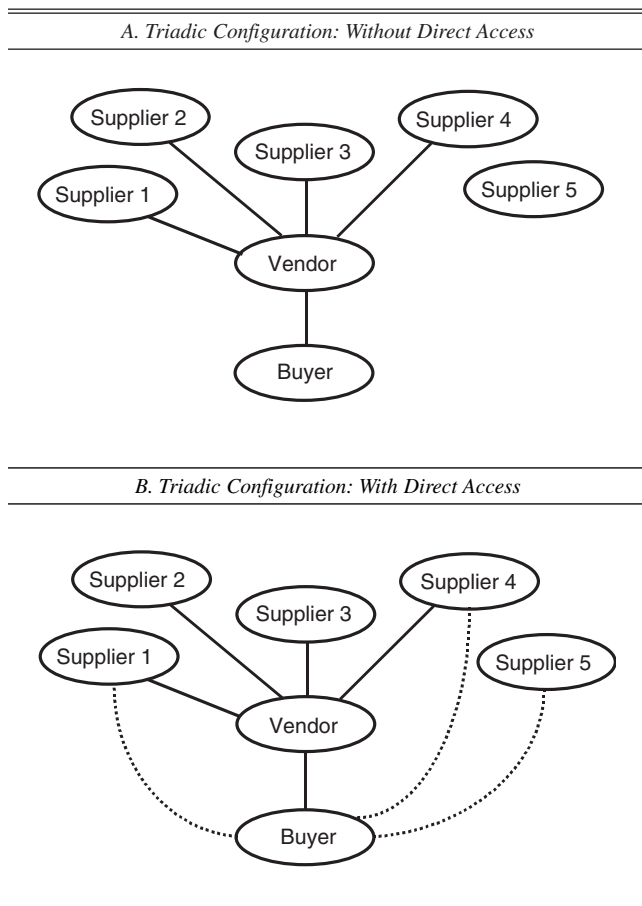
H_2: Buyers' preference for intensive (cooperative) ties with vendors is enhanced when the ties are also cooperative (intensive).

Second-Order Ties: Vendor–Supplier Dyads

Research on social support among friends and on the spread of information over network ties documents how the benefits an actor derives from a network can be a function of the quality of second-order resources, that is, the resources that are not particular to the actor but that are embedded in and can be mobilized through social networks (e.g., Burt 2000; Lin 1999). The importance of second-order resources implies that buyers care about not only their tie to their vendor but also the vendor's ties to suppliers.

Strength of second-order ties. In applying the same dyadic arguments we used when developing hypotheses for first-order ties, we expect that strong ties between vendor and suppliers stimulate resource and knowledge transfer between the parties, which will indirectly (through the vendor) benefit the buyer. For example, poor communication or an adversarial relationship between a software supplier and a computer network vendor is likely to result in the vendor being less knowledgeable about potential installation and deployment issues and receiving less (or less prompt) support from the supplier in case of problems. In turn, this increases the risk of installation and technical support problems for the buyer. Therefore:

H_3: Buyers prefer vendors that have (a) intensive ties rather than casual ties and (b) cooperative ties rather than competitive ties with their suppliers.

H_4: Buyers' preference for vendors that have intensive (cooperative) ties with their suppliers is enhanced when the ties are also cooperative (intensive).

Number of second-order ties. The quality of an actor's second-order resources is also a function of the number of ties that its partner has. There are at least four reasons for this. First, a vendor that has ties to a large number of suppliers provides the buyer with indirect access to more knowledge bases. Second, a vendor connected to more suppliers is likely to be better able to cross-validate bits of information (Burt 1999) and thus provide its buyers with more reliable information. Third, buyers may use the number of a vendor's upstream ties as an indicator of its status and quality, thus inferring that if many suppliers are doing business with the vendor, it must be good (Ball et al. 2001; Podolny 1993). Fourth, buyers may believe that a vendor working with multiple suppliers provides them with better incentive alignment: The more suppliers the vendor represents, the less likely the vendor is to push a product or solution that is not in the best interest of the buyer.

