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The Impact of Downstream Network Subgroups on Collaboration and Performance: A Survey of Buyer-Supplier Relationships in the Dutch Flower Sector

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Abstract

In this paper, we aim to identify those network subgroups that enhance the collaborative governance in a focal buyer-supplier relationship. We argue, that partners in a focal buyer-supplier relationship can be seen as embedded in a broader network of business relationships with network subgroups, (e.g. other buyers, buyers customers), which pro-vide information that can support the collaborative governance, assessed by flexibility, joint planning and joint problem solving, by lowering the level of information asymmetry between the partners. Empirical evidence was gathered through a mailed questionnaire returned by 175 Dutch suppliers of potted plants and flowers. Our results show the importance of the information provided by the network subgroups to manage the focal buyer-supplier relationships and ultimately the impact on performance. Interestingly, although five network subgroups were mentioned in the questionnaire, suppliers only obtained reliable information for their focal relationship from the downstream subgroups of other buyers (i.e. merchant-distributors) and buyer's customers (i.e. supermarkets and flower shops). In order to avoid redundancy, managers in seeking information in their business network should not consider the network as a whole, but rather the downstream subgroups.

1. Introduction

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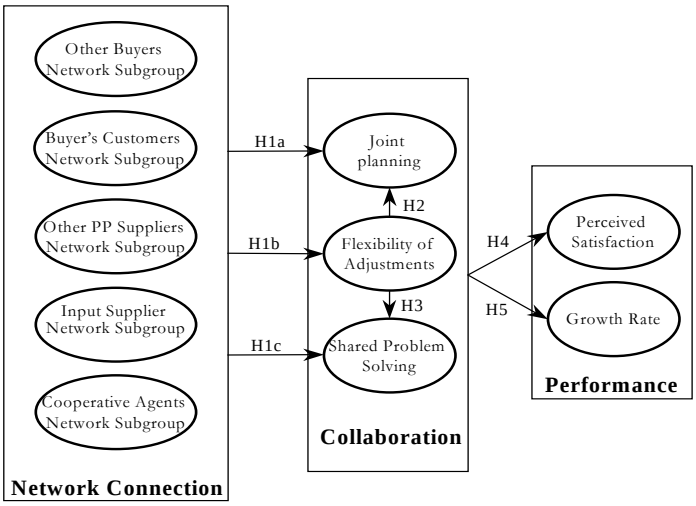
In this article, we propose that considering network connections allows a more refined understanding of the relational governance of a buyer-supplier relationship in marketing channels. Previous studies have concentrated mainly on the organizational factors related specifically to the dyadic relationship – e.g. on transaction specific investments (Dyer and Singer, 1998), trust (Anderson and Narus, 1990), commitment (Anderson and Weitz, 1989), opportunism (Stump and Heide, 1996), and on the exchange of information and data interchange between the partners (Morgan and Hunt, 1994, Kraut et al, 1999). Less attention has been directed to the influence of broader business networks on these dyadic relationships. These studies have focused on commitment (Blankenburg Holm, Eriksson and Johanson, 1999), innovation (Hakanson, Havila and Pedersen, 1999) and contractual design (Antia and Frasier, 2001). However, so far no study has investigated whether the information provided by the network connections – other firms within a business network which are somehow connected to the exchange partners in a focal business relationship – would influence the extent of collaboration between the partners in a focal business relationship. Drawing on the work of Anderson, Hakanson and Johanson (1994) and Burt (1997), we argue, that partners in a focal buyer-supplier relationship can be seen as embedded in a broader network of business relationships with network subgroups, (e.g. other buyers, buyers customers), which provide information that can support the collaborative governance by lowering the level of information asymmetry between the partners. For instance, if a supplier has difficulties to set up the proper sales conditions or is concerned about the reputation of the counterpart, he can rely on the diligent information flows in the business network to make its decision. Certainly not all the network subgroups possess valuable information and firms are typically embedded in multiple, often overlapping set of relationships, so for managers seeking efficiency, it is central to maintain connections with those network subgroups that offer valuable information with no or limited redundancy.

