Managing business networks and buyer-supplier relationships

How information obtained from the business network affects trust, transaction specific investments, collaboration and performance in the Dutch Potted Plant and Flower Industry

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Danny Pimentel Claro

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Dedicated to my soul mate,
Priscila

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Preface

Business networks, supply chains and buyer-supplier relationships are all types of business linkages, ranging from a web of connections to a dyadic relationship. These have become fashionable in management literature over the last decades. My interest in these phenomena was triggered by the growing number of references in the literature to a firm's network. This interest has found expression herein, in the study of the managerial implications of the business network for buyer-supplier relationships. This thesis presents a theoretical discussion ranging from the multifaceted network of connected relationships to the complex, dyadic buyer-supplier relationship. The aim is to provide a sound empirical basis for a theoretical framework about how these relationships are coordinated.

Firms in the Dutch potted plant and flower industry serve as the study's 'subjects', offering valuable insights that help us to evaluate our theoretical framework. The involvement of buyers and suppliers allows us to look at issues from both sides of the relationship, that is, purchasing and marketing. Forerunners to this thesis were a number of papers for scientific journals and contributions to scientific congresses and workshops. These papers and contributions enriched our discussions and provided light to illuminate the path of this work.

This thesis is aimed at managers at different levels within firms: decision-makers in purchasing and sales and managers at strategic planning levels. Policymakers and researchers working in the field of supply chain and network management may also find useful ideas and concepts in our theoretical framework. Researchers in fields of relationship management may be interested in the operationalizations of the conceptual elements of the framework and in the interpretation of the estimated statistical models. Because the field of management is broad, all of the methods and techniques presented in this thesis may not be fully appropriate to all. Nonetheless, these pages certainly contain a great deal of information relevant to managerial practices.

This study was made possible by a grant from CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), the Brazilian agency for training researchers at a higher educational level. Although doing research and writing this thesis was sometimes a lonely journey, I never walked alone. There are many people I would like to thank for their help as I initiated and completed my expedition. In the words to come, I try to acknowledge some of them, though words are insufficient to fully express my gratitude for much of the support.

The research was conducted at Wageningen University in the Department of Business Administration. It would have been impossible without the support of researchers and professors from different disciplines. Further, I thank the managers of the supplier and buyer firms who gave their time for the interviews and to fill in the questionnaires. I am indebted to Alexander van der Heiden and Saskia Groot, whose advice enabled me to conduct the empirical research and evaluate the results. Special thanks to Geoffrey Hagelaar who provided me with timely advice in each step of conducting the research. Interestingly, it did not imply much talking (though sometimes our meetings were enjoyably long!) but rather efficient and directive guidelines that supported

even without words. Special thanks also to Onno Omta for all his theoretical and practical advice that was helpful in completing this thesis. His commitment to the research project and in meeting the deadlines were essential to the quality of the work presented here. I am indebted to all of the faculty members of the Department of Business Administration, especially Ron Kemp who gave me crucial guidelines to make this thesis a concrete contribution to the scientific 'world of quantitative research'.

The advice of Decio Zylbersztajn in Wageningen, Amsterdam, Noordwijk and São Paulo was essential to carefully develop a scientifically sound framework and to keep from straying too far from the reality of the Brazilian agri- and food industries. Peter Zuurbier was the first to invite me to pursue my PhD at WUR and also the one who showed me networking in practice. Others were helpful during some parts of the research and I would like to thank them by name: Marcos Neves and Elizabeth Farina (Pensa/USP); Rudy Nayga and family (Texas A&M) for the support and friendship; Ken Wathne and Daniel Caravielo (Wisconsin University, Madison); Andrew Fearne and Jo Cadilhon (University of London, Wye); Hakan Hakanson (BI University, Oslo); Elsabeth Holmen (University of Twente); Fernanda Hattnher (Reijers Group, Holambra); Hélio Zanqueto (State University of Espírito Santo); Eduardo and Flávia Machado (University of São Paulo); José Marcio Carvalho (State University of Tocantins); Mark Overboom, Victor Scholten, Erik Visscher, Joanna Gusc, Frances Fortuine, Jack van der Vorst, Jacques Trienekens, Harry, Emiel, Edwin, Janneke, Femmie, Willem and all other members that I had the pleasure to work with in the Department of Business Administration (WUR); Meulenberg, Ivo and Frans from the Department of Marketing and Consumer Behavior (WUR); Sebastien Deneux (LEI/WUR). I am indebted to Michelle Luijben whose care in editing this thesis allowed my thoughts to be better articulated. I have good memories of discussions with people in all the different places I traveled to report the results of the research project. Especially noteworthy are Onno in Cancun and Seattle; Geoffrey in Dijon and Seattle; Mark Overboom in Twente; Marcos in Noordwijk and Cancun; Rudy in College Station, and innumerable other people in my primary locations (Wageningen, São Paulo and Lavras).

Several other friends and colleagues encouraged me throughout the research period here in Wageningen and in Brazil. Our stay in Wageningen was joyful thanks to the Brazilian community who gave a Brazilian taste to nearly everything we experienced in the Netherlands. I would especially like to thank Rodrigo and Ana; Francisco; Milza; Vagner; Mario and Mana; Roberto and Bea; Irene and Jim; Edgar and Juci; Dekão, Mari and Ivan; Irene and Arne; Michella and Chris; Renato and Denise; Claudine; Paulo and Veri ('dag' Arthur); Rosane; Amaral and Claudia; Rose; Rômulo and Flavia; Gilma, Luis, Cristiane and Guilherme; Simone e Cristiano; Lucinha, Gilberto, Dudu e Vivi; Marineide e Olavo, Paola e Natalia; ,Ivete, Alan and Diego; Chalfuns; Isabella e Stefano; Joana; Isabela and Eduardo; Luis (Passarinho), Simone and Co. Ltda. Without all of your warm and pleasant company, the lack of sunshine would have been much worse. I also thank our friends Mark, Victor, Erik, Joanna and Suresh for the good times we had together, enjoying life not only in Wageningen, but also in other parts of Europe, especially our skiing adventures in Austria and Germany. The international students group of the MSc program 2001 also offered me pleasant times, where we could share our visions from different countries and more importantly learn with each other's lessons of life. I especially thank Mathias and Noortje; Sebastien; Sandra; Guan and Yunfei; Chen Le and Bernard; Tiago and Cristiano; Heiko and Tunde. Mari Jose, Susan, Sander and Helen. I thank you for the lovely dinners we had together. Finally, I would like to mention the finest students who I have the pleasure to supervise: Daniel, Linda, Camila and Priscila. Discussing the topics of your research has been a great learning exercise.

The hardest part of being abroad is the distance from beloved friends and relatives back in Brazil. They are Dennis, Dianna, Dennise, Décio, André, Adriana, Albert, Letícia, Pedrinho, Lu & Lu, Flavinho, friends from the Sulvet, the Butterfields from Danco, Tico, Gustavo, Dilão, Percio and Ivone, and certainly so many others who live in our hearts.

I express my special gratitude to those who motivated me during every step of this journey. My parents (Cecília and Victor) and my 'second parents' (in law, Nélida and Márcio) supported me with words by phone, e-mails and letters as well as by sending us the always "so-expected mailed little-containers". These containers were the real example of an efficient supply chain! We received delicatessen items and souvenirs, t-shirts and traditional Brazilian baby items. We appreciate the care with which you treat us.

Last but not least (as a matter of fact, above all) I thank Priscila, who is not only my wife and the best mother, but also my greatest research partner with a sharp professional feeling and a well-balanced person. Thanks for your careful reading of my drafts and paper and for the congresses we attended together. I appreciate your care and tenderness at the difficult moments, and I am certainly living my life with much love and happiness, as you always do. Finally, I express my utmost gratitude to life for the ultimate source of inspiration: our first baby Lucca, born in Wageningen, September 23, 2003.

Wageningen, November 2003

Danny Pimentel Claro

Part 1

INTRODUCTION AND THEORY

Chapter 1

Introduction

Part 1 of this thesis introduces the research topic and lays its theoretical foundation. In this first chapter, we[1] reveal the motivation for conducting the study of business networks and buyer-supplier relationships. Section 1.1 presents a general introduction and positions our study in the context of the Dutch potted flower and plant industry. Next, we present the research questions and main hypotheses. We also present the two constructive steps used for collecting empirical evidence to test the hypotheses. Section 1.3 describes the advantages of combining qualitative with quantitative methods in the research design. Section 1.4 provides some facts, figures and tendencies of our focal industry. The chapter ends with an outline of the rest of this thesis.

1.1 General Introduction

No firm works in a vacuum. In the complex business world of today, information has become essential. Managers continually look for opportunities or challenges, using their relationships with other firms in their supply chains to obtain valuable information for their decision-making. For instance, information obtained from their buyers about certain problems encountered may lead them to new business opportunities. Firms then increasingly realize that becoming embedded in networks is essential to stay in business. Sporleder and Peterson (2003) advocate striving for, what they call, 'learning' supply chains, via long-term buyer-supplier relationships supported by management systems for the bilateral and multilateral sharing of valuable information.

We asked ourselves at the start of this research project: What impact does the information that flows in the business network have on a focal buyer-supplier relationship? Do managers in a long-term buyer-supplier relationship profit from the information that flows in the network? In other words, is there a positive relation between information from the business network and the performance of a firm involved in a long-term buyer-supplier relationship? Up to now most network literature (e.g., Gulati, Nohria and Zaheer, 2000; Antia and Frazier, 2001) regards the business network as a single entity. In response to this, we asked ourselves if this is in fact the case. It can be expected that the information a manager gets from certain parts of the network is more important than that from other parts. For instance, starting from supply chain management literature, and following the idea of the importance of chain reversal for receiving real-time market information, we may expect that the information that flows downstream in the network is more important than that flowing upstream in the network. In business practice however, this may not be the case. It might turn out that being embedded in a vast network of colleagues and suppliers that enables learning about the latest technological developments is more important for business performance than real-time market information.

[1] In my writing, I preferred to use "we" rather than "I", because it sounds more realistic and consistent.

We should realize, of course, that the human capital (i.e., competences, capabilities and business skills of a firm's personnel) and the structural capital (i.e., tangible assets, such as plants and equipment, and intangible assets, such as patents, trademarks, brand names, product and process technology and/or know how, licenses and trade secrets) are at least as important as the social capital of a firm (i.e., the firm's capacity to extract valuable information from its business network) for its long-term business survival. We then asked ourselves: How important is the social capital compared to the human and structural capital of a firm? Should managers concentrate on increasing the social capital of their firm? Or is it more important to concentrate on human and structural capital, taking the limited manager's time and resources into account? These questions are even more important in the agrifood industry, where profit margins are rather slim and the competitive environment is shaken by rapid changes in consumer wishes, technology and international trade.

The Dutch potted plant and flower industry is the focal industry of our study. It is one of the most important Dutch agribusiness industries, generating half of the total production value of Dutch horticulture (over €3 billion) and accounting for more than 65% of world trade in flowers and plants (Ministry of Agriculture, 2001). Despite the fact that the Dutch auction clock system is world renowned, in recent years an increasing number of firms have shifted their trade from the auction clock, where buyers and suppliers have virtually no contact, to fixed lines, in which long-term and close buyer-supplier relationships are established. These changing relationships require merchant distributors and growers to change their spot-market mindset. Firms must now look for collaboration, in terms of creative problem solving, integration of activities and resources, and close contact with the counterpart. The shift away from spot-market exchange also entails a shift in approach to obtaining valuable information. In fact, there has been a change in structure and procedures for collecting information and dealing with the counterpart. There has also been an associated structural change in the form of more layers in the organizational structure and more complex interpersonal relations, not only with the counterpart's personnel but also with other organizations (Deneux and Luten, 2001). These changes have stimulated firms to replace short-term transactions by long-term, close buyer-supplier relationships.

The new-style buyer-supplier relationships are increasingly becoming representative in the total trade. They currently represent over 30% of the total sales of potted plants and flowers, as opposed to less than 5% only five years ago (Kalenzi, 2000). The fixed lines present advantages for both buyers and suppliers. Buyers are assured of the necessary quantity of potted plants, delivered at the requested date, time and place and at a fixed price. 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 unexpected price and volume fluctuations.

1.2 Research Questions and Main Hypotheses

The fundamental question of this thesis is "Why are some firms more effective in their buyer-supplier relationships than others?" Understanding how some buyer-supplier relationships are coordinated and succeed while others fail is perhaps among the essential questions for firms. For instance, is coordination based solely on the collaboration established between two firms, or is it influenced by the business network? In order to answer such questions, our study aims to understand the impact of the business network on a focal buyer-supplier relationship. To that end, we analyze the business network in terms of the information that firms can obtain from the total set of connected relationships (e.g., with first-tier suppliers and buyers' customers). This analytical perspective was triggered by Salancik (1995) and Nohria and Gulati (1994), who claimed that the network is a relevant factor influencing the coordination of a focal buyer-supplier relation-

ship and consequently deserves special attention. The central research question of this study thus refers to the effect of a firm's network on a buyer-supplier relationship.

Central Research Question:

How does a firm's business network affect a focal buyer-supplier relationship?

The literature contains few empirical contributions about the influence of information from the network on the management of a focal buyer-supplier relationship (Rindfleish and Heide, 1997). With regard to the management of buyer-supplier relationships, previous studies have provided conceptual and empirical answers to several questions: Can trust relationships increase the degree of collaborative planning and joint problem solving? Is there any joint effort response to high degrees of investments made specifically to deal with a counterpart? Do flexible firms tend to work more closely together through sharing plans and forecasts and even offering personnel and expertise to solve a counterpart's problem? These questions emphasize three conceptual elements of the buyer-supplier relationship: trust (Anderson and Narus, 1991), transaction-specific investments (Williamson, 1985) and the dimensions of collaboration (Morgan and Hunt, 1994), namely joint action (Zaheer and Venkatraman, 1995) and flexibility (Noordewier, John and Nevin, 1990). The specific question that this study tries to answer is whether the information that firms obtain from the business network supports these conceptual elements of buyer-supplier relationships. Moreover, the decomposition of the business network into subgroups of connected relationships (e.g., colleagues, first-tier suppliers) can allow firms to reduce redundancy and increase efficiency. Thus, our exploration of the impact of individual subgroups on a buyer-supplier relationship requires special attention. These thoughts can be converted into two specific research questions:

1. How does the information from the business network affect trust, transaction-specific investments and collaboration in a buyer-supplier relationship and how does collaboration affect performance?

2. What is the impact of individual network subgroups on a buyer-supplier relationship?

The first research question is the most profound and can be converted into two main hypotheses. We expect firms to obtain valuable information from the network that benefits its ability to safeguard and coordinate a focal buyer-supplier relationship. Buyers and suppliers obtaining information from the network can enhance the conceptual elements of the buyer-supplier relationship. Also, in a collaborative buyer-supplier relationship, parties are expected to perform better. This leads to two major hypotheses.

Hypothesis 1:

The more information a firm obtains from the network, the more the network will encourage transaction-specific investments, trust, joint action and flexibility to make adjustments in a buyer-supplier relationship.

Hypothesis 2:

The higher the degree of collaboration (joint action and flexibility) in a buyer-supplier relationship, the higher the performance will be.