H_5: Buyers prefer vendors that have ties to more rather than fewer suppliers.

Strong ties help in mobilizing support and transferring complex knowledge (Coleman 1990; Hansen 1999). Therefore, to the extent that buyers use vendors tied to many suppliers to provide them with better access to suppliers' knowledge and support (Reasons 1 and 3 in the development of H_5), buyers should prefer such vendors to have cooperative ties with their suppliers:

H_6: Buyers' preference for vendors that have many ties to suppliers is enhanced when the ties are cooperative.

However, note that if buyers prefer vendors that have many suppliers mostly because it enables them to search more efficiently for reliable information or because of better incentive alignment (i.e., Reasons 2 and 4 in the development of H_5), H_6 need not hold.

For the intensity of a vendor's many supplier ties, the same two-sided argument applies. However, an additional concern arises: When a vendor has ties to many suppliers, and the vendor interacts frequently and intensively with them, buyers may be concerned that the vendor invests too much time and energy in dealing with suppliers rather than with customers, which would hurt the vendor's ability (though not its willingness) to transfer knowledge and support to its buyers. In view of this competition for attention (e.g., Hansen and Haas 2001), buyers may prefer their vendors to develop intensive ties with only a few suppliers rather than many suppliers. Thus:

H_7: Buyers' preference for vendors that have many ties to suppliers is decreased when the ties are intensive.

Buyer–Vendor–Supplier Triads: Transfer of Second-Order Resources

In this section, we develop hypotheses about how the strength and number of vendor–supplier ties affect buyers' preference for strong buyer–vendor relationships.

Strength of ties. Working with a vendor firm that assimilates knowledge and mobilizes resources at the supplier side of the triad is valuable to the buyer to the extent that the vendor passes the resources along to the buyer. Thus, the more a vendor is able to mobilize the knowledge and expertise of its suppliers through intense interaction and cooperative relationships, the more interesting it becomes for the buyer to develop a strong tie with that vendor. In short, buyers are likely to prefer situations in which intensive and cooperative ties exist at both levels in the vertical network.[1] Thus:

H_8: Buyers prefer intensive ties with vendors more when the latter have (a) intensive ties with suppliers and (b) cooperative ties with suppliers.

H_9: Buyers prefer cooperative ties with vendors more when the latter have (a) intensive ties with suppliers and (b) cooperative ties with suppliers.

An alternative rationale for H_{9b} is possible: Buyers may prefer to match cooperative vendor–supplier ties with cooperative buyer–vendor ties to ensure that vendors do not align themselves too much with their suppliers rather than their customers.

Number of second-order ties. If strong ties help in mobilizing support and transferring complex knowledge, and if vendors that are tied to many suppliers are considered more knowledgeable (Reasons 1 and 3 in the development of H_5), buyers should prefer to develop strong ties to vendors that have ties to many suppliers. Thus:

H_{10}: When vendors have ties to many suppliers, buyers prefer (a) intensive ties and (b) cooperative ties with vendors.

However, if buyers prefer vendors that have many suppliers mostly because it enables them to search more efficiently for reliable information or because of better incentive alignment (i.e., Reasons 2 and 4 in the development of H_5), H_{10} need not hold.

Direct Access: Third-Party Sanctioning

Vendors typically occupy bridge positions between buyers and suppliers. This is a double-edged sword for the buyer. On the one hand, it may enable the buyer to piggyback on the vendor's upstream ties and thus gain indirect access to a variety of information without needing to develop direct ties with suppliers (Burt 1999; Granovetter 1973). On the other hand, the vendor can opportunistically exploit this bridge position by manipulating or biasing information (Burt 1992; Porter 1974). In addition, the vendor can control the flow of resources and influence whose interests, other than its own, will be served in the transaction at hand: the suppliers' or the buyer's (Burt 1992).

