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The value of downstream information:
exploring the effects of business networks on buyer-supplier relationships

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The value of downstream information:
effects of network subgroups on relationship collaboration

Abstract

Research has emphasized the importance of networks to marketing relationships. Building on the literature, we argue that networks contain subgroups of firms with similar function in the market. The approach to network subgroups allows firms to concentrate efforts on the relevant ones and not on the whole network. The literature in demand orientation indicates that relevant subgroups are located close to end consumers. They are firms in the retail and wholesale business, called downstream network subgroups. We develop hypotheses about the impact of information firms obtain from downstream network subgroups on three dimensions of collaboration: joint planning and joint problem solving, and flexibility. Data was gathered in the Dutch potted plant and flower industry. The findings show that relationship collaboration is contingent to the information obtained from downstream network subgroups. We checked the differences between collaboration in selling relationships and purchasing relationships. Results show no difference in the relationships. Both of them are influenced by the information obtained from downstream subgroups. Our study shows that information that flows from the subgroups is valuable because it may allow firms to safeguard and coordinate collaboration in business relationships.

Keywords: network subgroups, relationship collaboration, information

1. Introduction

Research has emphasized the importance of a firm's network to relationship management. There is evidence that the network has an impact on alliance performance (Baum, Calabrese & Silverman, 2000), inter-organizational learning (Powell, Koput & Smith-Doerr, 1996), relationship collaboration (Dyer, 1996), commitment (Blankenburg Holm, Eriksson & Johanson, 1999) and flexibility (Wathne & Heide, 2004). However, evidence remains uncovered on the particular network ties that impact the relationship management. One of the key ideas in the literature is Burt´s (1980) analytical approach to network subgroups, according to which a set of direct ties with firms operating similarly in the market become a valuable source of information. The approach to network subgroups allows firms to concentrate efforts on the relevant ones and not on the whole network. This is in line with Salancik´s (1995) advice to avoid "not seeing the trees for the forest". Therefore, there is a need to understand the subgroups within a network that provides information to foster business relationships.

In the marketing literature, scholars have claimed the need to turn firm's orientation to quickly capture consumers' demand (Fournier & Mick, 1999). Firms may set up ties with other firms that are close to end consumers. In a network subgroup concept, it means that firms may exploit advantages of the information obtained from subgroups located downstream the value chain. The downstream network subgroups (DNS) may offer timely access to information about consumers, which allow firms to become earlier aware of changes in demand than their competitors.

In this paper, we aim to study the impact of information obtained from the DNS on the relationship collaboration. Research showed that collaboration is essential for relationship management (Morgan and Hunt, 1994). Collaboration is a departure from the anchor point of dis-

creteness that underlies spot-market transactions toward a relational exchange (Dyer & Singh, 1999). The complexity of any relationship collaboration requires mechanisms to safeguard and coordinate. We argue that ties with firms in the DNS may offer timely information that allows firms to collaborate further with a partner. For instance, once a manufacturer maintains close ties with retailers and distributors (i.e. ties of DNS), the manufacturer obtains information about the reactions of consumers to its products. In this way, manufacturer can more quickly adapt production processes to improve packing. Very often adjustment is dependent on adjustments of the partner. Therefore, collaboration may be contingent to the information obtained from the DNS.

By testing this contingent effect, we can isolate information as the central benefit of a firm's DNS and consider this information as supportive in terms of safeguarding and coordinating the relationship collaboration. The key contribution of this paper to the literature of network and relationship management is to show that the source (i.e. subgroups) within the network may have different impact on the way relationships are managed.

A survey was conducted to test the hypothesis including a sample of suppliers and merchant distributors of potted plant and flower in the Netherlands. This industry was chosen, because it is one of the most important sectors in the Dutch agribusiness with a 2001 sales volume of over €3 billion, accounting for more than 65% of the total world trade in flowers and plants (Ministry of Agriculture, Nature and Food Quality, 2002).

The next section of the paper discusses the concept of network subgroup and after the matter of collaboration to relationship management. In section 4, we present the rationale of our hypotheses. Section 5 presents the study domain and the constructs used in the statistical estimations. At the end, we show the results, discussions and concluding remarks.

2. Network Subgroups

Building on social exchange literature, researchers in the past decade have moved beyond the dyadic level to look at the effects of the overall set of network ties in which firms are embedded (Granovetter, 1985). Networks have also received attention in a wide range of organizational literature, from sociology to management and economics. From these fields a network perspective has emerged which views organizations as embedded in a set of ties that both facilitate and constrain them by guiding their interests and ability to take actions (Powell, 1990; Nohria and Eccles, 1992). Underlying embeddedness is the quest for information to support organizational actions (Granovetter 1985). Gulati and Gargiulo (1999) argued that information passed through networks is 'thicker' than information obtained in the market and freer than that communicated in a hierarchy. The information transmitted through the network may regard commercial matters (e.g. price formation, quality and quantity data), and proprietary and tacit types of information, such as how to improve production processes and logistics (Uzzi, 1997). Firms in a network may bring social capital to other network members in the form of information, which can be used as a source of reputation, contacts and referrals. Firms may also share expert interpretations of information. For example, specialized associations frequently release reports on the market, tendencies and trends. The interpretation and applicability of such information is even more important than the transmission of the information itself. The information then reflects the stock of expertise within a network that is not always written down or even formally expressed but may nevertheless be essential to a firm's effective operation.