In this paper, we aim to determine the specific network subgroups, which provide valuable information that supports a focal business relationship in terms of its collaborative governance and ultimately its performance. In § 2 we discuss the theoretical background of the study and present the hypotheses. In § 3 we explain the research design and in § 4 the results are discussed. Finally, in § 5 the conclusions, managerial implications, and limitations and suggestions for further research are presented.

2. Theoretical Framework and Hypotheses

The research model presented in figure 1 is not a full representation of all the factors influencing a business relationship, but rather a set of hypotheses deduced from relevant characteristics of network subgroups and the business relationship. We will elaborate on the background of the model, the selected variables and hypotheses, below.

Figure 1. Research Model



Granovetter (1985) argues that information from a broader business network is valuable because it is relatively cheap, and creates consistency in the context surrounding a focal relationship. These informational benefits may include monitoring of actions of the counterpart by other connected firms e.g. as a safeguard against opportunistic behavior (Burt, 1997; Williamson, 1985), to improve the coordination of production processes (Hakansson and Snehota, 1995; Hakansson, et al, 1999), logistics (Gadde and Snehota, 2000), and the setting of a sales strategy (Stern et al, 1996). Considering that there are innumerable potential connections with different organizations to be considered (Ritter, 2000), a selection of the relevant network connection becomes vital. Following Burt's (1980) suggestion to find a proper degree of actor aggregation, we decided to use the concept of network subgroups that refers to a number of organizations with the same function in the market. The subgroups can be not only the four subgroups located upstream (e.g. colleagues/competitors and input suppliers) and downstream the market (e.g. other buyers and buyers' customers), but also the subgroup of third parties (e.g. mediation agents).

Collaboration is a departure from the anchor point of discreteness that underlies spot market transactions to a relational exchange as the roles of supplier and buyer are no longer narrowly defined in terms of the simple transfer of ownership of products (Macneil, 1981). By focusing on relational exchange, collaboration entails the activities that are undertaken jointly rather than unilaterally (Heide, 1994; Zaheer and Venkatraman, 1995). Within the framework of relational governance we propose the following variables to be central: joint planning, joint problem solving and flexibility of adjustments.

Joint planning refers to the joint activities by which future contingencies, and consequential duties and responsibilities in a relationship have been explicitly made ex-ante (Heide and John, 1990 and Heide and John, 1992). This is an action that is

basically proactive in nature, which operates as aids or frames of reference rather than 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 take place (Macneil, 1981). The supplier with good connections to downstream network subgroups is more likely to get information on new trends and new product demands, which may imply changes of the production and transportation processes, e.g. the joint planning of the focal business relationship.

Joint problem solving refers to joint activities to resolve disagreements, technical failures and other unexpected situations (Lush and Brown, 1996; Heide and Miner, 1992). This is a reactive action in which firms are looking for mutually satisfactory solutions (Calantone, Graham and Wimsatt, 1998). Even though a reactive action in nature, firms often attempt to persuade each other to adopt particular solutions to the disagreement situation. In collaboration, these persuasive attempts are more constructive than coercive or dominative (Dwyer, Schurr and Oh, 1987). Joint problem solving can be influenced by the information of the network subgroups. Several problems in business relationships are related to the definition of sales conditions (Stern et al, 1996), and the resolution linked to the problems is dependent on the information (Burt, 2001). The information gathered in the business network might support the negotiation on prices, quantities and quality of products. The problems related to production and logistic processes might have been faced by other network connections that can provide the partners with solutions to solve the problems.