Buyers can better control their vendor's behavior if they develop direct ties with suppliers. The reason is that such ties enable the buyer to voice dissatisfaction about an opportunistic vendor and vilify it among suppliers, some of which the vendor may consider working with in the future. The risk of being vilified and of consequently losing future business if suppliers refuse to work with them discourages

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[1]Our reasoning hinges on the notion that complex knowledge *transfer* requires strong ties and thus conflicts only in appearance with previous research on the advantages of weak ties for *searching* simple bits of information. For previous discussions of this distinction, see Granovetter (1982) and Hansen (1999).

vendors to behave opportunistically toward their current customers (e.g., Bendor and Mookherjee 1990; Greif 1993).

A buyer's direct access to suppliers is an effective protection against vendor opportunism to the extent only that the vendor is sensitive to suppliers' wishes. The latter is more likely to occur when the vendor has intensive and cooperative ties with suppliers. Thus:

> H_{11}: When the buyers themselves have more direct access to suppliers, buyers' preference for vendors that have (a) intensive ties and (b) cooperative ties to suppliers is enhanced.

Even though we posit H_{11b} for empirical testing, buyers may not be optimistic enough to expect that their direct access to suppliers protects them from vendors and suppliers that cooperate with each other to collude against their customers. The development of cooperative ties with vendors is an alternative mechanism to this end, as we mentioned previously.

Relationship to Other Theoretical Approaches to Study Marketing Channels

We briefly relate our conceptual framework to transaction cost economics and trust, which are the most prominent approaches to study channels. Complex knowledge transfer is often facilitated by transaction-specific investments (Uzzi 1997). In addition, the discussion about direct access to suppliers that leads to H_{11} assumes that buyers are concerned about self-interest seeking with guile, and it notes how norms of cooperation rather than opportunism can be sustained through network structure. However, the concepts of transaction-specific investments and quasi-rent extraction are not of direct interest to our investigation, so we do not explicitly manipulate or measure these key transaction cost economics constructs. Nevertheless, we do not ignore their potential effect on buyer preference: Our experimental procedures and statistical model (random effects) protect us from such omitted variable bias in the effects of the factors we manipulate.

Many of our arguments are based on the claim that tie strength and network structure affect trust in the vendor's future knowledge transfer, which in turn affects preferences for particular buyer–vendor–supplier constellations. Thus, we take for granted that effects of tie strength and direct access to third parties on behavior and outcomes can operate through trust (Coleman 1990), and we do not explicitly manipulate or measure trust as a mediator. Our study aims to document that characteristics of the triad affect buyer preferences, and it leaves the task of empirically documenting mediating processes to further research.

METHOD

Research Design

We used a mail survey that included a conjoint experiment. We preferred this design to a retrospective field study for several reasons. First, experimental manipulation enables us to draw conclusions on causal effects. Second, a conjoint experiment enables us to make multiple measurements per respondent, which increases power and enables us to control for heterogeneity in preferences. Third, an experiment may be less subject to *post hoc* rationalizations than a retrospective study that asks respondents to evaluate

their actual relationship (Wathne, Biong, and Heide 2001). Finally, high internal validity need not come at the detriment of contextual realism. Industrial customers are approached by vendors regularly and are used to make assessments of a vendor's characteristics. Pretests showed that respondents found the conjoint tasks to be realistic. Nevertheless, a conjoint design also has drawbacks compared with the traditional nonexperimental survey designs. Surveys can more easily accommodate a large number of variables and may be more suited when the research objective is to describe associations among variables rather than to study causal effects. Given our research objective of documenting triadic effects, the drawbacks do not offset the advantages.

Research Setting

We studied relationships among buyers and vendors of integrated computer networks and manufacturers of hardware and software in the computer network market. This market is well suited to investigate triadic channel effects: Intermediaries (vendors) are important, buyers vary in terms of their direct access to suppliers, and the buying situation is complex. Although our experiment assumes rather than documents that complex information flows play an important role in buyers' preference, this assumption is validated by our in-depth interviews and pretests with 14 industry participants; by Tempest's (1998) case study of Siebel; and by the trade press, which reports that the biggest challenge computer network buyers face is having knowledge transferred from their system integrator (e.g., Violino and Caldwell 1998).