Recent literature has emphasized the need for identification of specific ties within the network (e.g. Wuyts et al 2004). Selecting subgroups and establishing their importance is critical because there might be innumerable potential ties with different organizations (Ritter, 2000).

Following Burt's (1980) suggestion to find a proper degree of actor aggregation to study networks and considering Salancik's (1998) warning about defining a proper actor aggregation, network subgroup refers to firms operating similarly in the market. The concept of network subgroups is analogous to the idea of layers in netchain analysis (Lazzarini, Chaddad and Cook, 2001). The layers are composed of horizontal ties between firms within a particular group which are sequentially arranged in the supply chain based on the vertical ties between firms in different layers. Following Lambert and Coopers (2000), the members of a supply chain include all firms with whom the focal firm interacts directly or indirectly through its suppliers or customers, from the point of origin to the point of consumption. The concept of network subgroup is depicted in figure 1.

INSERT FIGURE 1 ABOUT HERE

The focal firm A is the central unit of analysis. It is from this firm's point of view that all other organizations are located in the network. Subgroups may be located upstream in the chain (e.g., input suppliers) and downstream in the chain (e.g., wholesalers and retailers). The information firm A obtains from the DNS may influence the collaboration with firm B. Before developing specific hypotheses about DNS, we discuss the matter of collaboration in relationships.

3. Relationship Collaboration

Collaborating partners work together to achieve mutual goals (Anderson and Narus, 1990; Morgan and Hunt, 1994). In business relationships, organizational boundaries are penetrated by the integration of activities as the supplier becomes involved in activities that traditionally are considered the buyer's responsibility and vice-versa (Yilmaz and Hunt, 2001). Collabo-

ration is a departure from the anchor point of discreteness that underlies spot-market transactions toward a relational, bilateral exchange. In the literature, collaboration entails activities undertaken jointly rather than unilaterally (Heide, 1994; Zaheer and Venkatraman, 1995) as well as the flexibility to make adjustments (Noordewier, John and Nevin, 1990; Bello and Gilliland, 1997).

Joint action comprises joint planning and joint problem solving. Joint planning refers to the collaborative activities by which future contingencies and consequential duties and responsibilities in a relationship are made explicit ex ante (Heide and John, 1990). It is an activity that operates as an aid or frame of reference rather than a strict specification of duties as in a contract. Plans represent frameworks within which subsequent adaptations (e.g., joint problem solving) can and are expected to be made (Macneil, 1981). When one partner's actions influence the ability of the other partner to compete effectively, the need for jointly set goals, long-term plans, responsibilities and expectations increases. Dwyer, Schurr and Oh (1987) suggested that input to decisions and goal formulation are important aspects of joint planning and improve planning performance. Joint planning then allows mutual expectations to be established and collaborative efforts to be specified at the outset.

Joint problem solving refers to joint activities to resolve disagreements, technical failures and other unexpected situations (Lush and Brown, 1996; Heide and Miner, 1992). It motivates firms to continue their relationship because it assures them the ability to reach mutually satisfactory solutions (Calantone, Graham and Wimsatt, 1998). Firms often attempt to persuade each other to adopt a particular solution to a problem situation. In collaboration, these persuasive attempts are more constructive than coercive or dominative (Dwyer, Schurr and Oh, 1987). Furthermore, integrative outcomes satisfy more fully the needs and concerns of parties in a business relationship (Mohr and Spekman, 1994).

Flexibility to make adjustments is the bilateral expectation of willingness to make adaptations in day-to-day management (Heide and John, 1990). The partners accept smooth alterations in practices and policies in the light of unforeseen or changing conditions. Flexibility is an essential relational norm (i.e., an expected pattern of behavior, Macneil, 1981), which establishes the ground rules for the initial and future exchanges (Heide and John, 1990). In short-term trade, flexibility is external to the relationship and is achieved by deliberately limiting the transaction's scope (Macneil, 1981). In a longer term relationship, however, flexibility is incorporated into processes and defines the bilateral expectation of willingness to make adaptations as circumstances change. From a supplier's perspective, it represents a guarantee that the relationship will be subject to good-faith modification if a particular practice proves detrimental in the light of changed circumstances.

The joint problem solving together with joint planning and flexibility to adjustments are important elements of relationship collaboration and may be influenced by the information firms obtain from the downstream network subgroup. The specific hypotheses are discussed in the next section.