By testing these hypotheses, we can isolate information as the central benefit of a firm's network and consider this information as supportive in terms of safeguarding and coordinating the buyer-supplier relationship. We may also understand the success factors of a buyer-supplier relationship. The theoretical contribution of this thesis then lies in its explicit consideration of the information attained through the connected relationships in a network as a factor influencing the coordination of buyer-supplier relationships. As such, we expect a cross-fertilization of the network school of thought and the literature in the fields of buyer-supplier relationships (i.e., supply chain management, transaction cost economics, marketing channels), which contributes to the supply chain and network fields of research.

Theoretical and empirical answers for the research questions and hypotheses should enable managers to proactively invest in (or divest) their networks, in order to exploit benefits of the information obtained from the network, and moreover to be engaged in collaborative buyer-supplier relationships. We expect to find interesting implications for the managerial question of how to coordinate a buyer-supplier relationship within a business network and be successful. Tackling these questions should enable managers to understand the types of information that members of a network provide, whether the structure of the network can be consistently divided into subgroups to avoid redundancy, whether information from the network affects trust or transaction-specific investments and, moreover, whether this information supports collaboration in buyer-supplier relationships. Theoretical and empirical investigation of such issues related to networks and relationships will enable managers to base their decisions on a tested framework.

In order to gather empirical evidence, our study focuses on the two sides of the buyer-supplier relationship. This allows for a fine-tuning of research in the field of relationships, since most previous studies collected data from only one side of the relationship (for more details, see Table 6.1, Chapter 6). By collecting data from both buyers and suppliers, we accurately explore the differences between the purchasing and marketing perspectives.

1.3 Overall Research Design: Two Constructive Steps

The research question that forms the central pillar of this study is how business networks affect trust, transaction-specific investments and collaboration in a specific buyer-supplier relationship and ultimately performance. Two constructive steps are used to conduct the empirical research, considering the research question at hand and the research object. Since few empirical studies have been conducted to capture the impact of information from the network, an initial step must be to explore the phenomenon, to gain insights in potential beneficial effects of the network on each element of a buyer-supplier relationship. In addition, a second step must be taken to quantitatively test hypotheses in a theoretical framework. These two steps can be envisaged as two constructive steps that take the research from a first exploratory look at managers' perceptions regarding the business network and relationships to a formal test of hypotheses concerning the theoretical framework of the network and buyer-supplier relationships. The decision was made to use the two constructive steps in order to capitalize on the advantages of both research strategies.

Combining research strategies within a single project opens up opportunities for mutual advantages in each step of the design, data collection and analysis (Sieber, 1973). Each of the research strategies contains drawbacks. First, the case study, which is employed in the first, exploratory phase of this research, is the most established qualitative research strategy, defined as "an empirical inquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used" (Yin, 1994: 13). The case study can take the object of investigation as the product of consciousness, which allows for creative interactions between researcher and the research object. The drawbacks of such a strategy relate to reliability and generalizability. In

doing qualitative research, a researcher builds a personal understanding of a situation; the question is whether this wealth of experience of the (participant) observer is reliable (Sieber, 1973). The question of reliability relates to two aspects: whether the results would be the same if the research was repeated and whether the results would be the same if the study was conducted by another researcher. To increase the reliability of the results, the qualitative researcher can make use of well-developed methods such as Yin's case study protocol. The use of these methods enables independent researchers to verify the methods of data collection, findings and interpretations. Although the drawback of reliability can thus be tackled, the problem of generalizability remains. Because observations only concern one or a few cases, care should be taken in generalizing conclusions.

The second step of the research strategy, the survey, is commonly used for quantitative research and allows researchers to gain an overall picture of a phenomenon. A survey is generally characterized by large numbers of research units, labor extensive data generation, breadth rather than depth and quantitative data and analysis (Verschuren and Doorewaard, 1999). In quantitative research the problem of reliability is easier to address than in a case study. To ensure reliability, questionnaires can be pre-tested, observers and interviewers can be trained and the informant can be thoroughly informed about the research (Dillman, 1978). In the context of a survey a phenomenon is labeled, defined and operationalized so that it can be measured using numbers and scales. The question of validity now concerns the legitimacy of the translation steps that have been made. Careful definition of indicators can ensure the measurability of concepts. The drawback of this research strategy is that it offers little contextual information.

The combination of survey (quantitative) and case study (qualitative) research strategies is sometimes referred to as triangulation (see Jick, 1979). The triangulation metaphor is from navigation and military strategy where it refers to a process in which multiple reference points are used to locate an object's exact position. Similarly, studies in the fields of organizational research can improve the accuracy of their judgments by collecting different kinds of data bearing on the same phenomenon. The point of departure in triangulation is the assumption that the drawbacks of using only one method can be solved by combining multiple methods in the same research. Triangulation ensures that the variance and observations reflect the phenomenon of interest and not the method used (Jick, 1979). This thesis uses a combination of the case study and survey rather than a pure triangulation. The premise in using such a combination is that the weaknesses of one method can be compensated by the strengths of the other.

The research process presented in this thesis is thus based on two constructive steps that underline the combination of the research strategies: an exploratory phase and a descriptive phase (Malhotra, 1999). The major emphasis in the exploratory research phase is on the discovery of ideas and insights. The exploratory phase is particularly helpful in breaking down broad, vague problems into smaller, more precise sub-problems. Moreover, it assists us in formulating hypotheses that can be tested in a survey context. The descriptive phase is concerned with determining the frequency with which something occurs or the relationship between two or more concepts. Thus, the descriptive survey phase is based on substantial prior knowledge and theories about the concepts of interest and the relations between them.

The contribution of the exploratory case study to the descriptive survey in hypothesis testing is twofold. First, rich insights are gained to contribute to understanding managers' perceptions regarding the main concepts in the theoretical framework and their interrelations. The input of the case study results to the research design includes not only its confirmatory role but also its providing an initial rationale for the design. Case studies inquire through different sources of information, such as personal interviews, observation and participation. These sources may provide

insights that contribute to the development of the survey design. Our exploratory case study offered information about the receptivity, frames of reference and span of attention of potential respondents. This information allowed us to improve the questionnaire. Second, the case study assists us in analyzing and interpreting the survey data. Some of the statistical findings are associated with statements and observations made in the case study.

In sum, this research uses the case study to collect rich insights. By subsequently conducting a quantitative survey, the generalizability of the theoretical framework is enhanced. Such a combination enables us to better define and analyze the research phenomenon: the impact of the business network on buyer-supplier relationships.

1.4 Study Domain: The Dutch Potted Plant and Flower Industry

Firms in the Dutch potted plant and flower industry provided information related to our theoretical framework. This is an interesting industry for our empirical analysis because it can offer valuable insights on the way firms do business with each other and because it can provide the necessary quantity of data to enable statistical inferences to be made about the theoretical framework. In preliminary desk research, we found that the degree of collaboration and the use of the business network as a source of information are increasingly important for long-term relationships between growers (suppliers) and merchant distributors (buyers). The focal buyer-supplier relationships are known as the 'fixed lines'. Before describing the structure of the fixed lines, we present some facts and figures of the industry.

1.4.1 Facts and figures of the industry

The Dutch potted plant and flower industry plays an important role in the world trade, especially as a gateway to Europe. The high indices of per capita consumption continue to define the industry's national and international orientation (see Table 1.1). Per capita consumption of cut flowers in Europe averages €35.50 compared to €28.30 in the United States. The countries in Western Europe show high consumption as expected, and surprisingly Eastern Europe shows a relatively high consumption as well. There is great potential to increase overall consumption in these Eastern European countries as well as in the large markets of China and Russia.

Table 1.1 Per capita consumption in euros (2001)

Western Europe	Flowers	Plants	Eastern Europe and Others	Flowers	Plants
Austria	43.8	30.6	Croatia	5.9	5.5
Belgium	40.7	15.3	Czech Republic	8.9	3.8
Denmark	39.5	39.6	Hungary	10.7	5.7
Finland	35.7	25.1	Poland	7.4	2.3
France	32.6	19.4	Japan	34.1	–
Germany	39.4	43.8	Russia	2.8	0.7
Greece	14.3	6.1	Slovakia	6.5	1.7
Ireland	28.4	9.8	Slovenia	29.7	17.4
Italy	33.1	9.5	China	0.5	–
Netherlands	59.8	33.8	United States	28.3	–
Norway	57.4	54.9			
Portugal	16	5.2			
Spain	17.5	15.8			
Sweden	33.8	41.2			
Switzerland	91.4	40			

Source: Flower Council of Holland (http://www.flowercouncil.org).

The significance of this Dutch industry is beyond doubt. The Netherlands accounts for the majority of commerce in cut flowers and potted plants and flowers worldwide and has been described as an example of competitiveness (Liemt, 1999). Table 1.2 shows the importance of the Dutch

flower industry in Europe. The Netherlands produces, cultivates and exports far more than any other European country.

Table 1.2 Production, greenhouse area and export of the top-five European countries producing cut flowers, foliages and potted plants and flowers

Country	Production (US$ million)*	Greenhouse Area (ha), 1998	Total of Export (US$), 1998
Netherlands	3,555	8,116	2,220
Italy	2,167	7,654	135
Germany	1,268	7,066	29
France	1,244	6,795	28
United Kingdom	512	6,568	22

* Figures for production are from 1998 in the Netherlands, 1997 in Germany and UK, 1996 in France and 1994 in Italy.
Source: Lannings (1999).

Dutch potted flower and plant exports have increased dramatically since 1998. Table 1.3 shows the share of exported products to several countries. Not only have cut flower exports to countries in Europe increased, a sharp increase is also evident to the large market of Russia. The figures of exported potted products show a general increase, especially exports to countries accessible by lorry (e.g., Germany, UK and France). Considering the weight of vases and soil, the high costs of air transportation impede these products from traveling far distances. The lorries are temperature controlled to maintain optimum product quality. All flowers and plants are transported in two standard rolling containers: 'Danish containers' and 'auction containers'. Rail transport is increasingly used for longer distances within Europe. For example, special trains carry fresh products to Italy and Russia.

Table 1.3 Dutch export of products to various countries (in € million)

		Cut Flowers		Potted Plants and Flowers	
Country and Inhabitants (x million)		2002	2001/2002(%)	2002	2001/2002(%)
Germany	82	922.4	–0.9	549.6	5.5
United Kingdom	60	554.7	9.5	152.9	21.0
France	60	420.5	–1.3	166.7	12.1
Italy	58	153.9	8.4	110.5	12.0
United States	278	134.8	–0.7	–	–
Switzerland	7	96.0	9.6	42.9	11.4
Belgium	10	89.2	5.9	65.3	23.6
Austria	8	81.3	5.1	44.3	5.6
Denmark	5	68.9	5.1	32.0	15.5
Russia	145	65.9	15.2	–	–
Spain	40	–	–	32.9	21.1
Sweden	9	–	–	29.3	–10.6
Others		402.5	3.7	167.4	25.0
Total		2,990.1	3.1	1,393.8	11.5

Source: Flower Council of Holland (http://www.flowercouncil.org).

Suppliers' output grew faster than acreage over the past 15 years. This contrasts with the situation before 1980, when increasing production came mainly from increasing area cultivated (Lannings, 2000). Productivity growth since the early 1980s can be attributed to improved greenhouses, better cultivation methods, controlled lighting and automation of vital processes to regulate climate and humidity. Nowadays, ornamental products under glass have actually decreased in area (see Table 1.4). In contrast, the area outdoors under ornamental plants has increased by 7%.

Table 1.4 Production area for each group of products

	2002	2001/2002 (%)
Ornamentals under glass	*6,214*	*–0.2*
Cut flowers	3,578	–0.8
Potted plants and flowers	1,272	–0.9
Propagation material	190	–9.1
Other	784	5.0
Arboricultural products	390	3.7
Ornamentals outdoors	*40,306*	*7.0*
Floricultural products	2,684	12.8
Flower bulbs	24,221	7.1
Arboricultural products	13,401	5.8

Source: Flower Council of Holland (http://www.flowercouncil.org).

If we compare the increase in production area (Table 1.4 above) with the increase in production value (Table 1.5), it appears that a process of concentration driven by economies of scale is continuing but at a slower pace. Regarding potted plant and flower products, there has been an increase in production value of 3.3% contrasted with a reduction in production area under glass (–0.9%) and an increase in the outdoor production area (5.8%). There might be a productivity increase in the areas under glass, but it is more likely that the increase in outdoor areas influenced the increase in production value. The layout of dispersed parcels suggests that the increase in outdoor areas is a result of physical restructuring. A process of concentration is also reflected in the reduced number of registered production units for all of the products in 2002.

Table 1.5 Production value of products (in € million) and number of production units

	Total Production		Number of Units	
	2002	2001/2002 (%)	2002	2001/2002 (%)
Potted plants and flowers	4,550	3.3	5,796	–6
Cut flowers and foliages	3,420	4.7	1,955	–7
Arboricultural products	560	4.7	1,312	–4
Total	9,100	3.3	9,063	–4.1

Source: Flower Council of Holland (http://www.flowercouncil.org).

The buyers, generally called merchant distributors, are firms such as wholesalers, cash-and-carries and garden centers. Although the number of merchant distributors is high, concentration is very much the watchword here: the largest 4% of buyers (those with sales of more than €12 million) control 46% of purchases, while the bottom 82% of buyers (those with sales of less than €2 million) account for only 19% of purchases (see Table 1.5). There were 1,449 buyers in 2000. Around 200 buyers operate only in the national market. The number of buyers with less than €500,000 in sales is diminishing and sales growth is mostly confined to buyers with sales of more than €5 million. The two largest buyer firms have sales of more than €200 million.

Table 1.6 Distribution of merchant distributors according to turnover, 2000

Turnover (€ million)	Number of Buyers	%	Purchasing Share (%)
0–2	1,190	82	19
2–5	116	8	13
5–12	92	6	22
12–25	31	2	16
25–35	9	1	8
>35	11	1	22
Total	1.449	100	100

Source: http://www.tuinbouw.nl.

Florists are the dominant retailers in the industry, representing 52% of the outlets (see Table 1.7). Street sellers account for 27% of outlets, followed by supermarkets. Although there is some in-

consistency in the figures of value of sales, the supermarkets are known to be gaining importance in retail markets. In some countries the increase is barely noticeable; in others like the United Kingdom, supermarkets account for about 45% of the total sales of cut flowers and potted plants. In Switzerland, the two major supermarket chains (Migros and Coop) together account for about 65% of the total sales (Lannings, 2000).

Table 1.7 Shares of the various retail outlets in the Netherlands

Retail outlets	Share (%)
Florists	52
Street sellers	27
Supermarket	15
Growers	2
Garden centers	2
Others	2
Total	100

Source: http://www.tuinbouw.nl.

The products of this industry can be divided into two main groups: cut flowers and foliages and potted plants and flowers. In the Netherlands potted plants and flowers are grown largely under glass. They are divided into potted foliage plants and flowering plants. Foliage plants are those that derive their ornamental value from green or colored foliage. The flower provides the ornamental value in the flowering plants. Foliage plants make up 40% of Dutch potted plant production. The most important of these is the *Ficus*, with sales of €39.3 million in 2002 (Table 1.8). Other important foliage potted plants in the Netherlands are *Dracaena*, *Hedera*, *Schefflera* and palms. Smaller-sized foliage plants, such as the small *Ficus*, *Draceaena marginata*, *Hedera* and *Nephrolepis* are often grown on moveable growing tables. Operations such as potting up and packing can be carried out in processing rooms at the front of a nursery.