We instructed respondents to imagine a situation in which their firm would purchase a completely integrated computer network of hardware (server, workstations) and software (network operating system, application software) components from one vendor (rather than purchasing separate components from component suppliers). We further specified that the vendor was new to the firm; that is, we ruled out prior ties between buyer and vendor.

Conjoint Scenarios and Measures

The conjoint task included 16 full profiles based on five factors with two levels each.[2] The task was an orthogonal half fraction of a 2^5 full factorial design that allows for estimation of all main effects and two-way interaction effects (Louviere 1988). We asked respondents to rate their preferences for a vendor characterized by the manipulated attributes on a seven-point scale that ranged from very low to very high preference. We used ratings rather than rankings or choices, because ratings are more time efficient for respondents and are easier to administer through mail. Although adaptive conjoint analysis is more popular than full profile, we preferred the latter given the large number of interactions to be estimated. As Huber and colleagues (1993) suggest, we used less than seven attributes and pro-

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[2]The number of constructs we could include in our conjoint analysis is limited. To alleviate omitted variable bias concerns, we included a clear statement in the conjoint task that the profiles were to be considered exactly equal to each other, except for attributes that we experimentally manipulated. In addition, as we discuss subsequently, we used a random coefficients model that controls for the influence of unobserved respondent-specific variables.

vided a warm-up task (consisting of a preference rating of a first scenario not included in the final analyses to familiarize the respondent with the task). Pretests with five customers indicated that respondents did not suffer from cognitive or task overload.

Table 1 presents the preference scale and the five two-level factors we manipulated. The five factors in the conjoint task are tie intensity and tie valence for the buyer–vendor and vendor–supplier dyads and the number of suppliers with which the vendor works. Following industry terminology, we refer to computer network vendors as "system integrators" and to suppliers as "hardware and software manufacturers." We use an effects coding scheme for the five two-level factors, coding the first level as +1 and the second level as –1.[3]

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[3]Our operationalization of the factors is based on the academic literature and the trade press; 18 hours of interviews with vendors, customers, and manufacturers; visits to 75 vendor Web sites; pretests with 5 customers; and a pilot study among 35 customers. As do scale items used in survey-based marketing channel research, and as in previous conjoint experiments used to study business relationships (e.g., Wathne, Biong, and Heide 2001), we worded our factors in relative rather than absolute levels. Although the relative scaling may seem vague, our pretests with 5 customers did not indicate any harmful ambiguity. In addition, our statistical model partly controls for subject-specific differences in interpretation of the factor levels.

Table 1
DEPENDENT VARIABLE AND CONJOINT ATTRIBUTE LEVELS

Dependent Variable: Preference Rating

Indicate the preference of your firm for this system integrator:

Very low ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very high
     1 2 3 4 5 6 7

Manipulated Attributes: Levels

1. Buyer–vendor tie intensity (INT1)	+1: This system integrator will work with your company very intensively and very frequently.
	–1: This system integrator will work with your company, but not intensively and frequently.
2. Buyer–vendor tie valence (VAL1)	+1: Your company's relationship with this system integrator will be rather cooperative.
	–1: Your company's relationship with this system integrator will be rather competitive.
3. Vendor–supplier tie intensity (INT2)	+1: This system integrator works with its hardware and software manufacturers very intensively and very frequently.
	–1: This system integrator works with its hardware and software manufacturers, but not intensively and frequently.
4. Vendor–supplier tie valence (VAL2)	+1: This system integrator's relationships with hardware and software manufacturers are rather cooperative.
	–1: This system integrator's relationships with hardware and software manufacturers are rather competitive.
5. Number of vendor's supplier ties (NR)	+1: This system integrator works with a large number of hardware and software manufacturers.
	–1: This system integrator works with a small number of hardware and software manufacturers.