Flexibility of adjustments refers to the extent to which a partner shows a flexible response to changing circumstances (Heide, 1994). Flexibility is an essential relational norm (i.e. an expected pattern of behavior, see Macneil, 1978, p.854), which establishes the ground rules for the initial and future exchanges (Heide and John, 1992). Much of the motivation for exploring the network is centered at the new logic of production that requires flexibility, as opposed to mass production (Powell, 1990). Markets for standardized goods are saturated, while higher quality and more specialized goods attract consumers. To meet the demands of this changing market place, firms adopt new modes of organization that spread production across diversified inter-organizational linkages of other buyers, suppliers, brokers, and buyers' customers. Flexibility is central in collaboration, since no plan can be implemented in full, and changes in circumstances occur (Macneil, 1981). Even the simple planning of delivery, quantities and qualities is subject to change and without flexibility of the partners it is quite likely that the relationship fails. Flexibility is necessary to cope with the changing circumstances that any supplier faces considering the complexity and risky nature of its processes, even more so in agriculture production, which is very dependent on such uncertain factors as the weather conditions. As problems emerge, the required flexibility fosters teamwork between the partners. We expect that the more a supplier receives

information from the network subgroups, the more flexible the parties of a buyer-supplier relationship will be.

Anderson and Narus (1990) found that firms engage in intensive collaboration with a mutual interest in finding ways to add value or saving costs and primarily to serve consumer needs, which in turn provide competitive advantage. The reasoning underlying the expected positive influence of the three dimensions of collaboration on performance is based on the reduction of transaction costs and achievement of mutual expectations. Therefore, the time and energy so often spent on trying to plan and work out problems without consulting the buyer is gained. Reviewing the above, we formulate the following hypotheses:

There is a positive influence of the information provided by the network subgroups on relational governance in terms of joint planning (H1a), joint problem solving (H1b) and flexibility of adjustments (H1c).

There is a positive influence of flexibility of adjustments on joint planning (H2) and joint problem solving (H3).

There is a positive relationship of relational governance on perceived satisfaction (H4) and growth rate(H5).

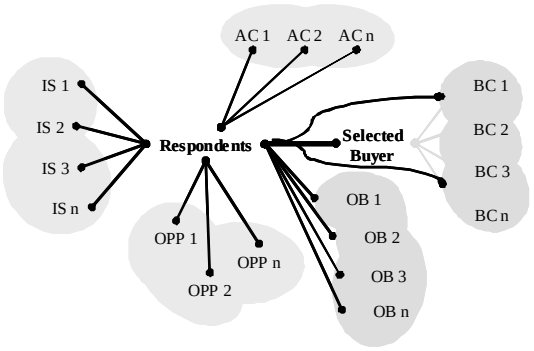
3. Research Design

A sample of suppliers of the Dutch potted plant and flower sector was used to test the hypotheses. This sector is one of the booming agribusiness sectors in the Netherlands, accounting for over 65 per cent of the total world potted plant and flower trade (Elshof, 1998). A specific interface in the sector was selected, namely the business relationships between suppliers and merchant-distributors. This was chosen because of the significant trade volume that is sold in direct collaboration between suppliers and buyers via fixed lines, as opposed to the traditional auction clock transactions (i.e. resembles a pure spot market). The fixed lines currently represent over 50 per cent of the total sales of potted plants and flowers, as opposed to less than four percent about five years ago (Kalenzi, 2000). Our respondents (owners or managers of supplier companies) were asked to focus on the most important wholesaler (hereafter referred to as the selected buyer) in terms of sales via fixed lines in the previous year. Data were collected through the use of a written questionnaire. The study sample consisted of 571 suppliers of potted plants and flowers. Our data collection effort yielded 202 responses, of which 27 were incomplete questionnaires and non-eligible companies, a response rate of 31%. Questions address the relationship between a supplier and its most important merchant-distributor in terms of purchases in the previous year. According to the extrapolation method (Armstrong and Overton, 1977), non-response bias did not appear to be a serious problem in our study.