Table 1.8 Top-ten potted plants and cut flowers registered by the auction cooperatives (€ million)

Potted Plants and Flowers	2002	2001/2002 (%)	Cut Flowers	2002	2001/2002 (%)
Phalaenopsis	64.4	30.9	Rose	699.8	7.2
Ficus	39.3	–5.3	Chrysanthemum	307.1	6.2
Dracaena	38.9	11.8	Tulips	171.2	–3.4
Kalanchoë	37.8	6.8	Lilies	168.1	7.8
Anthurium	34.1	28.0	Gerbera	107.7	3.7
Chrysanthemum	27.9	4.2	Cymbidium	66.2	–0.6
Spathiphyllum	24.8	3.4	Freesia	62.1	0.5
Hydrangea	24.3	8.0	Dianthus	45.5	–19.1
Hedera (ivy)	23.6	1.6	Alstroemeria	44.5	–0.3
Rosa	20.9	10.1	Anthurium	41.6	11.2

Source: Flower Council of Holland (http://www.flowercouncil.org).

In flowering plants the shape and color of the flower determine ornamental value. These are usually herbaceous plants and do not grow as tall as the (woody) foliage plants. Among the important flowering potted plants are *Kalanchoë*, *Phalaenopsis* (orchid), *Dendranthema* (potted chrysanthemum), *Spatyphillum*, gerberas and roses grown in pots. These are largely cultivated on growing tables. Taller flowering plants such as the *Hortensia* and larger-sized *Euphorbia pulcherima* (poinsettia) are grown on concrete floors or anti-rooting cloth.

A proportion of potted plants is grown hydroponically, particularly for interior planting in offices and similar uses. The plants stand in pots of fired clay granules, which absorb large quantities of water. One great advantage of this system is that the plants get a large water buffer, which need only be topped up once a month. Young plants for hydroponic cultivation are raised on phenol

foam or rooted directly into the clay granules. Some are started in potting compost. Before transplanting, the roots of these plants are rinsed clean of any compost which could be transferred to the clay granules.

The group of cut flowers and cut foliages are produced and harvested to be sold without roots, bulbs or soil. They are, for example, asparagus, mostera and ruscus. The most important cut flower is the rose, with sales of €699.8 million in 2002 (see Table 1.8 above). This represents an increase of 7.2% over the previous year. Other cut flower products are chrysanthemum, tulips, lilies and gerberas. Some of these cut products reach the end consumer as bouquets created by specialized wholesalers or florists and through supermarkets and open-air markets. Box 1.1 lists useful Internet sites on commerce in plants and flowers.

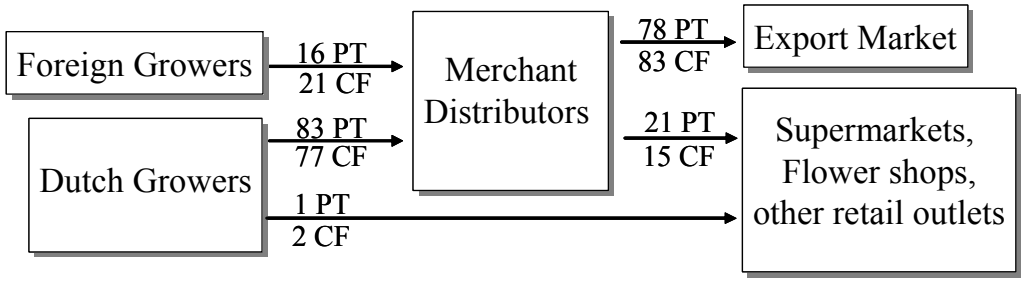
Box 1.1 Useful Internet sites on plants and flowers

- Internet platform for the industry: www.flowerweb.com
- Research institute: www.lei.dlo.nl
- Ministry of Agriculture and Food Quality: http://www.minlnv.nl/international
- Service sites for the Dutch agri- and food industry: www.tuinbouw.nl and www.agriholland.nl
- Auction cooperatives: www.vba.nl and www.bvh.nl

1.4.2 The channel structures and the auction cooperatives

Figure 1.1 depicts the share of sales accounted for by each channel in the focal industry. Of the total products coming from foreigners, Kenya represents 30%, followed by Israel (29%) and Zimbabwe (18%). The great majority of products purchased by merchant distributors originate from Dutch growers (84% of potted plants and flowers and 79% of cut flowers). The share of products sold by merchant distributors highlights the importance of the international market for the industry.

Figure 1.1 Shares of sales (%) accounted for by each channel in the focal industry, 2000 (CF: cut flowers and PT: potted plants and flowers)



Source: Deneux and Luten (2001).

The channel between growers (suppliers) and merchant distributors is primarily through the auction cooperatives. The Netherlands is renowned for its large auction cooperatives. More than 92% of trade between suppliers and buyers is affected under the services of these cooperatives (Ministry of Agriculture and Food Quality, 2001). Except for the smallest one, all of these cooperatives have registered increasing total sales volumes (see Table 1.9). The two largest, namely Aalsmeer and Flora Holland, account for more than 80% of the total trade between suppliers and buyers, which includes Dutch and foreign suppliers and buyers.

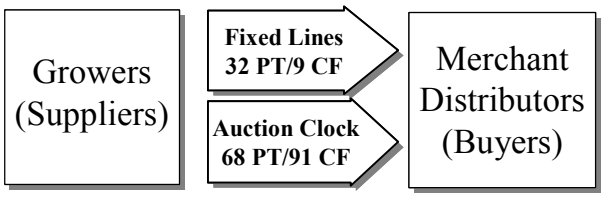
Table 1.9 Sales of potted plants and flowers and cut flowers registered by the auction cooperatives (in € million)

	Potted Plants and Flowers		Cut Flowers	
	2002	2001/2002 (%)	2002	2001/2002 (%)
Aalsmeer Flower Auction	462.1	8.4	1,583.5	6.4
FloraHolland Flower Auction	454.1	8.7	1,917.9	4.9
Oost-Nederland Flower Auction	18.8	13.9	57.4	13.8
Vleuten Flower Auction	3.5	–12.0	22.9	–3.0
Total	938.5	8.5	3,581.7	5.7

Source: Flower Council of Holland (http://www.flowercouncil.org).

These cooperatives are meant to assist suppliers in their commercial activities and offer financial and transportation services and collective purchase of inputs. Suppliers' auction cooperatives offer infrastructure for the trade in two distinct channels, namely fixed lines and the auction clock. Once a supplier becomes a member of the cooperative, all of its production has to be traded via the channels set up by the cooperative. In Figure 1.2, the upper arrow represents the fixed lines channel and the lower arrow represents the auction clock.

Figure 1.2 The channels in the auction cooperatives and the share of sales (%) between suppliers and buyers in the focal industry



Source: Deneux and Luten (2001).

Short-term trade resembling spot-market transactions characterizes the Dutch auction system. The Dutch 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. Nearly 10 years ago, the auction cooperatives began to allow suppliers to sell directly to buyers as long as a mediation department, controlled by the cooperative, acted as a broker to arbitrate the sales. This channel is also seen as a short-term trade and is greatly influenced by the brokers of the cooperative. This brokerage is basically characterized by impersonal relations and a low cost of switching to other transactional partners.

This thesis focuses on the other channel, called 'fixed lines'. These fixed lines are characterized by deals made directly between suppliers and buyers. In this channel, the buyer and supplier make their own decisions about delivery times, quantities and prices. The mediation department of the auction cooperative handles only the financial aspects of the transaction. This means that no arbitration role is played by the mediation department in this channel, the task remaining for the auction cooperative is to receive payment from the buyers and transfer it to the suppliers.

Suppliers and buyers consider fixed lines an attractive way to trade, because it enables them to match market segments more precisely and effectively. The buyers' strategy is focused on reducing transportation costs (transport can constitute up to half of the operational cost of a buyer) and requesting added-value products instead of purchasing based only on price. Buyers are constantly looking for ways to receive products early in the morning and advance orders, which helps to guarantee sales and more importantly reduces uncertainties of supply. For suppliers, fixed lines are attractive because they guarantee sales and allow them to reduce uncertainties:

they are no longer completely dependent on the uncertain auction clock with its unexpected price and volume fluctuations.

It is important to notice that there is a power balance between suppliers and buyers when dealing with each other in a fixed-line channel. The industry structure is dispersed on the supplier side and concentrated on the buyer side. The total number of suppliers is 9,063 units involved in commercial growing of potted plants and flowers and cut flowers (see Table 1.5). In contrast, there are 1,449 buyers, among them wholesalers, exporters, garden centers and cash-and-carries (see Table 1.6). In view of this industry structure, one might suppose that the buyers have more negotiation power than the suppliers. However, there is more balance than the huge gap would suggest. Demand and quality orientations have influenced the power balance. For instance, trade is frequently influenced by contracts (e.g., longer term and for large quantities) that buyers have with large retailers (Lannings, 2000). Also, the number of specialized suppliers for each type of item in the assortment is relatively small. Increased competition on the supplier side has resulted in a drive for cost reduction, implementation of new technologies and large production scales (Liemt, 1999). Therefore, the power balance in this relationship appears to be determined not solely by the number of alternative partners or the size of the firm, but rather by the partner's specialization.

1.5 Outline of the Thesis

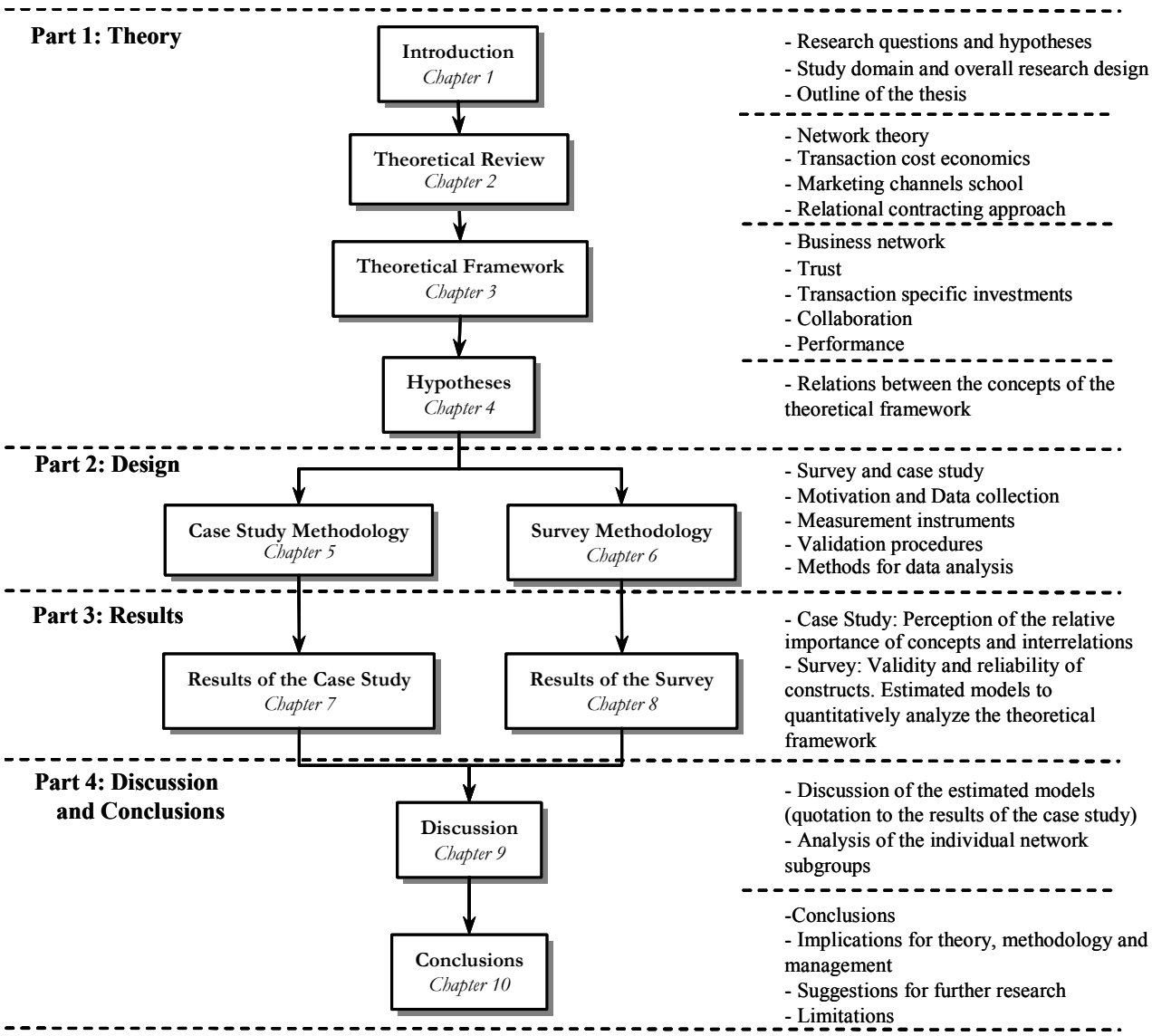
This thesis is divided into four parts. Part 1 (Chapters 1 to 4) introduces the research and lays the theoretical foundation for the study. The second chapter reviews the literature on networks and buyer-supplier relationships. It begins with a discussion of the network school of thought and elaborates on supply chain management. The theoretical review is complemented by a discussion of three schools of thought: transaction cost economics, marketing channels and relational contracting theory. These schools of thought provide the background to define a governance mechanism for buyer-supplier relationships. Further, the complementarities of the schools are explored for the study of the business network and buyer-supplier relationships. Chapter 3 elaborates on the relevant concepts for the study of networks and buyer-supplier relationships. After reviewing the extant literature, it presents the conceptual elements of the business network, transaction-specific investments, trust, joint action and flexibility. Chapter 4 presents the hypotheses that compose the theoretical framework.

Part 2 (Chapters 5 and 6) presents the research design. Chapter 5 presents the choice of the two constructive steps of our research design. This chapter also discusses some advantages of conducting research by case study. Chapter 6 describes the motivation for employing a quantitative research strategy, the survey. It also presents the research methodology for the survey and describes how data was collected and what measurement instruments were used, as well as the methods for data analysis.

Part 3 (Chapters 7 and 8) describes the results of the case study and the survey. Chapter 7 presents the insights gained from the interviews with suppliers and buyers. It emphasizes the differences in perceptions regarding the concepts of the theoretical framework and the interrelations between the concepts. This chapter argues the need to investigate both sides of the buyer-supplier relationship. Chapter 8 first tests the validity and reliability of the constructs that were derived from the elements of the theoretical framework. It then presents the results of the estimated models to test the hypotheses of the framework for both sides of the relationship. The analysis is then extended to the individual network subgroups (e.g., the subgroups of buyers and the subgroups of suppliers) and includes control variables (e.g., firm size and length of the relationship).