We did not manipulate the buyer's direct access to hardware and software manufacturers experimentally, but we measured it as a respondent characteristic in the questionnaire. Our measure for direct access (ACCESS) is the number of suppliers with which the buyer has weekly contact.

Data Collection

The sampling frame was a database of more than 200,000 officially registered companies in the Netherlands. We randomly selected 1750 firms with up to 500 employees from four industries: industrial services, food production, machine production, and transportation. We focused on small and medium-sized firms because they typically purchase integrated computer networks rather than individual components. To be included, firms needed either to have recently bought an integrated computer network, consisting of both hardware and software components, or to be interested in buying one. To serve as a key respondent in the company, a respondent needed to be (1) involved in information technology purchases, (2) knowledgeable with respect to the process of purchasing a computer network, and (3) able and willing to participate. We selected potential respondents by contacting each firm in our sampling frame by telephone.

The final sample consisted of 745 firms that met our selection criteria. All key informants received a questionnaire that consisted of the conjoint experiment and additional questions. We provided several incentives to enhance the response rate, including a statement of support by the head of an industry association, the promise to provide the respondents with an executive summary report, a five-dollar donation to a cancer research fund for each completed questionnaire, and a reminder mailed three weeks later.

Of the 745 firms we contacted, 189 returned questionnaires. We deleted 22 questionnaires because the respondents did not meet our key informant selection criteria or because of excessive missing data. The final sample contained 167 firms and 2667 observations (5 observations are missing because 5 respondents did not rate one of the profiles). To assess the possibility of nonresponse bias in our data, we correlated the time at which we received the questionnaire with revenues, profits, firm size, purchase importance, knowledge about computer networks, and ACCESS. None of the correlations were significant at the 95% confidence level.[4]

Statistical Model

We used a hierarchical linear model that allows for random effects in both the intercept and the slopes. With subscript i to denote a respondent, j to denote a rating task, and x_k to denote the kth regressor, the model structure we used to explain preference scores y_{ij} is

(1) $\quad y_{ij} = \beta_{0i} + \Sigma_k \beta_{ki} x_{kij} + \varepsilon_{ij}$ (k: 1, …, K),

where

$$\beta_{ki} = \beta_k + U_{ki} \text{ (k: 0, …, K)},$$
$$\varepsilon_{ij} \text{ i.i.d. } N(0, \sigma^2), \text{ and}$$
$$\mathbf{U}_i \text{ i.i.d. } N(\mathbf{0}, \boldsymbol{\Omega}).$$

Deeming 16 observations per respondent a fairly large number, we did not impose a variance components struc-

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[4]However, this test of nonresponse bias may suffer from low power.

ture, but we let $Cov(U_k, U_{k'})$ be freely estimated. As it always is in hierarchical linear models, the random-effects U_{ki} are assumed to be independent of the residuals ε_{ij}. Random effects not only capture heterogeneity in preferences and the resultant dependence in errors but also allow for heteroskedasticity and control for possible differences in how respondents interpret the conjoint attribute levels.[5] We used residual maximum likelihood to estimate the model, and we used likelihood ratio tests to identify the simplest yet statistically most defensible error structure. As is preferred when using residual maximum likelihood, we used t-tests rather than likelihood ratio tests to assess whether fixed-effects β_k are significantly different from zero.[6]

We mean-centered the ACCESS variable ($\bar{X} = 1.0$, standard deviation = 1.5, range = 0–10) before estimation. Note that the respondent-specific covariate ACCESS should not have any bearing on the within-individual variation in preferences measured in the conjoint task. Only its interaction terms with manipulated factors can be expected to have significant effects.

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[5]The random-intercept-only model controls for differences in interpretation of conjoint variable levels. To illustrate, take a model with one regressor but allow respondents to vary in what they consider "high" versus "low" values of the regressor. Let this cutoff point be a random variable $\delta_i \sim N(0, \tau^2)$. Let $Corr(\beta_{0i}, \delta_i) = \rho$. The model is then $y_{ij} = \beta_{0i} + \beta[x_{ij} + \delta_i] + \varepsilon_{ij}$, which is identical to $y_{ij} = \gamma_{0i} + \beta x_{ij} + \varepsilon_{ij}$, where $\gamma_{0i} \sim N(0, \omega^2 + \beta^2\tau^2 + 2\rho\omega\beta\tau)$.