4. Hypotheses

Research has long recognized networks as supporting the relational governance of transactions (Granovetter, 1985: 503). According to Saxenian (1991), firms act in a complex environment in which no relationship can really be understood without reference to relationships with many others. Previous researches found evidence that networks influence collaboration. Dyer (1996) studied the preferred-supplier approach used by American and Japanese automobile manufacturers. He found that a fluid information flow between the parties and also among other suppliers supported close interactions among suppliers' technicians and the engineers employed

by Japanese manufacturers. By this means, Japanese manufacturers were building high degree of collaboration with suppliers. In the same line of findings, Saxenian (1991) and Wuyts et al (2004) in the computer industry and Larson (1992) in the clothing industry found evidence of interactions between not only the direct participants in a specific buyer-supplier relationship but also between other suppliers and customers. These interactions create an atmosphere of supportive social relations with information flows providing opportunities and access to resources. Gulati, (1998) and Kogut, (2000) studied the direct combination of resources via networks. Essential to this approach is the role of 'hub firms', which set up the network and play a proactive role in appropriating the necessary resources. Researchers in Europe have pointed out that stable long-term linkages among industrial manufacturers sharing R&D facilitates the joint development of resources and personnel (Johansson and Matson, 1985). Swedish construction firms invest in connections with other firms and pool information that fosters joint resource integration and innovation and blurs independent identities (Hakansson, Havila and Pedersen, 1999).

While previous research showed that the whole network influences the collaboration, there is a need to understand the impact of the valuable information from the DNS. Overall, the rationale behind the impact of the valuable information follows the need to set up mechanisms to safeguard and coordinate the relationship collaboration. Consumers influence company's actions. The DNS are close to consumers and may offer timely information about the demand. Obtaining information from the DNS allows a firm to predict future action of its buyers, which guard the investments made to develop collaboration. In addition, firms may fell confident to integrate further activities because of the information from the DNS. According to this rationale, we developed a set of hypothesis about the impact of information from the specific DNS.

4.1 Joint planning and joint problem solving

Joint planning deals with the ex ante issues in relationships. Future plans and strategic decisions can take into account the information obtained from the DNS. Information on trends and product demands are timely transmitted through the ties with firms located close to end consumers. The planning will rely on important information about demand and firms will be willing to share the future actions. Thus, we expect that valuable information obtained through a network will support joint planning with a counterpart.

H1: The more information a firm obtains from the downstream network subgroups, the higher the degree of joint planning.

Joint problem solving is related to ex-post actions in relationships. Many problems in relationships relate to the definition of sales conditions, and resolving such problems is dependent on information (Stern, El-Ansary and Coughlan, 1996). Information gathered from DNS supports the negotiation of price, quantity and quality of products. As consumers dictates the way businesses are conducted, a mutual satisfactory solution may be reached by the information obtained from the DNS. Firms may be more willing to solve problems quickly as valuable information about consumers is brought to the table. Further, common production and logistical problems might be faced by a number of buyers, some of which will be able to suggest alternative solutions (Jarillo, 1993). Considering the DNS similar positive effect on joint planning and joint problem solving, the related hypothesis is as follows:

H2: The more information a firm obtains from the downstream network subgroups, the higher the degree of joint problem solving.

4.2 Flexibility of adjustments

Information obtained through the DNS promotes flexibility. Firms with access to information tend to develop positive bilateral expectations of their partner, which makes them inclined to adapt as circumstances change. The changes may be in response to, e.g., market fluctuations or shifting buyer's demands. The information from the DNS represents a guarantee that a relationship is subject to good-faith modification if a particular practice proves detrimental in the light of changed circumstances. Flexibility is an expected behavioral norm, which establishes a positive attitude to adopt requests for adjustment (Macneil, 1981). For instance, a firm's ties with its customers can help it learn of new consumer wishes, which may support flexibility. End consumers might be willing to buy different colors or sizes of the same product; buyer's customers (e.g., retailers) can provide suppliers with valuable information on end customers because they are farthest downstream in the chain. In addition, information provided by buyers can support price setting. We then expect information provided by the DNS to support flexibility in making adjustments. Consequently, the hypothesis is as follows:

H3: The more information a firm obtains from the downstream network subgroups, the higher the degree of flexibility to make adjustments.

In this study, we included four control variables. The *length of business interaction* might create incentives to further collaborate in a relationship. In other words, older relationships are more familiar and comfortable. Adjustments and shared problem solving have been experienced (Anderson and Weitz, 1989) and consequently firms in longer relationships are likely to invest more in the collaboration. *Environmental volatility and diversity* may increase information asymmetry and encourage parties to behave opportunistically. Under a high degree of environmental volatility and diversity, firms will be less willing to collaborate (Ganesan, 1994). *Firm size and counterpart size* may affect collaboration. It is reasonable to suppose that larger firms

have become so by virtue of achievement, which suggests a general intention to invest and take some risks (Lusch & Brown, 1996). We also included a measure of direct channels distribution (Stern, El-Ansary & Coughlan, 1996). The transactions between supplier and buyer that occur directly with no interference of a third party are called fixed lines. In direct modes, transactional parties make every decision independently and have enough incentive to collaborate.