Finally, Part 4 (Chapters 9 and 10) consists of the discussion and conclusion of the study. Chapter 9 discusses the results of the estimated models, underlining the effects of information obtained from the network on a specific buyer-supplier relationship. Also highlighted are the interrelations between the different conceptual elements (e.g., the influence of trust on collaboration) and the ultimate impact on performance. The results of the case study help us to interpret the results of the estimated models. The chapter presents comparisons between the buyer and the supplier sides of the relationship throughout. Chapter 10 presents the conclusions of the study. The focus is on the study's contribution to and empirical evidence for the schools of thought used to support the framework. A section containing managerial implications presents suggestions for managers to further develop their relationships and networks. Suggestions are also provided for the research agenda based on the conclusions and limitations of our study. Figure 1.3 presents the outline of this thesis.

Figure 1.3 Outline of the thesis



Chapter 2

Theoretical Review

This first chapter reviews theories related to networks and buyer-supplier relationships. It starts with an overview of the current state of the literature on networks. Following this, supply chain management is presented in its chain and network frameworks. Succeeding sections then present three perspectives on how relationships are organized: transaction cost economics, marketing channels and the relational contracting perspective. This confers a solid background for the study of buyer-supplier relationships. The chapter ends with a look at the governance of buyer-supplier relationships, contrasting market and hierarchy modes of governance.

2.1 Overview of Network Theory

The network school of thought has significant implications for the buyer-supplier relationship. Building on social exchange literature, researchers in the past decade have moved beyond the dyadic level to look at the effects of the overall structure of relationships 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 web of linkages that both facilitate and constrain them by guiding their interests and ability to take actions (Powell, 1990; Nohria and Eccles, 1992). Granovetter (1985: 487) presented the essence of this perspective: "*actors do not behave or decide as atoms outside a social context, nor do they adhere slavishly to a script written for them by the particular intersection of social categories that they happen to occupy. Their attempts at purposive action are instead embedded in concrete, ongoing systems of social relations.*"

From the literature, a generally accepted framework can be derived with sufficient theoretical and empirical depth to help us to understand the network phenomenon. Nonetheless, the wide variety of terminology and definitions used is remarkable, and these differences result in a diverse set of conceptual ramifications. Despite this difficulty, some studies have emerged that can be used as building blocks in conceptualizing networks. Two main blocks can be distinguished based on the level of analysis, namely the individual level and the organizational level.

The individual level of the network analysis has often been studied by researchers as the social capital. There is, with respect to consequences, a contextual complement of the social capital to the human capital (Coleman, 1988). While human capital refers to individual ability, social capital refers to opportunities. According to Burt (1997), the social capital perspective predicts that the returns to a manager's intelligence, education and seniority depend to some extent on his or her location in the social structure of a market or hierarchy. Furthermore, managers' social capital confers their ability to coordinate other people by identifying opportunities to add value

within an organization and getting the right people together to develop the opportunities. Knowing who, when and how to coordinate is a function of the manager's network of contacts within and beyond the firm's boundaries (Burt, 1997). Thus, the social capital view assumes that actors' behaviors and expectations are constrained by the degree to which their relationships are embedded in the network structure. Table 2.1 compiles representative definitions of networks at the individual level proposed by authors from different theoretical domains.

Table 2.1 Definitions of networks: Individual level of analysis

Author and Journal	Definition: Network Design and Implications (Theoretical Domain)
Granovetter (1973) AJS	The interpersonal relations that provide diffusion of influence and information, mobility opportunity and community organization. The strength of weak ties is a combination of the amount of time, the emotional intensity, the intimacy and the reciprocal services which characterize the tie. (Social Networks/Embeddedness)
Burt (1990) ARS	Network structure is described in terms of the typical relations in which individuals are involved and the extent to which actors are connected within a cohesive primary group as cliques. (Social Networks/Social Capital)
Uzzi (1996) ASR	Social ties among firms that the structure and quality of these ties shape economic action by creating unique opportunities and access to those opportunities. (Social Networks/Embeddedness)
Burt (1997) AMJ	Personal interrelations that confer significant information and control benefits and consequently offer opportunities for bridging structural holes. (Social Networks/Social Capital)
Uzzi (1997) ASQ	Loose collections of individuals who maintain personal ties through stable networks of exchange partners and close social relationships. The primarily benefit is that they create structure and quality of exchange ties and because these factors shape expectations and opportunities. (Organizational Economics/Organization Networks)
Borgatti, Jones and Everett (1998) CO	A set of relationships with others that offers sources of material, information and emotional aid. (Social Networks/Social Capital)
Gulati and Gargiulo (1999) AJS	Multiple informal interpersonal relationships that emerge across organizational boundaries, which facilitate the active exchange of information and the production of trust that fosters interorganizational cooperation. (Strategic Management/Social Networks)
Cross and Prusak (2002) HBR	Web of communications and exchange of information (emphasized in the value of information and the value of ties), which affects firm performance. (Organizational Networks/Social Capital)
Adler and Kwon (2002) AMR	A social structure in which the goodwill that others have toward us is a valuable resource, where goodwill refers to sympathy, trust and forgiveness offered us by friends and acquaintances. The effects flow from information, influence and solidarity. (Social Networks/Social Capital)

Note: The theoretical domain is in parentheses at the end of the definition. Acronyms of journals: CO: *Connections*; AJS: *American Journal of Sociology*; AMJ: *Academy of Management Journal*; AMR: *Academy of Management Review*; ASQ: *Administrative Science Quarterly*; ASR: *American Sociology Review*.

The definitions vary according to the focus of the journal. In general, studies in the sociological journals (e.g., *American Journal of Sociology*, *American Sociology Review*) pay more attention to social elements, such as aid and relational bonds, while studies in management journals (e.g., *Administrative Science Quarterly*, *Academy of Management Review*) pay more attention to opportunities and control. Granovetter's seminal work (1973) discusses the strength of weak ties.

The framework of weak ties serves to concentrate people's efforts when searching for a job. Burt (1992) formulated the matter of weak ties slightly differently, as the occurrence of 'structural holes' in the manager's network. Structural holes are the gaps between non-redundant contacts, which form distinct clusters (or network subgroups). Managers in different clusters know one another, but they are so focused on their own activities that they have little time to attend to the activities of people in the other cluster. Burt (1997) claims that non-redundant contacts offer information benefits that are additive rather than redundant. Network relations may enhance the social capital of a company by enabling it to obtain information, technical know-how and financial support. But, at the same time, these relationships may lead to 'social liability', for example, limited opportunity to relate to companies outside the network, risk spill-over and high coordination costs of network relations. In the same theoretical domain, Uzzi (1996) analyzed the network as an important source from which managers access information about opportunities and control over subordinates. Cross and Prusak (2002) studied several large American organizations. They found that to make effective decisions managers rely on information from people within their network. Another example is the research of Krackhardt and Hanson (1993), who focused on informal networks as an information source. These networks can cut through formal reporting procedures to jump long, slow-moving initiatives and meet extraordinary deadlines. All of these studies showed the relevance of social capital and information obtained from networks for controlling, monitoring and job-seeking.

While these developments are interesting, they are rather limited in terms of organizational scope (Borgatti, Jones and Everett, 1998). Alongside this block of scholars, network analysis at the organizational level has become prominent. Table 2.2 shows selected definitions in terms of network design and implications for business. (Appendix A presents a more extensive list.)

Table 2.2 Definitions of networks: organizational level of analysis

Author and Journal	Definition: Network Design and Implications (Theoretical Domain)
Cook and Emerson (1978) ASR	An exchange network is a set of two or more connected exchange relations. Two exchange relations are connected to the degree that exchange in one relation is contingent upon exchange (or non-exchange) in the other relation. (Exchange Networks)
Granovetter (1985) AJS	Networks refer to the social relations influencing economic actions. This concept explicitly considers trust, ongoing process, interpersonal relations and information exchange and reservoir of other partners. The stable (strong links with other individuals) networks are more appropriate in complex transactions. (Sociology/Embeddedness)
Thorelli (1986) SMJ	Two or more organizations involved in long-term relationships, which makes a special type of system – the one whose internal interdependencies generally change over time. Due to the intensity of interaction, two or more firms constitute a subset of one market (or several markets). (Management/Strategic Networks)
Jarillo (1988) SMJ	The long-term, purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantages vis-à-vis their competitors outside the network. (Management/Strategic Networks)
Hakansson and Snehota (1989) SJM	An organization-environment interface that stems originally from causal observations that business organizations often operate in environments which include only a limited number of identifiable organizational entities (actors). These entities are involved in continuous exchange relationships with the organization with a complex set of interdependences (resources and activities). (Industrial Networks)
Powell (1990) ROB	Indefinite, sequential transactions within the context of a general pattern of interactions. Transactions are embedded in a particular social structure. Boundaries are expanded to encompass a larger community of actors and interests that would previously have either been fully separate entities or absorbed through merger (Network Governance)

Table 2.2 Continued

Larson (1991) JBV	Close collaborative alliances with a limited set of suppliers and customers that enable a firm to stabilize itself while remaining flexible and responsive to a changing market. (Management/Strategic Networks)
Saxenian (1991) RP	Long-term, trust-based partnerships that allow for informal information flow and mobility and a blurring of the boundaries between interdependent but autonomous firms. (Management/Supplier Networks)
Nohria and Eccles (1992) book chapter	A new type of organization that is radically different from the Weberian bureaucracy or market transactions... (with) properties consisting of a fluid, flexible and dense pattern of working relationships that cut across various intra- and inter-organizational boundaries... that are made possible by advances in information technologies. Network organizations are not the same as electronic networks, nor can they be rebuilt based entirely on them. Face-to-face and social encounters are essential (Organizational Behavior/ Social Networks)
Larson (1992) ASQ	A set of inter-organizational and interpersonal relationships that create social dimensions (personal relationships, reputation, trust, reciprocity norms) to the transactions and are central to the explanation of control and coordination in the exchange structure. (Organizational Economics/Social Networks)
Anderson, Hakansson and Johanson (1994)2JM	A set of two or more connected relationships (see Cook and Emerson, 1978), in which each exchange relation is between business firms that are conceptualized as collective actors. Business networks possess advantages that go beyond the sum of the involved dyadic relations. (Business Networks)
Dyer (1996) SMJ	Individual firms engaged in a narrow range of activities which are embedded in a complex chain of input-output relations with other firms. (Management/Strategic Networks)
Williamson (1996) book	The embeddedness that matters to the transaction cost model because of the information and opportunities it offers and is considered in the institutional environment as a locus of shift parameters. (Economic Networks)
Economides (1996) IJIO	Links that connect nodes. There are one-way and two-way networks according to the economic feasibility of the links between two nodes. It is emphasized that network externalities occur when the benefits of adopting some type of technology or contract increase with the expected number of adopters. This would confer increasing returns on adoption by one party. (Economic Networks)
Gulati (1998) SMJ	A set of nodes (e.g., individuals or organizations) linked by a set of social relationships (e.g., friendship, transfer of funds, overlapping membership) of a specified type. This could include horizontally and vertically connected firms. (Strategic Networks)
Gulati , Nohria and Zaheer (2000) SMJ	Strategic networks encompass a firm's set of relationships, both horizontal and vertical, with other organizations – be they suppliers, customers, competitors or other entities – including relationships across industries and countries. These strategic networks are composed of inter-organizational ties that are enduring, are of strategic significance for the firms entering them, and include strategic alliances, joint ventures, long-term buyer-supplier partnerships and a host of similar ties. (Management/Strategic Networks)
Antia and Frazier (2001) JM	Formal networks among agents comprise consciously planned and designed sets of relationships, while informal network ties are spontaneous and shadow formally prescribed work flow and authority relationships. This suggests that individual relationships are embedded in a context of other relationships that could have governance implications. (Information Networks)

Note: The theoretical domain is in parentheses at the end of the definition. Acronyms of journals: AJS: *American Journal of Sociology*; AMJ: *Academy of Management Journal*; AMR: *Academy of Management Review*; ASQ: *Administrative Science Quarterly*; ASR: *American Sociology Review*; IJIO: *International Journal of Industrial Organization*; JBV: *Journal of Business Venturing*; JM: *Journal of Marketing*; ROB: *Research on Organizational Behavior*; RP: *Research Policy*; SMJ: *Strategic Management Journal*; SJM: *Scandinavian Journal of Management*.

As shown in Table 2.2 (and complemented in Appendix A), networks are investigated in relation to alliances (e.g., Gulati, 1998), organizational management (e.g., Kenis and Kenock, 2002), organizational learning (e.g., Kogut, 2000), strategy formulation (e.g., Jarillo, 1986), strategic groups (e.g., Peteraf and Shanley, 1997), preferred suppliers (e.g., Dyer, 1996), international relationships (e.g., Hakansson and Johanson, 1993) and marketing channels (e.g., Antia and Fra-

zier, 2001). Others have investigated networks as webs of firms connected by ICT and forming virtual organizations (e.g., Ahuja and Carley, 1999). One of the main contributions of the Industrial Marketing and Purchasing Group (IMP) on network research is the actor, resource and activity model (Håkansson 1982). The industrial network approach mostly focuses on exchange relationships between production and distribution firms. Because activities are interdependent, coordination is based not only on market forces but also on the actors, resources and activities that are part of the relationship (e.g., Hakansson and Snehota, 1989).

This diverse array of definitions and domains is helpful for understanding the phenomenon of networks. Every definition describes networks as a set of dense interdependent business relationships that can evolve out of a manager's personal ties or out of market-based relationships. The primary benefits of networks are information and access to resources. Interdependence is viewed as an important force binding organizations within a network. Despite the tendency to study the negative role of dependency (e.g., Heide and John, 1988), in network studies firms are interdependent along beneficial dimensions (see Lazzarini, Chaddad and Cook, 2002). The network has also been considered a governance structure, as an alternative to the traditional spot market and vertical integration (Thorelli, 1986; Powell, 1990). Networks are further recognized as supporting the relational, bilateral 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. Following studies that consider networks as supportive of bilateral governance, this study places networks central in the explanation of buyer-supplier relationships (Larson, 1992).

Networks have often been studied in a setting of bilateral governance (e.g., Larson, 1992), where collaboration, trust and transaction-specific investments are expected from parties involved in a buyer-supplier relationship. 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 efficient supplier networks. In the same line of findings, Saxenian (1991) in the computer industry and Larson (1991) 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, (1999) 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. Market researchers in Europe have pointed out that stable long-term linkages among industrial manufacturers sharing R&D facilitates the development of resources and personnel (Johansson and Matson, 1985). Swedish construction firms invest in connections with other firms and pool information that fosters resource integration and innovation and blurs independent identities (Hakansson, Havila and Pedersen, 1999).

A review of the literature echoes the role of information in supporting a relationship in terms of innovation (Kogut, 2000), resource exchange (Kenis and Kenock, 2002), sentimental attachment (Gulati, 1998), control and coordination (Larson, 1992), business opportunities (Hakansson and Johanson, 1993), capabilities (McEvilly and Zaheer, 1999), monitoring (Williamson, 1996) and the setting of trade conditions (Stern, El-Ansary and Coughlan, 1996). Moreover, recent studies focus on the information benefits provided by networks, and found that information directly affects the integration of complementary resources for improving processes in a specific relationship (Gulati, Nohria and Zaheer, 2000; Antia and Frazier, 2001).