A panel with practitioners and business academics and a pre-test with five suppliers were used to develop the questions. We measured performance via perceived satisfaction and growth rate. Perceived satisfaction refers to the rating of the respondent's satisfaction with its selected buyer (Bensaou and Venkatraman, 1995; Zaheer et al, 1998). Following Mohr and Speckman (1994) we used sales growth rate in the last three years as an objective measure for performance, while it was not possible to get reliable information on more direct measures, such as operating profit margin. Flexibility of adjustments is a set of items describing the parties' expected flexibility in response to changing circumstances (Heide, 1994). Joint planning measures the extent to which future contingencies and consequential duties and responsibilities in a relationship have been made explicitly ex-ante (Heide and John, 1990; Heide and John, 1992). Joint problem solving refers to the behavior to the relationships that captures the degree of joint solutions to problems a supplier demonstrates toward the selected buyer (Heide and Miner, 1992; Lush and Brown, 1996). The measurement instrument of *network connection* was developed on the basis of previous research (Anderson et al, 1994; Blankenburg et al, 1999). The measurement in those previous researches intended to capture the "general effect" of other relationships on the focal relationships. We then made two major adjustments to this instrument. First, we decided to include a third party (e.g. a mediator) as connection. Second, this measurement instrument captures the impact of five different types of informational benefits provided by five different connections that are called network subgroups. A network subgroup is a set of organizations with the same function in the market as perceived by the respondent. The subgroups are shown in fig. 2, which represent the ones located upstream (input suppliers and other supplier of potted plant products) and downstream (other buyers and buyers' customers), and the third party (agents of the auction cooperatives).

The network subgroup of input suppliers (IS) includes the suppliers of young plants and seeds, firms that supply fertilizers, chemical products, pots, vases, wood and other raw materials; that of other buyers (OB) includes wholesalers, flower exporters, cash and carries and garden centers; that of other potted plant supplier (OPP) includes the firms with similar products; that of the buyers' customers (BC) includes supermarkets, flower shops and wholesalers abroad. The network subgroup of agents of the auction cooperative (AC) is composed of the agents of the mediation department of the auction cooperatives in the Netherlands, who have strong contacts with the suppliers and buyers in this study. The informational benefits of each network subgroup refer to the support for setting prices, setting quantities, coordination of production processes and logistic operations, and foreseeing future actions of the focal buyer.

Figure 2: Network subgroups (downstream network subgroups in dark gray)



AC: Agents of the auction cooperative; IS: Input suppliers; OPP: Other potted plant suppliers; BC: Buyers' customers; OB: Other buyers.

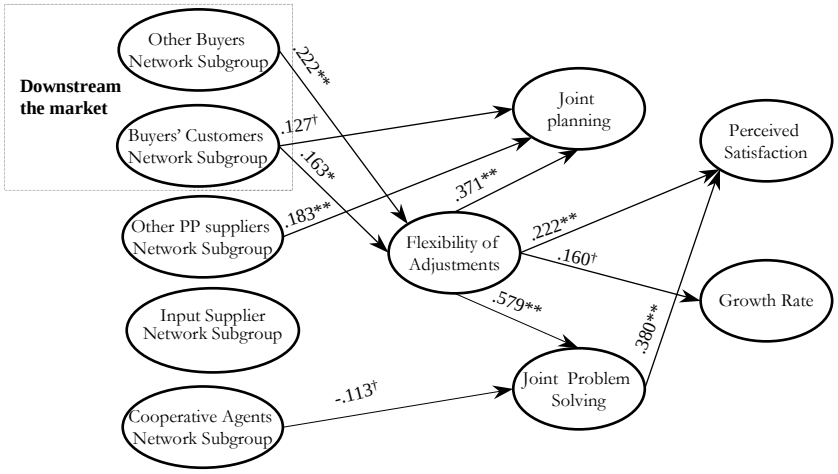
In order to test unidimensionality of the measurement instrument, an examination of the item inter-correlations was used to purify the reflective scales (i.e. flexibility of adjustments and joint problem solving). Although correlations between several network subgroups and the dimensions of collaboration are significantly positive, all of the correlations are below .60 (Churchill, 1979) dismissing any serious problem of multicollinearity between the independent variables. The hypotheses were tested based on structural equation modeling with Lisrel 8.50 (Jöreskog and Sörbom, 1996). To test for discriminant validity of these constructs, we conducted a confirmatory factor analysis model with the two constructs where one had its factor correlation fixed to unity (Steenkamp and van Trijp, 1991). The unconstrained model provided a significantly superior fit, suggesting adequate discriminant validity between the constructs. The scale composite reliability values of the reflective scales all exceed the recommended value .70, which reflects the good quality of the measurement instruments.