[6]Because preferences may not have metric properties, we also estimated ordered response models. The intercepts were quite evenly spaced, and the results were quite similar to the ones we obtained from linear model specifications.

RESULTS

Table 2 presents the results.[7] The coefficients for INT1 and VAL1 and their interaction indicate that buyers prefer intensive and cooperative ties to their vendors, in support of H_1 and H_2. The coefficients for INT2 and VAL2 and their interaction indicate that the preference for intensive and cooperative ties extends to vendor–supplier ties, in support of H_3 and H_4.

In H_8 and H_9, we advanced that buyers' preference for intensive or cooperative ties with the vendor is enhanced when the latter has intensive or cooperative ties with suppliers. H_{8a}, H_{9a}, and H_{9b} are supported; only H_{8b} is not (see Table 2). Buyers prefer cooperative but not intensive ties with vendors that have cooperative ties with suppliers. This suggests that vendor–supplier cooperation provides some benefits to the vendor that benefit the buyer as well (H_{3b}) but for which (unlike knowledge transfer) the buyer does not need frequent and intense interaction with the vendor. Examples of such benefits include vendor financing and the availability of technical engineers for emergency troubleshooting. Suppliers are more likely to provide such benefits abundantly to a reseller with which they cooperate, but

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[7]Because we use effects coding (–1, +1) for the manipulated factors and because the ACCESS covariate is mean-centered, the coefficients of linear terms represent main effects even in the presence of significant interactions. That we find a large number of significant interactions is consistent with Hagerty's (1986) claim that "true" preferences are likely to contain interactions. Both our choice of an appropriate empirical context and our use of a shrinkage estimator that allows for pooling across respondents may have helped unveil these interactions.

Table 2
RESULTS

Variable	Hypothesis	Fixed Effects		Random Effects	
		β	Standard Error	Var(U)	Standard Error
Intercept		3.43***	.05	.32***	.04
INT1	H_{1a}	.38***	.05	.31***	.03
VAL1	H_{1b}	.56***	.04	.24***	.03
INT1 × VAL1	H_2	.10***	.02	.03***	.01
INT2	H_{3a}	.28***	.03	.07***	.01
VAL2	H_{3b}	.18***	.03	.12***	.02
INT2 × VAL2	H_4	.07***	.02	0	
INT1 × INT2	H_{8a}	.06***	.02	.01ns	.01
INT1 × VAL2	H_{8b}	–.00 ns	.02	.01*	.01
VAL1 × INT2	H_{9a}	.04**	.02	0	
VAL1 × VAL2	H_{9b}	.06***	.02	0	
NR	H_5	.11***	.03	.07***	.01
NR × VAL2	H_6	–.01ns	.02	0	
NR × INT2	H_7	–.05***	.02	0	
NR × INT1	H_{10a}	–.04**	.02	0	
NR × VAL1	H_{10b}	.02 ns	.02	0	
ACCESS		.04 ns	.03	0	
ACCESS × INT2	H_{11a}	.04*	.02	0	
ACCESS × VAL2	H_{11b}	–.00 ns	.02	0	

–2 residual log-likelihood = 8199.8

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

Notes: Dependent variable is buyer's preference rating for system integrator. We computed the significance levels of the fixed-effect parameters from two-sided t-tests. For each random effect not set to zero in the model reported, the variance and covariances are jointly significant at 5% or better (χ^2 with 9 degrees of freedom). We computed the significance levels of the random-effect variance parameters from one-sided z-tests. We obtained the same significance levels when we used the –2 residual log-likelihood improvement from adding the variance parameter to a model that excluded both the variance and the associated covariance parameters (χ^2 with 1 degree of freedom).

the buyer can enjoy them regardless of the frequency of its interaction with the vendor. Apart from this exception, the effects in Table 2 that correspond to H_1–H_4, H_{8a}, and H_9 indicate that buyers value a sequence of strong ties that run from suppliers through the vendor to the buyer.