At present, many scholars invoke a multidisciplinary approach to study a firm's network. Networks are viewed as a kind of 'organizing logic', in that they support and govern relations among firms. This allows researchers and managers to systematically analyze networks by describing patterns of relations and by consciously considering their impact on organizational functions. This analytical approach views networks as a relevant force, external but contingent to the relationship.

The multidisciplinary approach is in sharp contrast with the atomistic position most often taken by economists whereby firms evaluate alternative courses of action without reference to the social structure. The instances where economists do take into account the role of external organizations (see Williamson, 1996: 229) are usually encapsulated within measures of competitiveness or the institutional environment. Williamson (1985) pointed out that the lower the level of competition (or the number of network relations), the more likely a firm is to be exposed to small number of alternative counterparts and other forms of opportunistic behavior. Network theorists have described such approaches as undersocialized, since they do not capture in any detail the constraints and opportunities posed by the firm's network connections. Network theorists are also critical of the other extreme, which they describe as oversocialized. Such a position has been attributed to many sociologists who argue that an individual's actions are completely determined by the social context. Instead, they propose an intermediate approach which allows for purposive action within some structural constraints (Granovetter, 1992). Ford et al. (2003) put forward three paradoxes of the network, which describe the structural constraints in detail (Box 2.1).

Box 2.1 The network paradoxes

1. *The network can be both a source of freedom for a firm and a cage that imprisons it.* The managerial implications of this paradox are threefold. First, managers must consider their firm's position with respect to its counterparts. Change and development may be constrained or fostered by the firm's network. Second, a manager must manage other people's expectations. Managing expectations is a particular problem for a company seeking change. Unless expectations are or can be made realistic, then change will be difficult to achieve. Third, change or development must be initially attempted with existing counterparts. Experience with and trust in one another make it difficult for a firm to achieve change by changing its counterparts. Changing counterparts always takes a long time and involves considerable investment. A way to cope with this first paradox is by networking (both the firm and the individual managers working in it). Firms face the choice of when to 'confront' the status quo of accepted ways of operating and when to 'conform' to a particular way of operating. In order to structure the network, firms must continuously make decisions that are an integral part of its regular interactions with its counterparts.

2. *The firm itself is the outcome of its relationships and of what has happened in them.* The managerial implications of this paradox are threefold. First, firms are conditioned by their set of relationships. Relationships can provide access to information held by counterparts and enable firms to develop and exploit opportunities. The knowledge, understanding, norms and values that the firms have acquired are a source of strength, efficiency and comfort. Second, firms need to seek commonality in their relationships. The costs and time involved in building relationships and in adjusting to different ways of behaving mean that it may be sensible for a firm to develop new relationships which display some commonalities with existing relationships. Third, a firm cannot afford to make all adaptations needed to satisfy the requirements of each of its relationship counterparts, nor can it manage all its relationships individually. Thus it will be necessary to reduce costs and enhance benefits

Box 2.1 Continued

by seeking to standardize its relationships either by content or requirements. The networking aspect with regard to this second paradox refers to the choice about position. Networking involves the choice between 'consolidation', by establishing and strengthening an existing network position, or 'creation', by establishing a new position and changing the combination of existing relationships or developing new ones.

3. *Controlling the network has destructive implications for the network.* The managerial implication of this paradox is that firms must manage their network and not attempt to achieve control over it. If a firm were ever to achieve such overall control, then the only source of wisdom and innovation in the network would be the firm itself. Instead, each firm must aim to manage its own network to gain advantage from the actions of others, profiting from others' initiatives while seeking their own benefits. This requires that firms accept conflict, since it is inevitable in a network and is a source of change. For firms to truly cope with this paradox, they must choose how to network. The choice is when to coerce others to do their wishes and when to concede to the wishes and initiatives of others. This is certainly not a dichotomous choice. Firms may simultaneously attempt to coerce some counterparts while conceding to others or execute both simultaneously in different parts of each relationship.

Source: Ford et al. 2003.

2.2 Supply Chain Management

The study of business networks has much to gain from the existing literature on supply chain management. Scholars have already recognized the importance of chain and network science (see Omta, Trienekens and Beers, 2001). Supply chain management asserts that one way for firms to pursue their objectives is by seeking cooperation in chains, since such chains can raise performance levels above those attainable in spot-market operations. By working together, firms organize and govern the consecutive steps from raw materials and intangible inputs to consumer products and services, in the end forming their network. Various definitions of the supply chain emphasize the flow of value between organizations and describe chain cooperation. Hagelaar and van der Vorst (2002) highlight four definitions that have come out of the debate:

By focusing on consumer needs a network will develop common activities and exchange of people, resources and information (Zuurbier, Trienekens and Ziggers, 1996).

The integration of business processes from consumer to the original suppliers leads to product-service information that has added value to customers (Lambert and Cooper, 2000).

A supply chain is a system whose constituent parts include material suppliers, production facilities, distribution services and customers, linked together via the feed-forward flow of materials and the feedback flow of information and financial capital (Stevens, 1989).

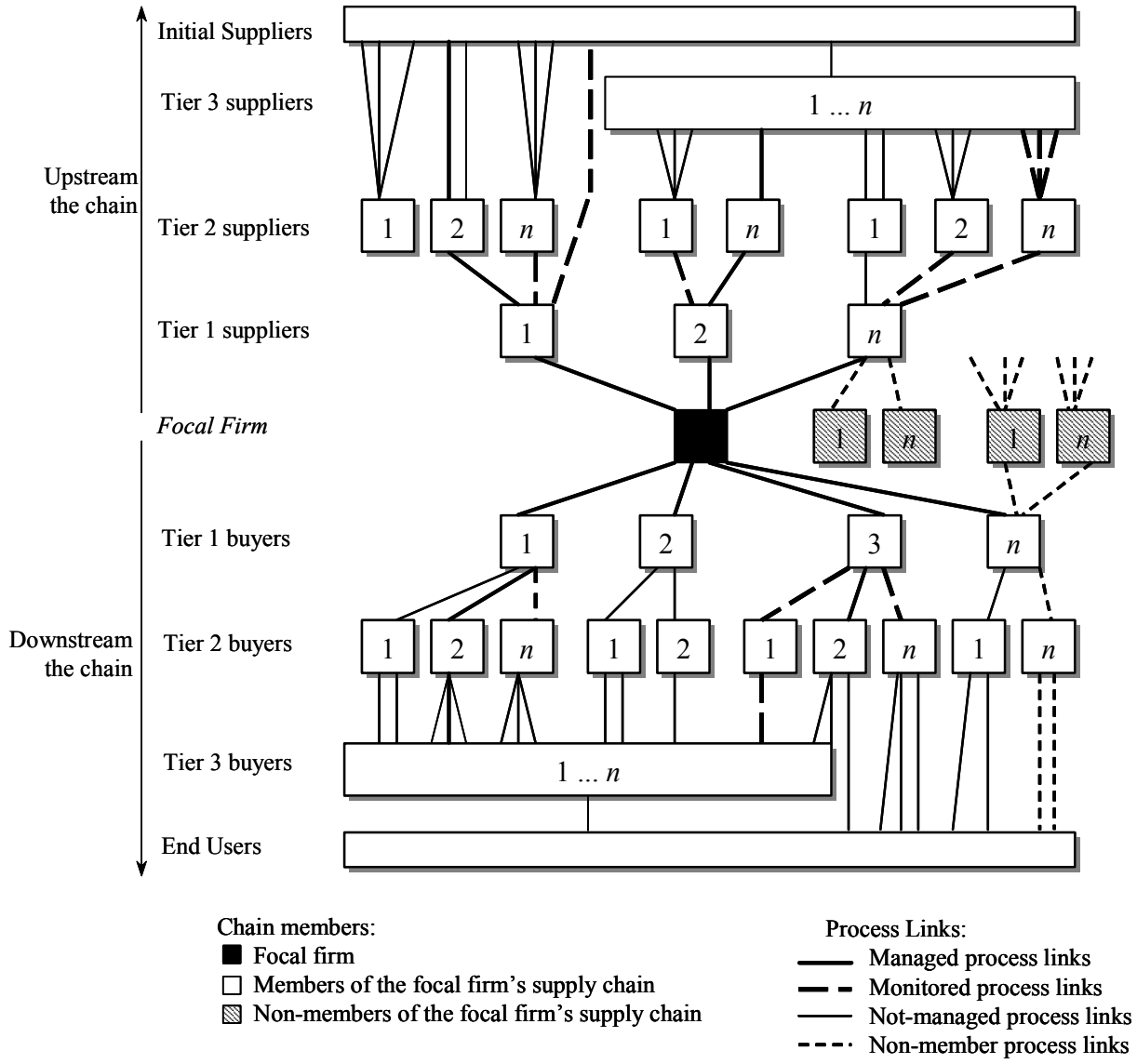
A supply chain is a network of organizations involved through upstream and downstream linkages in different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer (Christopher, 1998).

These definitions differ in many respects, since they are designed to limit a particular field of research or to fit a specific situation. However, each emphasizes that a product is transferred between firms before it reaches the consumer, and consequently a 'chain network' of firms transacting with each other is built (Omta, Trienekens and Beers, 2001).

There are four major characteristics of a supply chain (Lambert and Cooper, 2000). First, it evolves through several stages of increasing intra- and inter-organizational, vertical coordination;

and it spans from the initial source (the supplier's supplier) to the end consumer (the customer's customer). Second, it potentially involves many independent firms. Thus managing relationships is essential. Third, a supply chain includes a bidirectional flow of products (materials and services) and information and the associated managerial and operational activities. Finally, supply chain participants seek to fulfill the goals of providing high customer value with an appropriate use of resources and of building competitive chain advantages. Figure 1.1 depicts a typical supply chain structure. It shows that supply chain management places a firm in the center of a network of suppliers and customers with process links between members.

Figure 2.1 Supply chain structure



Source: Adapted from Stock and Lambert (2001).

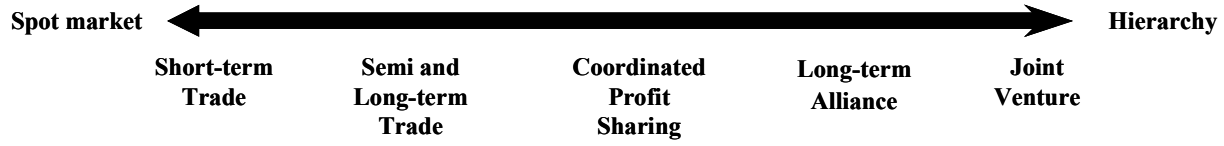
The firms that are proactively involved in the sequential processes and activities that produce a specific product or service are the 'primary supply chain members'. In contrast, the 'supporting members' of a chain are companies that simply provide resources, knowledge, utilities or assets to the primary members (Stock and Lambert, 2001). This terminology derives from Porter's (1985) method of distinguishing between value-adding and support activities in his 'value chain' framework. The primary chain members involved in the same process/activity compose one tier

within the supply chain. The number of tiers across the supply chain has been termed the 'vertical structure'. The 'horizontal structure' refers to the number of suppliers/buyers at each tier level. The ranking of the tiers is subject to the perspective of the company that is chosen to be the focal firm of the supply chain. The 'vertical position' refers to the focal firm's distance from the initial source of supply and the ultimate consumer. Obviously, the focal firm is not linked to all tiers of the chain directly; however, indirectly it is.

With its first-tier suppliers and buyers, the focal firm maintains the so-called 'managed process links'. 'Monitored process links' are less critical to the focal firm, but they nonetheless require some attention, since the links must be appropriately managed by other chain members. Links in which the focal firm is not actively involved and which are not critical enough to use resources for monitoring are referred to as 'not-managed process links'. A final category of process link involves the 'non-member process links', which exist between members of the focal firm's chain and non-members of the supply chain (e.g., competitors). These links affect the performance of the focal firm and its supply chain (Stock and Lambert, 2001). Every process link is a relationship. Together they form the network of a supply chain. The supply chain is more than the sum of its individual members, because the members maintain relationships with each other (Davis and Goldberg, 1957). Thus, how the supply chain is managed depends on the way relationships are organized.

Within a supply chain, relationships may take various forms: vertical integration, long-term contracts or market transactions. Van der Vorst (2000) views supply chain management as lying between fully vertically integrated systems and those in which each member operates completely independently, in other words, spot-market governance. Slack, Chambers and Johnston (2001) distinguished five forms of organizing relationships in a supply chain: short-term trade, semi- and long-term trade, coordinated profit sharing, the long-term alliance and the joint venture (Figure 2.2).

Figure 2.2 Forms of organizing relationships in a chain



Source: Adapted from Slack, Chambers and Johnston (2001).

At one extreme of the continuum is the pure spot market. The spot market is described by Williamson (1985) as discrete exchanges wherein the identity of parties, the time dimension and the product characteristics do not matter. An illustration of this discrete exchange is the situation in which there is a "*one-time purchase of unbranded gasoline out-of-town at an independent station paid for with cash*" (Dwyer, Schurr and Oh, 1987). At the other extreme, is the pure hierarchical organization. The extreme pole of hierarchical forms is the completely vertically integrated firm. All activities, from sourcing raw materials up to the sale to end consumers, are coordinated by a single company. Although such extreme manifestations are seldom found in practice, the notion of pure forms provides a useful analytical baseline from which the intermediary forms can be derived.

Looking more closely at the five forms of organizing a relationship, *short-term trade agreements* are single transactions after which the relationship ends. This form of organization often comes about through price negotiations, and sometimes information flows and other factors play a role (e.g., a reputation of having been cheaper in past transactions). Goods bought through short-term agreements are mostly standardized products unrelated to core production processes. Eventually,

such agreements may be used as a trial when a firm is looking for a new partner. Most decisions are based on cost reduction and price. Consequently the benefits of a longer-term agreement, such as collaboration and better coordination of activities and resources, are lacking.

In real life, many trade agreements are made without a formal contract that legally binds firms. Slack, Chambers and Johnston (2001) call these relationships *semi- and long-term trade agreements* when, for instance, a firm supplies a buyer a (fixed) quantity of a certain product during a certain time period. The price is often settled beforehand. The implications for vertical coordination are important for the firms' joint competitive advantages because such agreements can reduce risks of opportunism or shortages.

Coordinated profit sharing requires a certain degree of legal formalization. This form of organizing a relationship is often used for licensing and franchising. Proprietary goods, services or information are transmitted to mainly smaller organizations from which the owner receives a fixed guaranteed income. The service sector (e.g., fast food) uses this kind of agreement (Neves, 1999).

Alliances are forms of organization which entail the mutual exchange of property rights, technology, employees, information, goods and services, while the firms remain independent. They keep their own identity, culture and structure; however, freedom of either party may be limited. *Joint ventures* are a special type of alliance in which a new firm is created and owned by the alliance partners. Alliances and joint ventures generally aim to share risks, revenue, technology and innovations and they are characterized by high dependence (Kemp, 1999).

In our view, buyer-supplier relationships may take on any of the forms discussed above, bounded at one extreme by the pure hierarchy and at the other extreme by the pure spot market. Buyer-supplier relationships might be long-term or short-term and may or may not be governed by a formal contract. Thus buyer-supplier relationships are influenced by the degree of such elements as collaboration, trust and transaction-specific investments, which in fact form the basis of joint competitive advantage.