5. Methodology

5.1 Sample Characteristics

The potted plant and flower industry is one of the most important sectors in the Dutch agribusiness. Dutch merchant distributors (called buyers in this study) are firms such as wholesalers, cash-and-carries and garden centers. Among the about 1,500 merchant distributors concentration is very much the watchword: the largest 4% (those with sales of more than €12 million) control nearly half of the purchases. Florists are the dominant retailers in the industry, representing 52% of the outlets, street sellers account for 27% of outlets, followed by supermarkets. But in some countries supermarkets account for the majority of sales, for instance, 45% in the UK and even 65% in Switzerland.

The Netherlands is renowned for its auctions. More than 92% of the trade between growers of potted plants and flowers (called suppliers in this study) and their buyers in this sector is affected under the services of the auctions (Ministry of Agriculture and Food Quality, 2002). The two largest, namely Aalsmeer and Flora Holland, account for more than 80% of the total trade between suppliers and buyers. The auctions offer infrastructure for the trade in two distinct

channels, namely fixed lines and the auction clock. The Dutch auction clock system works via the price-reduction principle, in which the price is adjusted downward until the product is sold to the first buyer to respond. Our paper focuses on the other channel, called 'fixed lines'. Nowadays, this channel includes about one-third of the total potted plant and flower sales, as opposed to less than 5% only five years ago. It is expected to continue to grow in the future, because the fixed lines present advantages for both buyers and suppliers. For instance, buyers are assured of the necessary quantity of potted plants, delivered at the requested date, time and place and at a fixed price. Also, suppliers know the price they will get, since it is negotiated in advance. In this way, they are no longer dependent on the auction clock with its unpredictable prices and product volumes.

5.2 Data collection and research instrument.

The data were collected in 2002. The Aalsmeer Auction provided a list of 600 supplier companies and 350 buyer companies. The list was screened to eliminate non-qualifying companies. The supplier list was found to contain 32 non-eligible companies (e.g., foreign companies, liquidated companies and duplicate addresses) and the buyer list 8 non-eligible companies, which were excluded from the final list. Our data collection effort yielded 202 responses of supplier companies, of which 28 were incomplete questionnaires and non-eligible companies (31% response rate). From the buyers we received 67 usable questionnaires (20% response rate).

A standardized survey questionnaire was used that consists of 60 precoded questions. For most of the items Likert 7-point response format were used, and a limited number of items were assessed with 2 to 5-point response formats. When responding to the questions about collaboration and network subgroups, informants were asked to consider their relationship with a regular partner via fixed lines. For the suppliers, respondents were asked about a (preferred) buyer; for

the buyers, respondents were asked about a (preferred) supplier. This approach allowed exploring differences in the perspective of selling relationship and purchasing relationship.

Before the data collection started the questionnaire was tested in a case study design, including 5 supplier companies (5 to 45 employees) and 4 buyers companies (180 to 550 employees). The input from a panel composed of faculty members and industry experts was also particularly helpful in creating the different measurement scales and individual items. Table 1 shows the items used in the questionnaire.

INSERT TABLE 1 ABOUT HERE

The network subgroup construct refers to a set of ties with firms operating similarly in the market that influence (i.e. informational benefits) a business relationship (Cook & Emerson, 1978). This measure was developed based on Anderson, Hakansson and Johanson (1994), and Blankenburg, Eriksson, and Johanson (1999). The downstream network subgroup (DNS) comprises of other buyers (e.g. wholesalers, flower exporters, cash-and-carries and garden centers) and buyers' customers (e.g. supermarkets, flower shops and street sellers). The informational benefits include three areas: setting prices, quantities and qualities; coordinating production processes and logistic operations; and foreseeing possible future actions of the counterpart. The DNS then reflects the degree of the impact of information obtained from the network subgroups of other buyers and buyers' customers that supports the relationship with a selected counterpart.

To check for the impact of other network subgroups, we asked also respondents to assess the ties with firms located upstream (input suppliers such as young plants and seeds and firms that supply fertilizers, chemical products, pots, vases, etc.). In addition, respondents assessed the ties with peers and agents of the auction cooperatives (third party).

The collaboration construct has three dimensions: joint problem planning and joint problem solving and flexibility. *Joint planning* is defined as the extent to which future contingencies, and consequential duties and responsibilities in a relationship, have been made explicit ex ante (Heide & Miner, 1992). Items on joint planning refer to the proactive joint setting of goals and making the future of the relationship foreseeable. *Joint problem solving* is defined as the extent to which joint activities are organized to resolve disagreements, technical failures and other unexpected situations (Heide and Miner, 1992; Lusch and Brown, 1996). Problem solving is reactive by nature, and items measuring this aspect also encompassed the parties' attitude toward the joint solutions to problems in the relationship. The norm of *flexibility* is defined as the extent to which a partner shows an accommodating response to changing circumstances (Heide, 1994).