4. Results

The significant paths are displayed in figure 3 (for the non-significant paths, see appendix). The structural model was judged to provide an acceptable goodness of fit indices as well as statistically not significant associated chi square value (χ^2= 26.455, p=0.019, df=12). This judgment is based on meaningful interpretability of the model in terms of content and theory, the adequate value of .929 for the normed fitted index (NFI), and the absence of normalized residuals with absolute values greater than 2.32. This judgment is supported further by a goodness of fit index (GFI) value of .972 and a standardized root mean square residue (RMSR) value of 0.048. In order to provide greater confidence to the results provided in table 1, we tested our model (a restricted theoretical model M_T) against two alternative unrestricted models (Anderson and Gerbing, 1988 and Steekamp and van Trijp, 1991). The relevant test statistics lead to a non-significant chi-square difference test and an acceptance of our model.

The model in figure 3 shows the direct impact of network subgroups on relational governance and the indirect impact of network subgroups on performance. In reviewing the total pattern of our results, we note that they highlight the importance of reliable information provided by the downstream network subgroups of other buyers (i.e. merchant-distributors) and buyer's customers (i.e. supermarkets and flower shops). Furthermore, they show the importance of flexibility to enhance performance in terms of sales growth and perceived satisfaction. The downstream network subgroups capture the information provided by other buyers and buyers' customers that supports suppliers in defining price and quantities of products, coordinating the logistic and production process, and to control the actions of the wholesalers. By gathering such valuable information, suppliers can avoid surprises and take prompt action in the relationship with wholesalers, because the information originates from subgroups close to consumers. The action of planning together with the wholesaler requires a certain share of supplier's internal information, which relies on the support of colleagues and even competitors that might have experienced similar situations with the same wholesaler. By analyzing the three dimensions of collaboration, we tested the strength of the dimensions in capturing the collaborative efforts. The results show us that the norm of flexibility exerts a central role for collaborative channels with wholesalers.

Figure 3. Path analysis results (standardized estimates: γ and β) of the model of business network connections, the three dimensions of collaboration and performance.



$\chi 2$= 26.455 (P = 0.0195) df=12; GFI=0.972; RMSR= 0.048; NFI=0.929; **p<0.01, *p<0.05, †p<0.10, (two-tailed test).

The output generated by Lisrel also provides the total (direct + indirect) effects of network subgroups on the three dimensions of collaboration and the two measures of performance. The total effect coefficients corresponding to figure 3 are reported in table 1. The total effect coefficients are interpreted in the same way as those related

to the individual paths. The result reinforces the importance of the downstream network subgroups for suppliers dealing with wholesaling channels. The information provided by downstream network subgroups, other buyers and buyers' customers, influence positively perceived satisfaction and sales growth rate, and all three dimensions of collaboration. This indirect effect of downstream network subgroups is primarily mediated by flexibility and further mediated by joint planning and joint problem solving. By considering the level of significance, it appears that the network subgroup of other buyers evokes a stronger influence on performance when compared to the subgroup of buyer's customers. The model in fig. 3, which based on its fit indices, has a high ability to predict the actual data and captures the impact of these two downstream network subgroups on collaboration and performance.