The buyer-supplier relationship can therefore be understood as an exchange between two parties that involves not only a transaction but also social elements (Claro, Hagelaar and Omta, 2003). Moreover, the transaction entails economic logic. No firm sells or buys goods or services without thinking about exploiting a benefit (this includes non-profit organizations, which exploit a promotional benefit when undertaking a campaign). Transactions do not occur in a vacuum, but rather are surrounded by the social structure, the network of connected relationships of suppliers and buyers. One could liken this structure to lubricants that in hard economic transactions enable the positive behavior of human beings to prevail over self-seeking behavior (Arrows, 1974; Granovetter, 1985).

Studies of buyer-supplier relationships have been primarily based on economic and organizational theories. The theories most frequently used are three: transaction cost economics (Williamson, 1985), the marketing channels perspective (Stern, El-Ansary and Coughlan, 1996) and relational contracting perspective (Macneil, 1981). Each of these theories offers its own focus, assumptions and framework for studying the buyer-supplier relationship. Nevertheless, they do provide overlapping and rather complementary explanations for the particulars of the relationships. The starting point is the well-known and extremely influential article *The Nature of the Firm* with which economist Ronald Coase (1937) began a revolution in economic and organizational theory by asking an innocuous question: *Why do firms exist?* The whole discussion focused on the competitive market theory, which posits the price system as a perfectly coordinating mechanism for goods and services provision. Research in the fields of buyer-supplier relationships has shown that collaborative modes of governance successfully replace the price mecha-

nism where there is, for instance, an influential connected relationship and transaction-specific investments (e.g., Anderson and Narus, 1990; Anderson, Hakansson and Johanson, 1994). Buyer-supplier relationships too can be examined through the lens of these three theories. The remainder of this chapter introduces these theories and describes how they can help to explain the governance of a buyer-supplier relationship.

2.3 Transaction Cost Economics

Transaction cost economics (TCE) focus primarily on the costs involved in making transactions rather than the costs of producing a product. TCE thus emphasizes the elements that govern transactions. Here the term 'governance' is defined broadly as the 'mode of organizing' (Williamson, 1991). Governance is viewed in terms of the design of the particular mechanisms supporting an economic transaction where there is an exchange of property rights. TCE tries to derive the optimal governance mechanism under a certain set of situational contingencies (Barney and Hesterly, 1999). Three assumptions underlie decisions on a given governance mechanism. First, individuals in any economic system have a bounded rationality. This means that while people intend to be rational, in reality their cognitive capabilities are limited. Second, at least some individuals are inclined to be opportunistic or to act in self-interest with guile. Third, information is asymmetrically distributed. Thus, the parties to many transactions have access to only incomplete, imperfect or imbalanced information (Williamson, 1985). Based on these three assumptions, TCE explicitly considers the efficiency implications of adopting alternative modes of governance in transactions.

According to TCE, collaboration in a buyer-supplier relationship is based on the lowest transaction costs. It compares alternative governance mechanisms, which can range from vertical integration to spot-market exchanges. In the TCE framework, the costs of any transaction comprise the costs of planning, adapting and monitoring operations (Williamson, 1996), also known as 'coordination costs' among organizational theorists (Douma and Schreuder, 2002). According to Williamson (1985), in the case of a high level of collaboration, the buyer-supplier relationship will be close to the vertical integration mode of governance, whereas in cases of lower levels of collaboration the relationship will be close to the other extreme, the spot-market mode of governance. In the original framework to study the governance mechanisms, Williamson (1985) refers to three dimensions, namely transaction specific investments, uncertainty and frequency. Because transaction costs are difficult to measure, the transaction-specific investments are mostly used to determine the optimal governance mechanism of a transaction[2].

Transaction-specific investments involve human and physical assets that are dedicated to a particular relationship and cannot easily be redeployed. The idiosyncratic nature of these assets gives rise to a safeguarding problem, and consequently a mechanism must be designed to minimize the risk of subsequent opportunistic behavior (Anderson, 1988). According to Williamson (1996), transaction-specific investments are so critical that they transform the nature of the exchange; rendering firms both valuable and vulnerable positions. In a valuable position, the investments allow for coordination of activities and exploitation of complementarities of assets. In a vulnerable position, transaction-specific investments can create a situation in which the number of potential partners is small and a firm becomes dependent on its counterpart (Kemp, 1999).

[2] The original TCE framework proposes that the choice of the governance mode can also be influenced by the uncertainty and the frequency of the transaction. Since the study of buyer-supplier relationships focuses on recurrent transactions (Van der Ven and Walker, 1984) and the uncertainty faced by the transactional partners within the same industry are typically alike (Klein, Frazier and Roth, 1990; Ganesan, 1994), transaction-specific investments become the most critical dimension of a buyer-supplier relationship in the context of our discussions. Additionally, more recent studies have pinpointed the transaction-specific investments as the most critical dimension of a transaction (for a review see Rindfleish and Heide, 1997).

The firm cannot rely on a spot-market transaction because of the relatively high specificity of the assets. For safeguarding or exploiting the advantages of specific investments, the high specificity requires close collaboration or, in extreme situations, even vertical integration.

In spite of the explanatory strength of the degree of transaction-specific investment to the specific design of a buyer-supplier relationship, we can identify some drawbacks of the TCE framework. The first criticism of TCE is that transactions are considered a phenomenon isolated from their environment. TCE focuses on a single transaction as the unit of analysis, ignoring other relationships that surround the focal transaction and could be contingent on them (Cook and Emerson, 1978). Such embeddedness of transactions is especially likely to be present in a recurrent set of transactions in long-term buyer-supplier relationships. Second, TCE does not explicitly consider the dynamic evolution of governance mechanisms and transactions (Ring and Van der Ven, 1992). Third, TCE can be challenged based on its view of individuals as being motivated by self-interest with guile (Powell, 1990; Barney and Hesterly, 1999). It seems that many forms of organizational interactions are based on a gradual development of trust, helping firms to lower the part of transaction costs related to safeguards against opportunism (Anderson and Narus, 1990). Apart from calculative trust (Williamson, 1993), TCE generally overlooks the implications of the affective and other features of trust (these are discussed later, in section 3.2.2) (Rindfleish and Heide, 1997; Barney and Hesterly, 1999). Considering these limitations of TCE, scholars aiming for a better understanding of buyer-supplier relationships have also employed the marketing channels perspective, discussed below.

2.4 Marketing Channels Perspective

According to Stern, El-Ansary and Coughlan (1996), the traditional management of marketing channels literature consists of two main streams, namely the microeconomic and the behavioral streams. The microeconomic stream draws on elements of the functional and institutional marketing perspectives as well as neoclassical economics to explain the manner in which individual marketing functions are allocated across types of institutions. The general decision criterion underlying these models is economic efficiency, and particular marketing functions are considered candidates for contracting out or functional spin-off (Stern, El-Ansary and Coughlan, 1996). The implicit view of buyer-supplier relationships in these microeconomic models is a choice between internal and external organization. As such, this stream parallels that of transaction cost economics (Heide and John, 1988). Yet it should be emphasized that the two approaches differ with respect to the types of costs used as explanatory factors.

In response to the limitations of the microeconomic model, a behavioral research stream evolved. The focus of this stream is on the design of the mechanism by which to control the performance of individual channel members (Stern, El-Ansary and Coughlan, 1996). In a general sense, governance in this stream is a matter of establishing and employing power, to achieve the goal of coordinating the efforts of different channel members (Gaski, 1984).

Though it provides useful insights, the behavioral stream has been criticized, most commonly related to its focus on behavioral phenomena in isolation from their antecedent conditions (Heide, 1994). A joint consideration of the two research streams leads to a view of channel decisions as general trade-offs between costs and control (Hunt and Nevin, 1974). On one hand, internalizing a particular channel function is assumed ex ante to offer superior control opportunities by virtue of the employment relation created. On the other hand, the control advantage associated with ownership is likely to be a trade-off with the cost efficiency of contracting out to external specialists, who are in a position to achieve economies of scale by pooling multiple demand curves (Heide, 1994).

More recently, some authors have introduced new concepts (e.g., trust, joint action) to the study of marketing channels. They have suggested that inter-firm agreements can be structured in such a way as to make the buyer-supplier relationship a distinguishable channel (Dwyer, Schurr and Oh, 1987; Heide, 1994). Some developments have evolved from the transaction-cost framework (Heide and John, 1990; Klein, Frazier and Roth, 1990; Jap, 2001; for an extensive review see Rindfleish and Heide, 1997). Others explicitly consider the social structure of the buyer-supplier relationship (Anderson and Narus, 1990; Doney and Cannon, 1997) and the implications of embeddedness in a relationship (Anderson, Hakansson and Johanson, 1994; Antia and Frasier 2001). As such, the key issue is not necessarily ownership or integration per se, but rather the manner in which a particular buyer-supplier relationship is organized. By looking at the organization of a buyer-supplier relationship, Dwyer, Schurr and Oh (1987) pinpointed a key conceptual implication of channel relationships for the development of marketing channels. That is, the relationships provide an important frame of reference for identifying the network of individuals and organizations that participate in the formation and execution of a specific buyer-supplier relationship. This key conceptual benefit allows for careful consideration of antecedent conditions and processes of the buyer-supplier relationship. These antecedents and processes are based on the bilateral governance proposed in relational contracting theory (Heide, 1994; Stern, El-Ansary and Coughlan, 1996). For the study of buyer-supplier relationships, this marked an important evolution of the marketing channels literature. The relational contracting theory and its bilateral governance are discussed below.

2.5 Relational Contracting Theory

Buyer-supplier relationships have been studied as a form of relational exchange. Building in part on Macauly's (1963) seminal study on non-contractual business relationships, Macneil (1978) developed a formal typology of discrete versus relational exchange. Discrete exchange is consistent with the underlying assumptions of neoclassical economic theory, in which individual transactions are assumed to be independent of past or future relations between the contracting parties and constitute nothing more than the transfer of ownership of a product or service (Macneil, 1980). This resembles the spot-market transaction as proposed in transaction cost economics. The classic example of a discrete exchange contract is the taxi an individual takes in a large city. The chance that this individual will use the same taxi again is remote. In organizational terms, the sale of an item in an auction system can be seen as a discrete exchange.

Relational exchange, in contrast, explicitly accounts for the historical and social context in which recurrent transactions take place. It views enforcement of obligations as following from the mutuality of interests between a set of parties (Macneil, 1980; Dwyer, Schurr and Oh, 1987; Dyer and Singh, 1998). In relational exchanges, individual goals are reached in a bilateral system through joint accomplishment (Heide, 1994), while concern for the long-run benefit of the system serves to restrain individual tendencies to pursue their own self-interests in an opportunistic fashion (Ouchi, 1980; Dyer and Singh, 1998). This bilateral governance incorporates the spirit of a collaborative buyer-supplier relationship in which individuals' utility functions are subsumed by the global utility of the system, and individual decision makers adopt a joint action orientation (Macneil, 1981).

For analytical purposes, the buyer-supplier relationship as governed by a bilateral system differs from the other governance mechanisms implied in the frameworks discussed previously. Specifically, transaction cost economics has been criticized for failing to account for the social structure in which an exchange is embedded (Granovetter, 1994) and for overemphasizing the ability of vertical integration mechanisms to govern transactions (Williamson, 1985). The valuable insights

of bilateral governance have now been explicitly incorporating Macneil's (1978, 1981) notions on relational exchange.

Drawing on the factors influencing buyer-supplier relationships as described by the bilateral governance concept, the critical elements of the relation that deserve attention are trust, transaction-specific investments and the dimensions of collaboration, namely joint action and the norm of flexibility. By focusing on the bilateral governance of relationships, we are now in position to discuss the implications of networks for managing buyer-supplier relationships.

2.6 Governance of Buyer-Supplier Relationships

In our view of business networks and buyer-supplier relationships, the governance employed by firms can follow the relational contract proposed by Macneil (1981), the network form of relationship proposed by Powell (1990) or the bilateral governance proposed by Heide (1994). Because the network may influence the management of a buyer-supplier relationship, it is important to discuss the design, processes and implications of the governance mode of a relationship. Table 2.3 depicts the key features of the buyer-supplier relationship and the two extreme poles of governance.

The spot market is characterized by the spot transaction, a one-time exchange that seldom involves a future appointment (e.g., payment occurs in cash). Past and future interactions are not taken into account. While the spot market is composed of discrete transactions, a buyer-supplier relationship is made up of heterogeneous events that are to some degree integrated, which is called the bilateral mode (Zylbersztajn and Farina, 1999). In a buyer-supplier relationship, partners are independent and exhibit few of the employment characteristics that are typical of vertical integration (Macneil, 1981).

Table 2.3 Key governance features of buyer-supplier relationships compared to the spot market and vertical integration

	Characteristics		
Key Features	**Spot Market**	**Buyer-Supplier Relationship**	**Vertical Integration**
Normative basis	Discrete transactions	Bilateral mode	Employment relationship
Organizational climate	Suspicion	Collaborative and open ended	Formal and bureaucratic
Information exchange	Vague and price oriented	Network, a valuable source for supporting the relationships	Strict to formal communication procedures
Governance driver	Prices and other market forces	Relationism: joint actions	Routines (command)
- Method of conflict resolution	Haggling	Joint problem solving and flexibility for adjustments	Supervision and administrative fiat
- Method of mutual understanding	Prices	Joint planning	Authority
Transaction-specific investments	Low	Medium to high	High
- Approach to resources	Independent	Interdependent (complementarities)	Dependent
- Switching costs	Low	Medium	High
Trust among the parties	Low – rather inexistent	Medium to high	Medium to high
Time orientation	Discrete	Long term	Long term (hierarchy)

Source: Adapted from Powell (1990), Heide (1994) and Macneil, (1978).

In buyer-supplier relationships, the organizational climate of interactions between partners is rather collaborative and open ended by nature, whereas suspicion is the climate in a spot market and a formal hierarchical structure sets the climate in vertical integration. Heide (1994) distin-

guished unilateral and bilateral exchanges. In bilateral exchanges, which are the governance form of the buyer-supplier relationship, parties collaborate by means of jointly developed plans directed toward the achievement of certain goals. In contrast, in vertical integration, unilateral exchanges rely on bureaucratic and authoritarian structures that confer power to impose rule, give instructions and decide on one partner.

The climate of the relationship impacts the source and content of the information exchanged. Vertical integration typically relies on the formal hierarchical structure to access and provide information. In a spot market, networks can play a sourcing role, but the information is usually vague and price-oriented. On the other hand, in buyer-supplier relationships the network figures as an important and valuable source of information (Powell, 1990). By accessing information about, for example, trade conditions, production and logistic processes, and to monitor the counterpart's actions, the connected relationships of a network support specific buyer-supplier relationships.

The governance driver of a buyer-supplier relationship is joint action. These relationships rely on joint problem solving for conflict resolution and on joint planning as vehicle for achieving mutual understanding. Plans provide the frame of reference within which the parties jointly participate in the formulation process. The joint problem solving is necessary to resolve disagreements that emerge in the process of maintaining the relationship, even when planning was done at the outset. Given the dynamics of the environment and the shared decision-making roles of the parties, joint problem solving and joint planning are both essential to success (Zaheer, McEvily and Perrone, 1998). In contrast, the governance drivers of the spot market are demand, supply and prices, which imply an ambiguous haggling method of conflict resolution and strong reliance on prices as a method for understanding the counterpart. Under vertical integration, the driver for resolving conflict is routine-based and the power of fiat and authority are key in reaching mutual understanding.