The *length of business interaction* was measured by an open-ended question as to the number of years that the respondent had done business with the selected partner. The measurement of *environmental uncertainty and diversity* captures respondents' perceptions of market volatility and diversity. It was assessed by five items with a Likert scale based on a previous study (Klein, Fraizer & Roth, 1990). The measurement of *firm size* comprised different instruments for each side of the relationship. In the supplier sample, firm size was measured on a categorical scale based on annual sales in the year 2001. A five-interval scale was used for the supplier size variable (respondent), and a three-interval scale was used for the buyer size variable (partner). For the buyer sample, the firm size was also measured on a categorical scale based on annual sales in the year 2001. For the buyer size we used a seven-interval scale (respondent) and for the supplier size a three-interval scale (partner). The *fixed lines* variable reflects the percentage of sales (in the sample of suppliers) or purchases (in the sample of buyers) through the me-

diation department of the Dutch flower cooperatives, which refers to non-auction-clock transactions.

We carefully checked the validity (discriminant, convergent and content) and reliability using Cronbach's alpha, composite reliability, and extracted variance of the measures and the sample's non-response bias. In all cases Cronbach's alpha was sufficiently high (> .7) to warrant confidence in the internal consistency of the scales. The correlations between the constructs did not suggest problems of pairwise colinearity that would preclude the use of all constructs in one equation. Table 2 and Table 3 display the correlation matrix of the supplier and buyer sample respectively.

INSERT TABLE 2 ABOUT HERE

INSERT TABLE 3 ABOUT HERE

6. Results

The characteristics of the companies that participated in our survey show the representativeness of our samples. Only 10% of the supplier and the buyer companies count more than 60 employees, and 50% has less than 15 employees. The sales difference between suppliers and buyers is apparent. While 51% of the buyers record an annual sales volume of more than €5 million, 42% of suppliers make less than €800,000 annually. However, a cross-tab of supplier size with the size of its selected buyer shows an interesting result. There is a large concentration of suppliers dealing with relatively smaller buyers. Interestingly, a cross-tab of the buyer sample shows that the buyers also deal with relatively smaller suppliers. Apparently, companies feel comfortable and therefore tend to engage in long-term relationships with partners, which resemble the company in size or are a little bit smaller.

The particular importance of these long-term relationships for the respondents is stressed by the fact that the indicated length of the long-term relationship with the selected partner in the supplier sample averages more than 8 years (sd: 5.6) and in the buyer sample over 7 years (sd: 4.67). It ranges from 1 to 30 years in the supplier sample and from 2 to 21 years in the buyer sample. 79% of the buyers have maintained this relationship for up to 10 years, while slightly fewer suppliers (70%) report having maintained a 10-year relationship.

We included a dependency variable in the questionnaire to assess the respondents' perceptions of the number of alternative counterparts in the market. In the supplier sample, 62% of respondents perceive that there are many alternative buyers in the market. In contrast with this, only 38% of the buyers perceive that there are many alternative suppliers in the market. This is in accordance with the observation that, due to the specialization of the potted plant suppliers, buyers have only limited alternatives. So, despite the fact that there are much more supplier than buyer companies, we can speculate that suppliers are less dependent and have less fear of becoming locked into an unfavorable counterpart relationship.

In the hypotheses testing, we estimated several independent ordinary least squares regressions for each sample. The downstream network subgroup, other subgroups and control variables served as the independent variables and the elements of relationship collaboration as the dependent variables. Table 4 presents the results of the supplier and buyer sample. Standardized coefficients and *t-test* of the estimated regression models are reported. The adjusted R^2 for equations ranges from 0.105 to 0.258. The explanatory power of the equations supports the further examination of individual coefficients, to check the effects of the downstream network subgroups and the control variables on the relationship collaboration.

INSERT TABLE 4 ABOUT HERE

In the supplier sample, there are several positive significant effects of the information from the downstream network subgroups on relationship collaboration. We find moderately significant coefficient to support H1 and H2. The results show that information from buyers' customers influence joint planning (β=.15, $p<.10$) and there is no significant effect of other buyers, which partially support our hypotheses H1. Information from other buyers (β=.15, $p<.10$) and buyers' customers (β=.17, $p<.10$) influence joint problem solving. This supports our hypothesis H2. Other buyers have a positive significant effect on flexibility of adjustments (β=.18, $p<.05$), as hypothesized (H3). However, there is no significant impact of buyer's customers on flexibility, which suggest that H3 is partially supported. None of the other network subgroups presented significant effects on collaboration, except a positive effect of other suppliers on joint planning (β=.18, $p<.05$). Two control variables influence collaboration, consistent with previous research. Firm size has a significant positive effect on all the elements of collaboration: joint planning (β=.15, $p<.01$), joint problem solving (β=.24, $p<.01$) and flexibility (β=.17, $p<.05$). The percentage of fixed lines has a positive significant effect on joint problem solving (β=.20, $p<.01$) and flexibility (β=.19, $p<.01$).

In the buyer sample, downstream network subgroups affect positively collaboration as suggested in our hypotheses. Buyer's customers have a positive significant effect on joint problem solving (β=.34, $p<.01$) and joint planning (β=.33, $p<.01$). The subgroup of other buyers strongly affects joint planning (β=.44, $p<.01$), but has no significant effect on joint problem solving. These results support H2 and partially H1. We found support for hypothesis H3. The network subgroups influence positively flexibility of adjustments (Other buyers: β=.41, $p<.01$; Buyers' customers: β=.27, $p<.01$). None of the other network subgroups affects collaboration, except a moderately negative effect of first-tier suppliers on flexibility. Two control variables influence

collaboration. Length of the business relationship strongly affects collaboration: joint planning (β=.40, p<.01), joint problem solving (β=.30, p<.01) and flexibility (β=.44, p<.01). The percentage of fixed lines influences joint planning (β=.24, p<.05).