Table 1: Path model results - Total effects of network subgroups

	Joint Planning	Joint Problem Solving	Flexibility of adjustments	Perceived Satisfaction	Growth Rate
Downstream subgroups					
Other buyers network subgroup	**.082*** (2.240)	**.128**** (2.368)	**.222*** (2.453)	**.092*** (2.014)	**.046**† (1.778)
Buyers' customers network subgroup	**.061**† (1.809)	**.094**† (1.874)	**.163**† (1.915)	**.081**† (1.872)	**.037**† (1.648)
Other subgroups					
Input suppliers network Subgroup	-.017 (.538)	-.027 (.540)	-.046 (.541)	-.028 (.669)	-.014 (.625)
Other PP suppliers network subgroup	-.033 (1.026)	-.051 (1.037)	-.089 (1.044)	-.007 (.154)	-.012 (.460)
Cooperative agents network subgroup	-.022 (.784)	-.035 (.789)	-.060 (.792)	-.060 (1.578)	-.022 (1.067)

**p<0.01, *p<0.05, †p<0.10, two-tailed test.
Note 1: Lisrel total effect coefficients and |t-test| within parentheses.
Note 2: Lisrel total effect coefficients range from -1 to 1 and provide an indication of the relative magnitude of the effects of each exogenous construct on the other furthest endogenous constructs within the context of the model tested.

5. Conclusions and managerial Implications

Consistent with network scholars, who suggest that connections with members of the network provide reliable information to support a business relationship (Anderson et al, 1994, Gulati, Nohria and Zaheer, 2000), we found interesting relations between the downstream network subgroups, collaboration and performance. The results support to a great extent the hypotheses derived from the framework in figure 1. It generally suggests that the studies of buyer-supplier relationship should consider the implications of individual network subgroups on the various dimensions of collaboration and performance and moreover that, in developing collaborative channels with wholesalers, the building and sustaining connections with downstream networks is critical. This supports a process view of the business network relationships consistent with Granovetter's (1985) concept of structural embeddedness. This implies that when firms are interacting they are

engaged in network structuring at the same time as they are conditioned by the network structure (Burt, 1980).

Two managerial implications of our study appear to be most critical. First, managers may use our study and its empirical evidence as a check on the adequacy of their existing business network in terms of the information provided by network subgroups. Second, it is important for managers to have an accurate perception of the value of the information of each individual network subgroup. Without this, any evaluation of the costs and benefits of alternative governance responses based on market forces (e.g. market-based governance) and relational norms (e.g. relational governance) would be vague.

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Appendix 1:

Individual path results of the hypothesized relationship between network subgroups, collaboration and performance

	Flexibility of adjustments	Joint Planning	Joint Problem Solving	Perceived Satisfaction	Growth Rate
Downstream subgroups					
Other buyers network subgroup	**.222**** (2.453)	.040 (.490)	.006 (.075)		
Buyers' customers network subgroup	**.163*** (1.965)	**.127**† (1.688)	.042 (.594)		
Other subgroups					
Input suppliers network Subgroup	-.046 (.541)	.114 (1.528)	-.036 (.509)		
Other PP suppliers network subgroup	- .089 (1.044)	**.183**** (2.443)	.087 (1.231)		
Cooperative agents network subgroup	.061 (0.792)	-.059 (.874)	**-.113**† (1.794)		
Collaboration					
Flexibility of Adjustments		**.371**** (5.506)	**.579**** (9.125)	**.222**** (2.491)	**.160**† (1.688)
Joint Planning				.014 (0.192)	.007 (.878)
Joint problem solving				**.380**** (3.654)	.089 (.946)

X2 = 26.455 (P = 0.0195) df=12; GFI=0.972; RMSR= 0.048; NFI=0.929

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

Note: Standardized estimates (γ and β) and |t-test| within parentheses.