The approach to investments differs distinctly among the three modes of governance. In buyer-supplier relationships, firms have more flexibility to change partners as compared to vertical integration, because switching costs and transaction-specific investments are lower. In a spot market, firms are basically independent in terms of investments. The extent to which assets are made specifically for a counterpart gives rise to two major effects on a specific buyer-supplier relationship. One, there is the risk of the counterpart acting opportunistically, reducing the price paid, because the investor is rather locked in the transaction. Two, there are complementarities that can be exploited by increasing the collaboration and coordination of activities and resources. This second effect is relevant for buyer-supplier relationships, since the degree of asset specificity is not so high as to bring with it too much risk of becoming locked in and may offer reasonable coordination benefits. Moreover, the risk of opportunism can be dealt with by using the information obtained from the network about the reputation of a counterpart.

Trust is another key feature of governance. Trust is rather insignificant in spot-market exchanges, since trust between the parties requires a certain timeframe to develop. For buyer-supplier relationships, a long-term orientation and a medium to high degree of trust are necessary conditions to achieve success (Ganesan, 1994). The implications are twofold. First, the long-term orientation creates security and stability that encourages the search for new ways to accomplish tasks, promotes learning and the exchange of information, and most of all, engenders trust. Second, and complementarily, in trusting the counterpart, one treats as manageable the critical negative points of the exchange which a spot-market exchange would render uncertain.

Drawing on the factors influencing buyer-supplier relationships as described in Table 2.3, the concept of the network would seem to deserve attention. As a source of information the network

is still unexplored and reveals an interesting research topic. Following Gulati and Nohria (1994), this study views the network as an important source of information that can significantly influence a buyer-supplier relationship. The buyer-supplier relationship, as studied in its bilateral governance form, is composed of three conceptual elements: transaction-specific investments, trust and collaboration. These elements form the essential components of the buyer-supplier relationship and are capable of elucidating the relationship phenomenon. As previous research has shown, these essential components of the buyer-supplier relationship are critical for the success of any trade.

2.7 Concluding Remarks

This chapter discussed the organizational and economic theories most often mentioned in the relationship literature. They were five: network theory, supply chain management, transaction cost economics, marketing channels and relational contracting theory. Each of these theories offers its own focus, assumptions and framework for the study of how buyer-supplier relationships are managed. At the same time, they provide overlapping and rather complementary explanations for the particulars of such relationships. Chapter 2 discusses in more depth the concepts of the network vis-à-vis the buyer-supplier relationship.

Chapter 3

Toward a Theoretical Framework

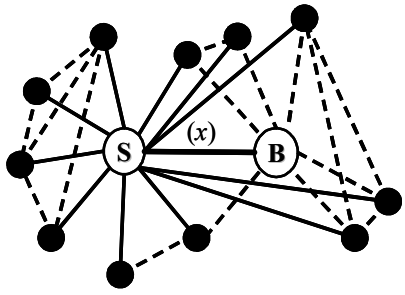
This chapter discusses in more depth networks and the conceptual elements of the buyer-supplier relationship. Chapter 2 presented the theories that form the basis of our study. Based on the previous discussion of the governance features of buyer-supplier relationships, this chapter aims to refine our thoughts about each element of the theoretical framework.

3.1 The Network Concept

A network can help shape buyer-supplier relationships, because it binds different connected relationships together. Relationships are connected in the sense that decisions made in a focal relationship are supported by the valuable information provided by other relationships (Gulati, 1998; Hakanson and Snehota, 1995; Burt, 1997; Blankenburg, Eriksson and Johanson, 1999). Generally speaking, firms link to one another to create bonds that serve both as a lubricant for getting things done and as a glue imposing order and meaning (Granovetter, 1985). Since no relationship exists in isolation, what happens or is achieved in one relationship will always relate to what is happening in at least some others (Anderson, Hakansson and Johanson, 1994). For example, if a supplier invests in developing a new product with a specific buyer, they could successfully apply information about the production and logistic processes used in other connected relationships. The supplier might also be able to use the same approach with other buyers in other regions. The network then can be said to possess informational advantages that go beyond information exchange in only one dyadic relationship.

Consider for instance the illustration in Figure 3.1 of a focal supplier 'S' that has a buyer-supplier relationship (x) with a buyer 'B' and maintains several connections with other firms (black lines and circles).

Figure 3.1 A business network



The connections that firm 'S' maintains with the other firms in the network provide information that might prove valuable for the relationship with firm 'B'. For instance, information transmitted through the network could help the partners to improve coordination of production processes

(Hakansson and Snehota, 1995; Hakansson, Havila and Pedersen, 1999) and logistics (Gadde and Snehota, 2000) and contribute to defining sales and purchase strategies (Stern, El-Ansary and Coughlan, 1996). By reducing information asymmetry between the partners, the network helps S to monitor the actions of a counterpart to safeguard against opportunistic behavior (Burt, 1997; Williamson, 1996). Consider the effect of S's network connections on the possibility of firm B acting opportunistically. It is crucial for S to create a mechanism to sort out those firms that have a high potential of acting opportunistically from those that do not. The connections of a network enable firms to develop common beliefs and values, which create goal congruence among members and certainly reduce risks of opportunism.

Salancik (1995) warned of an analytical pitfall when investigating networks. He stated that researchers have looked at the "forest and disregarded the trees" (Salancik, 1995: 345). By identifying the content and source of the network, this study expects to better capture its effects and implications for buyer-supplier relationships. The 'content' refers to the valuable information obtained from different network connections. We specify information benefits, unlike previous research that adopted a more generalized view on the impact of networks. By categorizing the sources of information, we distinguish network subgroups, enabling us to understand the network in intimate detail and, more importantly, to address managerial implications in terms of network redundancy and the (ir)relevance of certain subgroups.

3.1.1 Content: Information obtained from the network

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 connected relationships serve as conduits for sharing privileged information. The value of the information lies in its content and credibility rather than in the mere infrastructure for information sharing. Firms in a network bring social capital to other network members in the form of information, which can be used as a source of reputation, contacts and referrals. The network also brings information that *a priori* affects trust, which is an important element of a buyer-supplier relationship. Firms may also share expert interpretations of information. For example, cooperatives and 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. Box 3.1 presents an example of the difference between the states of information.

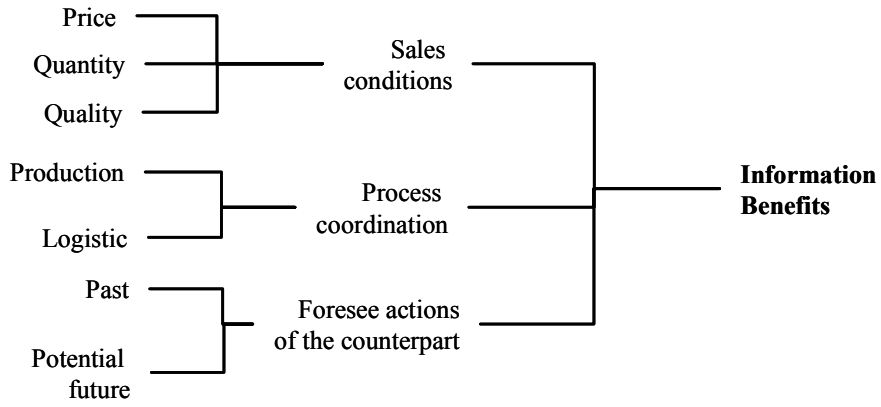
Box 3.1 Information and tacit knowledge

> While staying at a friend's vacation home, you decide to a get a takeaway meal. You find a number of menus in a kitchen drawer. The menus are an excellent source of information; however, in the absence of personal experience of these restaurants, you would gain more knowledge if your friend had noted views and personal experiences on the menus, together with cuttings of restaurant reviews from local newspapers. In essence, the goal of connecting with other people or organizations is basically to capture the tacit knowledge surrounding information (Alter, 1999).

As the example in the box illustrates, information can be transformed into knowledge when combined with experience. The distinction between tacit knowledge (i.e., in the form of know-how) and information is sometimes difficult to capture in the study of networks. Firms embedded in a network try to make use of any kind of information in any state (Granovetter, 1985). The information then reflects the stock of expertise within a firm or network that is not written down or even formally expressed but may nevertheless be essential to a firm's effective operation.

Information obtained from network connections helps firms to reduce information asymmetry in buyer-supplier relationships. 'Information asymmetry' refers to the fact that many transactions are characterized by incomplete, imperfect or unbalanced information among the transactional parties (Williamson, 1985). While public information is available to each transactional partner, private information is available only to selected organizations (Hobbs, 1996). Network connections are certainly a valuable source of information. The information transmitted through the network regards not only price formation and quality and quantity data (i.e., trade conditions), but also more proprietary and tacit types of information, such as how to improve production processes and logistics (Uzzi, 1997). Furthermore, a specific buyer-supplier relationship can derive benefits from information about the (potential) actions of a partner (Burt, 1997). Figure 3.2 depicts the information benefits of networks.

Figure 3.2 The information benefits of networks



Regarding trade conditions, the price of products offered is central in any economic exchange, and information about other deals that occurred in the surroundings can support price negotiations (Sebenius, 2002). In exchanges of products with added value, parties must consider other aspects of the trade conditions as well, such as quantities and qualities (Stern, El-Ansary and Coughlan, 1996). Information obtained through the network can impart current and historical facts about product price, quantity and quality.

Regarding process coordination, information obtained from other firms in a network can help a firm to improve its production and logistics processes. Information from networks has long been recognized as a locus of knowledge that fosters innovation and learning (Powell, Koput and Smith-Doerr, 1996; Hakansson, Havila and Pedersen, 1999; Kogut, 2000). Information derived from experiences and past deals could prove useful for developing and creatively coordinating current production and logistics. Both suppliers and buyers are interested in innovations in terms of product colors, robustness and variety. Regarding logistics, both parties want to reduce lead times and expenditures and maintain the product's quality attributes. Lack of specific information on how to handle products during transportation can undermine product quality, especially of perishable, delicate products. In some cases, other firms in the network may have overcome such problems and thus be able to convey valuable information to counterparts in a buyer-supplier relationship.

Information on a buyer's past and future actions enables firms to avoid unexpected moves by a transaction counterpart. In the business relationship literature firms are considered to act collaboratively, but eventually some 'self-interest seeking with guile' may emerge through opportunism (Williamson, 1985). Opportunism encompasses a diverse set of sources and outcomes (for a de-

tailed discussion on opportunism see Wathne and Heide, 2000). Information from the network can reduce the room for opportunism. Incomplete or distorted disclosure of information can conceal negative behaviors, such as a firm's failing to abide by honor contracts or its word. It is then crucial for firms to have access to information from other firms that might have been related to a counterpart in order to evaluate past actions and potential future actions.

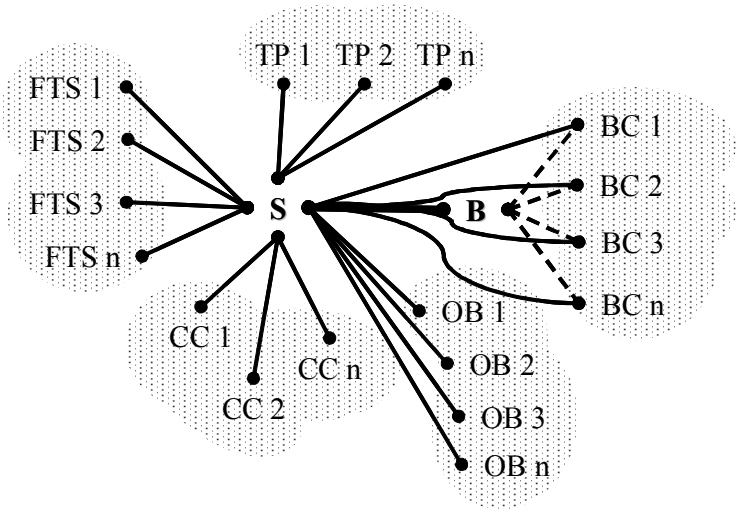
In sum, the content of information relates to aspects of trade conditions (price, quantities and qualities), process coordination (production and logistics) and monitoring the actions of a counterpart (past and future). Information that offers benefits is valuable and costly to transmit down the formal and informal hierarchical command in a relationship (e.g., complying with a contractual prerequisite or the norms) (Powell, 1990). Such information can be obtained from connected relationships with someone whom the focal firm dealt with in the past and found to be reliable. The focal firm relies on valuable information from other firms that it knows well. Considering that information must be valuable and sufficient to support decisions, selection of the relevant network connection becomes vital for firms. The next section discusses the network subgroups as the sources of information in a network.

3.1.2 Source: Network subgroups

Recent literature has emphasized the need for differentiation within the network (Omta, Trienekens and Beers, 2001). Selecting subgroups and establishing their importance is critical because there might be innumerable potential connections with different organizations (Ritter, 2000). Following Burt's (1980) suggestion to find a proper degree of actor aggregation to study networks and considering Salanacik's (1998) warning about defining a proper actor aggregation, this study uses the concept of the 'network subgroup' to refer to organizations with the same function 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 company interacts directly or indirectly through its suppliers or customers, from the point of origin to the point of consumption. The focal firm is the central unit of analysis. It is from this firm's point of view that we position all other organizations in the network. This study categorizes network relations into five subgroups: two located upstream in the chain (e.g., colleagues and input suppliers), two downstream in the chain (e.g., other buyers and buyers' customers), and one third party (e.g., mediation agents). Figure 3.3 presents a supplier's network subgroups.

Selection of the subgroups is based on the supply chain concept. This chain conceptualization refers to the commitment of suppliers and buyers to continuously create superior value for customers by encouraging connections both downstream and upstream (Porter, 1998; Trienekens, 1999; Van der Vorst, 2001). Network subgroups cover a large expanse of the network, which is useful not only for analytical purposes, but also for designing and implementing strategies by which firms can gain information benefits. Analytically and strategically speaking, differentiation of relevant subgroups in the network reduces redundancy. The way in which a network operates at a subgroup level allows firms to efficiently manage connections, avoiding those that are redundant.

Figure 3.3 Subgroups in supplier S's business network



Note: FTS: first-tier suppliers, TP: third parties, CC: S's colleagues and competitors, OB: other Bs, and BC: B's customers.

The concept of redundant connections is based on theories of weak ties (Granovetter, 1973) and structural holes (Burt, 1992). Granovetter (1973) posited that valuable information may be obtained in a network through casual acquaintances (i.e., weak ties) rather than through close connections (strong ties). He conceptualized strong ties as those with a relatively high frequency of interaction between the focal firm and the members of the subgroup. Since a subgroup of strongly connected firms is likely to interact frequently, much of the information circulating in this social system may be redundant (Granovetter, 1973). Redundant connections are defined as those that provide information that supports the relationship in ways similar to other connections. It becomes inefficient to spend time and resources on such connections because the same benefits might be easily gained with the connection to only one firm in a subgroup. Consider 'S' in Figure 3.3 above. If the network subgroups of FTS and TP both offer information that supports the business relationship in terms of developing trust with 'B', efficiency gains can be made by investing in the connection with only one of the network subgroups.