As we expected (H_5), buyers prefer vendors that are tied to many suppliers. We find the expected negative interaction between NR and INT2 (H_7) but no interaction between NR and VAL2 (which rejects H_6). The latter null effect is not consistent with many vendor–supplier ties that provide the buyer with better access to complex knowledge. The different effects of tie intensity and tie valence provide some empirical criterion validation to the bidimensional nature of tie strength.

The rationale for transfer of second-order resources led us to conjecture in H_{10} that buyers prefer stronger ties with a vendor, especially when the latter is connected to many suppliers. We do not find any support for this. The number of vendor–supplier ties (NR) does not interact significantly with tie valence (VAL1) and has a negative rather than positive interaction with tie intensity (INT1). As with the absence of an interaction between NR and VAL2, these results are not consistent with complex knowledge transfer through strong ties. Instead, the way the number of vendor–supplier ties (NR) interacts with the strength of both buyer–vendor and vendor–supplier ties (INT1, VAL1, INT2, VAL2) indicates that buyers' preference for intensive buyer–vendor and vendor–supplier ties is depressed when vendors have ties to many suppliers. As we discuss subsequently, this is consistent not with transfer through strong ties but with search through weak ties (e.g., Hansen 1999).

We find mixed evidence for the third-party sanctioning argument. Although we find a positive interaction effect of ACCESS with INT2 (H_{11a}), we do not find such an interaction with VAL2 (H_{11b}). This suggests that buyers do not consider direct access a mechanism to protect against resellers that have a cooperative relationship with their suppliers, as we discuss in the next section.

DISCUSSION

Conclusions

The findings we have presented lead to four conclusions. First, buyers go beyond the channel dyads they are involved in when they assess the appeal of a channel, which corroborates the value of a triadic and broader network perspective. Second, interaction intensity and valence do not always have the same effects. This provides some criterion validation to the distinction between these two dimensions of tie strength that has been documented in previous research.

Third, the overall pattern of the results is consistent with the view that buyers' valuation of network configurations is associated with the extent to which the network structure enhances their ability to mobilize resources either directly or indirectly. Specifically, buyers value a sequence of strong ties that run from suppliers through the vendor to the buyer. This is consistent with our argument about the transfer of complex knowledge to buyers. We further find that buyers' preference for intensive buyer–vendor ties and intensive vendor–supplier ties is depressed when vendors have ties to many suppliers. At face value, this seems to be inconsistent with our proposition that buyers use strong ties to mobilize resources and to transfer complex knowledge. However,

both findings are consistent with the principle of second-order resources when they are combined with the idea that weak and strong ties serve different functions, namely, search versus transfer (Granovetter 1982; Hansen 1999). Specifically, our findings are consistent with buyers valuing sequences of strong buyer–vendor–supplier ties as a way to mobilize support and to transfer complex knowledge while valuing nonintensive ties to vendors that also have nonintensive ties to many suppliers as a way to piggyback on vendors' portfolio of weak ties for scanning the broad market and technological environment.[8]

Fourth, our evidence that pertains to the third-party sanctioning mechanism is mixed. We find that buyers value direct access more when vendor–supplier ties are intensive, as we expected, but not when they are cooperative. Buyers seem to prefer having cooperative ties with vendors rather than direct access to suppliers to protect themselves against the risk of collusion posed by cooperation between vendor and suppliers.[9]

Limitations and Further Research

We took only a first step toward assessing triadic effects, and our study exhibits several limitations, some of which offer clear research opportunities. First, we considered only a simple network that consisted of one buyer, one intermediary, and an unspecified number of suppliers. In addition, the ACCESS covariate captures only the number of ties with suppliers in general, not whether the buyer has direct access to the suppliers actually involved in the purchase at hand. As a result, we can investigate the effect of direct access offering a higher likelihood of third-party sanctioning but not the expectedly stronger effect of direct access offering "network closure" (Coleman 1990) among all parties involved in the transaction.