7. Discussion

In the supplier sample, collaboration is contingent on the information provided by DNS. Valuable information flows from supermarkets, florists and street sellers, who are likely to dictate the necessary investments on joint action between supplier and its distributor partner. Previous studies showed that investments in demand-oriented chains are steered by retailers that are close to consumers and can quickly perceive consumers' needs (Myers, Daugherty and Autry, 2000). Information from these retailers can be helpful in finding solutions for problems and in discussing future plans with the counterpart in the relationship. The information that suppliers obtain from wholesalers, flower exporters and other kind of buyers increases the joint problem solving. Joint problem solving is a dimension of collaboration, which is significantly influenced by the downstream network subgroups. Interestingly, joint planning is also fostered by information upstream in the chain. The other suppliers can offer information about the actual situation of the supply side of the chain and that adds up to the information that flows from retailers downstream in the chain. The DNS of other buyers positively influences the norm of flexibility. This suggests that suppliers obtain information from other buyers that encourages a positive attitude toward adjustments when difficult situations in a relationship unfold.

In the buyer sample, the downstream network subgroups, namely other buyers and buyer's customers, were significantly related to the elements of collaboration. Although the business relationship is analyzed in this sample from the purchasing perspective, the demand orientation of buyers appears to be evident. The relationship that the buyers maintain with a pre-

ferred supplier (i.e. selected while answering the questions in the questionnaire) is contingent on the information from retailers and other buyers.

Examining the selling and purchasing perspective together, a pattern is noticeable in the buyer and supplier samples. The information from the DNS significantly affects several elements of collaboration. This contrasts with the results of a previous study on industrial marketing, which found suppliers to be strongly connected to first-tier suppliers (Blakenburg & Eriksson, 2000). Also, the conventional wisdom in purchasing literature emphasizes the upstream actors in a chain as the most important sources of information for buyers (for a review see Boer, Labro & Morlacchi, 2001). In our study, the information that firms obtain from ties downstream in the chain (e.g. retailers and distributors) fosters collaboration more than other network subgroups. The results support our argument that network needs to be addressed in its subgroups and not as a whole. We found evidence that DNS affect relationship collaboration.

7. Concluding Remarks

The image of atomistic actors competing for profits against each other in an impersonal marketplace is increasingly inadequate. The business environment creates a positive climate for firms to be embedded in networks of social, professional and exchange relationships with other organizations and actors (Granovetter, 1985; Jarillo, 1988; Gulati, 1998). The need to find a proper actor aggregation was pointed out in previous research (Burt, 1980). In this paper, we defined network subgroups as a set of firms operating similarly in the market and focused on the valuable information obtained from these subgroups. The information that flows in a network is valuable because it may allow firms to safeguard and coordinate collaboration in a specific business relationship.

This paper provides evidence that collaboration is contingent on the information companies´ obtain from the downstream network subgroups (DNS). While several studies claim that the whole network is essential for business purpose, our study shows that firms focusing on the DNS may increase the degree of joint problem solving, joint planning and flexibility of adjustments. The comparison among the individual network subgroups raised an interesting discussion about consumer oriented approach and redundancy in networks. This suggests that one may consider a decomposition of the network by focusing on the downstream network and perhaps evaluate the information value of the network in demand-orientated chains.

Regarding our contribution to the network school, this study shows the analytical importance of identifying the sources dimensions of the business network. Investigating the sources contributed to our analysis of the information effects of the network. Our empirical evaluation of networks showed that the more information a firm obtains from the downstream network subgroups the more a firm is encouraged to be engaged in collaborative forms of governance. Therefore, we found empirical evidence for the theoretical discussion of Cook and Emerson (1978), Granovetter (1985) and Powell (1990). Cook and Emerson (1978) and researchers of the European IMP group (Hakansson & Johanson, 1993; Blakemburg & Erikson, 2000) claimed that the network is formed by relationships that are connected to the degree that exchange in one relation is “contingent” upon exchange (or non-exchange) in the other relationship. Our study supported the idea that the “contingent effect” refers predominantly to the impact of information that flows through the connected relationships with firms downstream the chain, such as retailers and distributors. Moreover, Granovetter (1985) and Powell (1990) emphasized the importance of the network to increase the level of collaboration and also that the information functions as a mechanism for safeguarding collaboration. By examining our two samples, we found support to most

of our hypotheses. Thus, the results of the survey provided sufficient evidence to support the theoretical discussions at hand.

Limitations

Some limitations must be considered. Our study used a cross-sectional design, thus preventing the investigation of the dynamic effects of the network and the elements of the buyer-supplier relationship. Further work can consider a longitudinal study to investigate the framework at different points in time. Our study domain was firms in the Dutch potted plant and flower industry. This might limit the generalizability of our conclusions. Further research is encouraged to replicate the research in a different setting, such as another country or product. We concentrated our analysis on some elements collaboration. Future research can investigate the influence of DNS on for instance trust and performance.

Managerial Implications

Managers may use our study and its empirical evidence as a check on the adequacy of their existing network and the type of information benefits it might provide. Firms should weigh the entire set of significant network effects in our study in making decisions about the degree of flexibility and joint action. Information obtained from the network can reduce information asymmetry, increase coordination and offer safeguarding benefits. The mere process of making contacts and cross-checking information with members of the network may lead to an improvement of decision making by managers. It is also important for managers to have accurate perceptions of the impact of information from the network. If managers either under- or overestimate the positive impact of information from the network, their efforts will be misguided, eventually dampening performance.

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Figure 1: Model for network subgroups and focal relationship (A to B)

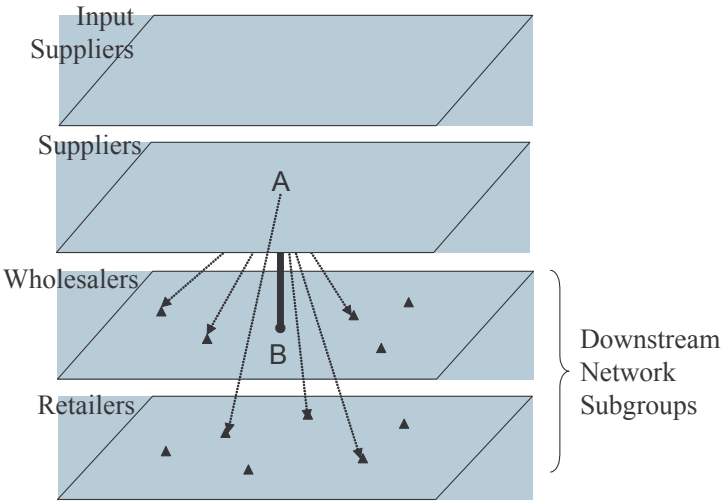

Table 1: Items of the questionnaire

Network Subgroups *(7*-point Likert scale, "not at all"–"very much"*)*
Downstream Network Subgroups

- Buyer's customers (retailers) network subgroup,
supplier sample α = .95; buyer sample α = .92

We get information from buyer's customers, which supports us:
- in defining prices of products for the selected buyer (supplier).
- in defining quantities of products to sell to the selected buyer (supplier).
- with the logistic operations of products that we sell to the selected buyer (supplier).
- with the production process of the products that we sell to the selected buyer (supplier).
- to foresee future actions of the selected buyer (supplier).

- Other buyers (Wholesalers) network subgroup,
supplier sample α = .84; buyer sample α = .93

We get information from other buyers, which supports us:
- in defining prices of products for the selected buyer (supplier).
- in defining quantities of products to sell to the selected buyer (supplier).
- with the logistic operations of products that we sell to the selected buyer (supplier).
- with the production process of the products that we sell to the selected buyer (supplier).
- to foresee future actions of the selected buyer (supplier).

Other network subgroups

- Input suppliers network subgroup, supplier sample α = .89; buyer sample α = .97

We get information from first-tier suppliers, which supports us:
- in defining prices of products for the selected buyer (supplier).
- in defining quantities of products to sell to the selected buyer (supplier).
- with the logistic operations of products that we sell to the selected buyer (supplier).
- with the production process of the products that we sell to the selected buyer (supplier).
- to foresee future actions of the selected buyer (supplier).

- Other suppliers network subgroup, supplier sample α = .81; buyer sample α = .93

We get information from other suppliers, which supports us:
- in defining prices of products for the selected buyer (supplier).
- in defining quantities of products to sell to the selected buyer (supplier).
- with the logistic operations of products that we sell to the selected buyer (supplier).
- with the production process of the products that we sell to the selected buyer (supplier).
- to foresee future actions of the selected buyer (supplier).

- Auction agents (third party) network subgroup,
supplier sample α = .91; buyer sample α = .92

We get information from agents of the cooperative, which supports us:
- in defining prices of products for the selected buyer (supplier).
- in defining quantities of products to sell to the selected buyer (supplier).
- with the logistic operations of products that we sell to the selected buyer (supplier).
- with the production process of the products that we sell to the selected buyer (supplier).
- to foresee future actions of the selected buyer (supplier).

Table 1: Items of the questionnaire (continued)

Collaboration (7-point Likert scale, "not at all"–"very much")

- *Joint planning,* supplier sample α = .70; buyer sample α = .85
  Our company plans volume demands for the next seasons together with this buyer (supplier).
  Our company plans the new products and varieties demands for the next seasons together with this buyer (supplier).
  This buyer (supplier) provides us with sale forecasts for the products our company sells to them.
  Our company shares long-term plans of our products with this buyer (supplier).