Second, our design did not take into account the customer portfolios of vendors or suppliers, even though these are likely to be a salient issue. For example, buyers may value a vendor less when it serves some of their competitors or when it is connected with other vendors that do so.

Third, we did not consider exclusivity between supplier and vendor or the quality of the supplier. Both are intertwined; buyers may prefer a vendor that has strong ties to a few suppliers only if they are top quality suppliers, and top quality suppliers are more likely to demand and obtain exclusivity from vendors.

Fourth, further research should investigate whether preferences for particular relationships vary over the buying and installation cycle. For example, buyers may not need direct access to suppliers in the search stage, but they may highly value frequent access to several suppliers in the design and evaluation stages. They also may highly value direct access

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[8]In this light, the pattern in buyer preferences observed in our experiment on buyer–vendor–suplier ties is consistent with the common practice of companies that buy directly from suppliers to distinguish between a small set of primary suppliers and a larger set of secondary suppliers. This enables buyers to achieve weak-tie benefits (search) and strong-tie benefits (transfer) at the same time (Uzzi 1997).

[9]As we mentioned when presenting H_{9b} and H_{11b}, the positive interaction between VAL1 and VAL2 may reflect a concern that high vendor–supplier cooperation leads vendors to align themselves too much with their suppliers rather than their customers. Matching cooperative vendor–supplier ties with cooperative buyer–vendor ties can be a co-optation strategy that buyers use to protect themselves against such scenarios.

in the implementation stage, but only for the suppliers involved in the contract.

Fifth, our study documents triadic effects that are consistent with social network theory, but it does not incorporate alternative explanations or complementary perspectives that have enjoyed considerable attention in prior channel research. To extend the present work and connect it more tightly with extant channel theory, future studies might include constructs that are closely related to knowledge transfer and opportunism, such as transaction-specific investments and ambiguity, as well as constructs that might moderate or mediate the effect of network structure on preference, such as trust. Our contribution is that we provide evidence of triadic effects relevant to marketing that corroborates several network arguments. Elaboration of how and when these effects pertain to findings from prior channel research is a task for further research.

There are several other avenues for further research, in addition to addressing limitations of the current study. For example, we focused on complex buying situations in which knowledge transfer from manufacturers through vendors to buyers is important. It would be worthwhile to assess explicitly whether the effects we hypothesized and documented are weaker in low-complexity buying situations in which knowledge transfer is less important. These and other industry differences may be revealed in future cross-industry studies.[10]

The level of the buyer's knowledge and expertise is another contingency that is worth investigating. If concerns about knowledge search and transfer markedly affect buyers' preferences for strong ties, an issue of interest to both organizational buying behavior and marketing strategy is whether more knowledgeable buyers value intensive and cooperative ties differently than less knowledgeable buyers do (e.g., Matthyssens and Van den Bulte 1994; Stremersch et al. 2003).[11]

Envoy

Our study was motivated by a theoretical interest in social networks, a substantive interest in go-to-market approaches, and industry reports on failures in knowledge and support flows in the information technology industry. Our findings about triadic effects are encouraging, and many interesting and important research questions remain, including several about contingency and mediation that often sharpen process explanations. Marketing scholarship, with its aim to contribute to the broad research area of exchange transactions and relations, would be remiss to maintain its focus exclusively on dyadic issues at the detriment of triadic and broader network-structural issues.

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[10]We tested whether the effects documented in Table 2 varied across the four industries from which we sampled buyers. We found no statistically significant differences (i.e., beyond what we would expect from chance alone). So, although we can conclude that our findings are robust across these four industries, it is possible that other, more theoretically salient sources of variation across industries exist.

[11]For a discussion of this issue and empirical evidence, see Wuyts and colleagues (2002).

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