- *Joint problem solving,* supplier sample α = .87; buyer sample α = .89
  This buyer (supplier) and our company deal with problems that arise in the course of the relationship together.
  This buyer (supplier) and our company do not mind owing each other favors.
  In most aspects of the relationship with this buyer (supplier), the responsibility for getting things done is shared.
  This buyer (supplier) and our company are committed to improvements that may benefit the relationship as a whole.

- *Flexibility to make adjustments*

supplier sample α = .60; buyer sample α = .70
  Our company is flexible in response to changes in the relationship with this buyer (supplier).
  This buyer (supplier) makes adjustments to maintain the relationship with our company.
  When some unexpected situation arises, this buyer (supplier) and our company work out a new deal.

Table 2: Correlation matrix, mean and standard deviation of the supplier sample

	Mean	SD	OB	BC	OS	IS	CA	JPS	JP
Other buyers (OB)	2,7	1,7	1						
Buyer's customers (BC)	2,9	1,4	**,41(**)**	1					
Other suppliers (OS)	2,6	1,5	**,43(**)**	**,27(**)**	1				
Input suppliers (IS)	2,4	1,4	**,44(**)**	**,38(**)**	**,26(**)**	1			
Cooperative agents (CA)	3,1	1,6	,09	-,05	**,22(**)**	,03	1		
Joint Problem Solving (JPS)	5,6	1,4	**,18(*)**	**,19(*)**	,06	,04	-,09	1	
Joint Planning (JP)	2,8	1,4	**,34(**)**	**,34(**)**	**,24(**)**	**,29(**)**	,01	**,29(**)**	1
Flexibility (Flex)	4,9	1,6	**,21(**)**	**,18(*)**	,08	,08	-,04	**,53(**)**	**,43(**)**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 3: Correlation matrix, mean and standard deviation of the buyer sample

	Mean	SD	OB	BC	OS	IS	CA	JPS	JP
Other buyers (OB)	3.1	1.6	1						
Buyer's customers (BC)	3.7	1.9	**,39(**)**	1					
Other suppliers (OS)	3.0	1.6	**,40(**)**	**,52(**)**	1				
Input suppliers (IS)	1.9	1.4	**,36(**)**	**,36(**)**	**,51(**)**	1			
Cooperative agents (CA)	3.3	1.8	,08	**,29(*)**	,18	,14	1		
Joint Problem Solving (JPS)	5.6	1.4	,20	,06	,01	-,11	-,05	1	
Joint Planning (JP)	3.4	1.8	**,38(**)**	**,29(*)**	**,25(*)**	,17	,07	**,39(**)**	1
Flexibility (Flex)	4.8	1.5	**,33(**)**	**,34(**)**	**,29(*)**	,15	,07	**,61(**)**	**,59(**)**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4: Results of the regression analysis

Predictor	Supplier			Buyer		
	Joint Problem Solving	**Joint Planning**	**Flexibi-lity**	**Joint Problem Solving**	**Joint Planning**	**Flexibi-lity**
Downstream ties						
Other buyers	**0.15**†	0.13	**0.18***	0.22	**0.44****	**0.41****
	(1.71)	(1.50)	(1.96)	(1.35)	(2.90)	(2.67)
Buyer's customers	**0.17**†	**0.15**†	0.09	**0.34****	**0.33****	**0.27***
	(1.77)	(1.73)	(1.02)	(2.32)	(2.51)	(2.00)
Other ties						
First-tier suppliers	–0.06	0.09	–0.06	–0.21	–0.20	**–0.26**†
	(0.72)	(1.03)	(0.65)	(1.32)	(1.38)	(1.74)
Other suppliers	0.13	**0.18***	–0.02	–0.24	–0.11	0.03
	(1.51)	(2.09)	(0.24)	(1.38)	(0.71)	(0.17)
Broker agents	–0.12	–0.07	–0.03	0.01	0.06	0.08
	(1.60)	(0.91)	(0.35)	(0.11)	(0.51)	(0.71)
Control variables						
Length of business interaction	0.07	0.09	0.01	**0.30****	**0.40****	**0.44****
	(0.94)	(1.28)	(0.10)	(2.05)	(3.00)	(3.25)
Environmental volatility and diversity	–0.04	0.07	–0.10	0.01	0.03	–0.06
	(0.55)	(0.98)	(1.40)	(0.11)	(0.25)	(0.49)
Firm size	**0.24****	**0.15****	**0.17***	–0.13	–0.10	0.07
	(3.26)	(2.06)	(2.20)	(0.97)	(0.86)	(0.60)
Buyer size	–0.11	–0.07	–0.03	–0.19	–0.08	–0.20
	(1.46)	(1.01)	(0.33)	(1.47)	(0.65)	(1.64)
% of fixed lines	**0.20****	0.08	**0.19****	0.22	**0.24***	–0.05
	(2.45)	(1.02)	(2.36)	(1.48)	(1.75)	(0.33)
R^2 adj	0.151**	0.174**	0.115**	0.105†	0.258**	0.249**

**p<0.01, *p<0.05, †p<0.10 (two-tailed).

Note: Regression coefficients are standardized coefficients β) and |t-test| within parentheses.