3.1.3 A workable definition of network for the study of buyer-supplier relationships

This study defines a network as follows:

"the set of connected business relationships of an organization – be they vertical (with suppliers, customers) or horizontal (with colleagues, competitors or other entities) – that can be separated into subgroups and form essential sources of valuable information that offers benefits to buyer-supplier relationships in terms of internal processes, trade conditions and foreseeing actions of the counterpart."

This definition is workable for examining both the impact of the network on buyer-supplier relationships and the scope of the concept. Since the scope of the definition is based on the dimensions of content and source, as discussed above, we can draw conclusive implications of the information provided by the subgroups for the buyer-supplier relationship. A central postulate for theorizing networks into the study of buyer-supplier relationship is that an organization's social contacts, which constitute its network, may modify its subsequent behavior (Thorelli, 1986). A primary mechanism for this subsequent behavior is the social influence. The fact that organizational actions may in some ways be predicated on the actions of other organizations is not new to sociological or economic theory. While economic accounts have examined such behavior as

competitive responses in an oligopolistic context, network theorizing has emphasized the role of imitative behavior prompted by environmental pressures (Gulati, Nohria, and Zaheer, 1999).

As presented in this discussion of the network theory, there is growing realization that the network affects firms' behavior and performance (Burt, 1997; Antia and Frazier, 2001). Just where attention is focused appears to be critical in understanding networks as a variable with impact on how buyer-supplier relationships are managed. Thus in the next section we consider the conceptual elements of the buyer-supplier relationship.

3.2 Conceptual Elements of the Buyer-Supplier Relationship

This section elaborates on the conceptual elements of the buyer-supplier relationship. These are, namely, transaction-specific investments, trust and collaboration. As shown in previous research, these essential components suggested by bilateral governance are critical for the success of any sale or purchase. Below each of these elements are discussed in depth, along with the extant literature dealing with them.

3.2.1 Transaction-specific investments

The ramifications of the decision to create specific transactional assets are the principal focus of transaction cost economics (TCE) (Williamson, 1985, 1996). TCE has focused attention on the accumulation of assets – that is, any tangible or intangible of value – that are difficult and costly to shift from one transactional partner to another. Such assets are rather customized and idiosyncratic and are therefore of considerably less value outside the focal relationship (Heide and John, 1990). Specificity arises in different ways, particularly in human knowledge and skills and in physical specificities. An example in the physical realm is when machinery is designed to have optimal value only for a particular application. Bensaou and Anderson (1999) described some examples, such as enormous oceangoing cargo ships fitted especially for crossing the Pacific and for the loading and unloading of Honda cars. While such a ship is clearly of great value to the car manufacturer, it is far less efficient in other applications, and overcoming these inefficiencies would involve expensive retrofitting.

Initially, the central proposition was that high levels of transaction-specific investments (TSI) would affect the buyer-supplier relationship negatively by fostering dependence and other governance hazards, such as opportunism (e.g. Williamson, 1985; Anderson, 1988). However, research has proven that TSI might enhance coordination and cooperation between partners (Bensaou and Venkatraman, 1995; Dyer, 1996). In strategic management, investment in specific assets can be a source of competitive advantage (Dyer and Singh, 1998). The notion of contracting with another organization, yet only partly shielding specific investments, has attracted considerable attention among particular supplier networks, supply chains and preferred buyers. In an increasingly complex, dynamic and competitive environment shaken by rapid changes in consumer wishes, technology and international trade, it has become more difficult for any single firm to 'go it alone' in all of its products and markets (Ohmae, 1989). Thus, many firms (e.g., a supplier that sells directly to end consumers) must reduce their range of activities and concentrate on a few core competences (Prahalad and Hamel, 1990), at the same time increasing the frequency and magnitude of collaboration with other firms (Contractor and Lorange, 1988). In buyer-supplier relationships, firms can focus on their own distinctive core competences (i.e., specializations) while investing in specific assets. Collaboration enables them to benefit from a counterpart's other, complementary assets, which might be difficult to appropriate, and still pursue a multitude of markets and technologies (Powell, 1990).

TSI is an important mechanism for achieving closeness in a buyer-supplier relationship. The deliberate creation of specific assets for the purpose of making it difficult for a partner to exit the relationship confers a sufficient reason for the collaborators to continue to work closely together (Williamson, 1985). This self-imposed exit barrier provides incentive for an investor to live up to its promises, suggesting that TSI acts as a safeguard against opportunistic behavior. Additionally, TSI reassures the counterpart about the intentions and integrity of the investor. Creating specific assets is known as creating credible commitments (Heide and John, 1988) or pledges (Anderson and Weitz, 1992).

The concept of TSI has been employed extensively in studies of buyer-supplier relationships (e.g., Heide and John, 1990; Klein, Frazier and Roth, 1990; Bensaou and Anderson, 1999). Given the extant literature, TSI primarily centers on the human and physical dimensions (for an extensive review see Rindfleisch and Heide, 1997). Physical TSI refers to transaction-specific capital investments that tailor processes to particular exchange partners. The physical investments investigated in previous research are customized machinery, tools and dies (e.g., Bensaou and Venkatraman, 1995). Human specificity is the degree to which the skills, knowledge and experience of firm personnel are specific to the requirements of dealing with another firm. Anderson (1988) considered specialized human knowledge in sales operations as representing the human TSI given the focus of the study on the supplier's perspective. John (1984) conceptualized specialized technical knowledge in shipping as reflecting human specificity. More recent studies have focused on human TSI as the level of training and experience specific to a product line in distribution channels (Heide and John, 1990; Bensaou and Venkatraman, 1995; Dyer, 1996).

The supplier and buyer involved in a buyer-supplier relationship may have a variety of TSI. In some cases, certain dedicated equipment must be purchased in order to sell or serve the counterpart's line effectively. In other cases, a firm's employees must be trained specifically for a particular counterpart's product line. Moreover, TSI may vary in its degree of specificity. Consider, for instance, the dedicated packing equipment that a supplier must purchase to sell products to a particular buyer. The machine purchase is completely a sunk cost and the salvage value would be close to zero if the buyer were to discontinue the supplier. Likewise, a supplier's employees being trained specifically to handle the buyer's product line is non-salvageable, because a termination of the relationship would necessitate learning the specifics of another buyer's line. Yet if the training is to some extent transferable, the degree of specificity of this investment diminishes.

3.2.2 Trust

The need for trust between partners has been identified as an essential element of buyer-supplier relationships (Anderson and Narus, 1990; Geyskens, Steenkamp and Kumar, 1998; Rousseau, et al. 1998). Previous research showed that trust is a basic requirement in the context of buyer-supplier relationships (Morgan and Hunt, 1994). According to Ring and Van de Ven (1992), trust plays a key role in any organizational relationship. Trust enables partners to manage risk and opportunism in transactions (Nooteboom, Berger and Noorderhaven, 1997). There is an element of trust in every transaction, although it varies across the transacting partners (Arrows, 1973: 23). Moreover, trust helps to reduce complex realities more quickly and economically than prediction, authority or bargaining (Powell, 1990).

Broadly defined, trust reflects the extent to which negotiations are fair and commitments are sustained (Anderson and Narus, 1990) and the extent to which one party believes that its requirements will be fulfilled through future actions undertaken by the counterpart (Anderson and Weitz, 1989, Barney and Hansen, 1994). Trust, then, refers to the shared belief that in the long run, rewards will be distributed fairly among the partners (Barney and Hansen, 1994). There is a general sense that this year's winner could be next year's loser and, consequently, to press one's

advantage opportunistically would be unadvisable. Trust is an important lubricant of relationships. It binds parties and has an important future orientation (Ganesan, 1994). It is efficient and enables a party to have a fair degree of reliance on the counterpart's word (Bradach and Eccles, 1989). Previous studies found that trust guides behavior in some business settings (Morgan and Hunt, 1994; Doney and Cannon, 1997), and when trust is operative the risk of opportunism and market instability is reduced. Moreover, Smith and Barclay (1997) found that trust significantly affects the attitudes and behavior of suppliers toward buyers (i.e., independent sellers).

A high degree of trust between the partners in a buyer-supplier relationship is conducive to coordinative behavior, whereas low trust leads to competitive behavior. This assertion follows the findings of Anderson and Narus (1990) and Gulati (1995). Long-term relationships and trust encourage effective communication, information sharing and joint pay-offs (Dwyer, Schur and Oh, 1987, Ring and Van de Ven, 1992) and might create a strong social bond (Barney and Hansen, 1994). Thus, trust significantly reduces the perception of risk associated with opportunistic behavior by a partner; it increases confidence that short-term inequities will be resolved over the long term and reduces the transaction costs in an exchange relationship (Ganesan, 1994).

Trust is a key concept in many research fields, as reflected, for example, in the marketing channels literature (Anderson and Weitz, 1989; Anderson and Narus, 1990; Ganesan, 1994; Morgan and Hunt, 1994; Doney and Cannon, 1997), organizational decision making (Zand, 1972), network literature (Thorelli, 1986; Jarillo, 1988; Powell, 1990; Larson, 1992; Uzzi, 1997; Coleaman, 1988), transaction cost economics (Williamson, 1993; Zajac and Olsen, 1993; Zylbersztajn and Zuurbier, 1999) and psychology (Rotter, 1971; Rotter, 1980). Each of these schools of thought uses a different definition of trust. Building on Geyskens, Steenkamp and Kumar's (1998) compilation of definitions of trust, we developed our own compilation that includes the network and other research traditions (Table 3.1).

Table 3.1 Representative literature on trust

Study	Research Tradition	Unit of Analysis	Conceptualization of Trust
Anderson and Weitz (1989)	Marketing channels	Sales representative and their suppliers	A firm's belief that its needs will be fulfilled in the future by actions undertaken by their partner.
Anderson and Narus (1990)	Marketing channels	Distributors and their manufacturers	A firm's belief that partners will perform actions that will result in positive outcomes for the firm and will not take unexpected actions that would result in negative outcomes for the firm.
Barney and Hansen (1994)	Management	Organizations	The mutual confidence that no party to an exchange will exploit another's vulnerabilities.
Bradach and Eccles (1989)	Management	Organizations	The positive expectation that reduces the risk that the exchange partner will act opportunistically.
Ganesan (1994) and Doney and Cannon (1997)	Marketing channels	Vendors and retail buyers	The belief that the partner is credible and benevolent.
Granovetter (1985)	Networks	Organizations	Confidence in the general morality of individuals.
Gulati (1995)	Networks	Biopharmaceutical, automotive, new materials suppliers and buyers	The particular level of subjective probability with which agents assess whether another agent or group will perform a particular action both before they can monitor such action and in a context in which it affects their own action.
Hakansson and Snehota (1995)	Networks	Organizations	A context in which the probability that a partner will perform an action that is beneficial or at least not detrimental to the counterpart is sufficiently high as to consider engaging in some form of cooperation.

Table 3.1 Continued

Kumar, Scheer and Steenkamp (1995)	Marketing channels	Car dealers and car manufacturer	The belief that the partner is honest and benevolent.
Morgan and Hunt (1994)	Marketing channels	Independent retailers and their suppliers	Confidence in the partner's reliability and integrity.
Powell (1990)	Networks	Organizations	Confidence translated into the act of taking as certain those critical aspects of life which in a business environment are rendered uncertain.
Rotter (1971, 1980)	Psychology	Individuals	A generalized expectancy held by an individual that the work, promise or statement of another individual can be relied on.
Sitkin and Roth, (1993)	Management	Organizations and individuals in the medical industry	The belief, attitude or expectation that the actions or outcomes of another individual or organization will be acceptable or will serve the partner's interest.
Thorelli (1986) SMJ and Jarillo (1988)	Networks	Organizations	An assumption or reliance on the part of A that if either A or B encounters a problem in the fulfillment of implicit or explicit transactional obligations, B may be counted on to do what A would do if B's resources were at A's disposal.
Uzzi (1997)	Networks	Apparel stores and their suppliers	The belief that an exchange partner would not act in self-interest at another's expense and operates not like calculated risk but like a heuristic – a predilection to assume the best when interpreting another's motives and actions.
Williamson (1993)	Transaction cost economics	Organizations	The rational form of trust fostered by mutual hostages, and building on reputation effects and risk.
Zaheer, McEvily and Perrone (1998)	Management	Electrical and electronic equipment manufacturers	The leap of faith by placing confidence in a referent without knowing with absolute certainty that the referent's future actions will not produce unpleasant surprises.
Zaheer and Venkatraman (1995)	Transaction cost economics	Agency and insurance representative	The extent to which negotiations are fair and commitments are upheld. Trust is a multidimensional concept, significantly developed on affective behavioral and cognitive bases.
Zand (1972)	Management	Individual managers	Actions that (a) increase one's vulnerability, (b) to another whose behavior is not under one's control (c) in a situation in which the penalty (disutility) one suffers if the other abuses that vulnerability is greater than the benefit (utility) one gains if the other does not abuse that vulnerability.

Based on Geyskens, Steenkamp and Kumar (1998: 226)

As Table 3.1 shows, significant differences in assumptions and methods exist between behaviorally oriented and economically oriented organizational scholars (Barney, 1990). On the one hand, behaviorally oriented researchers argue that most exchange partners are trustworthy, that they behave as stewards over the resources under their control and thus that trust in an exchange relationship – even without legal and contractual safeguards – will become common (Das and Teng, 1998). On the other hand, economically oriented scholars respond that it is difficult to distinguish at first between exchange partners that are actually trustworthy and those that only claim to be trustworthy (Williamson, 1993). This limits the scope of trust to that within rational prediction or calculation, wherein partners focus on collecting and processing information to forecast likely outcomes of certain future events. Although rational prediction is clearly an important part of trust, it provides a grossly incomplete understanding of trust on its own. Moreover, some economists recognize that a degree of trust must be assumed to operate, since formal control mechanisms alone cannot entirely stem force or fraud (Akerlof, 1970; Klein, 1996). Following

Wicks, Berman and Jones (1999), we identify two behavioral characteristics that add up to calculative-based trust, namely affection and belief.

First, affection is an emotion felt by people in a relationship (Rotter, 1980). Trust occurs because an emotional bond is created between individuals, enabling them to move beyond rational prediction to take a leap of faith that trust will be honored (Wicks, Berman and Jones, 1999). Some authors in the marketing channels school view affection-based trust as the benevolence of an individual toward a relationship (Anderson and Narus, 1990; Morgan and Hunt, 1994). Benevolence in a partner is motivated by concern for the well-being of the relationship itself and not by the goal of improving own welfare at the expense of the partners' interests (Ganesan, 1994). The affective aspect of trust has a clear moral element.

Second, the emotional bond in question is not just in the relationship but is, in large part, a belief in the moral character or goodwill of the trustee in the trusting relationship. Through their shared beliefs, partners can create goal congruence and so reduce the risk of free-riding and other types of opportunism (Bradach and Eccles, 1989). In the marketing channels tradition, belief-based trust is described as credibility (Kumar, Sheer and Steenkamp, 1995).

We highlight the affective and belief features because both are critical to understanding trust completely. Rational prediction (calculation) helps prevent partners from trusting blindly or foolishly. Affection and belief are necessary for developing and sustaining mutually trusting relationships, as well as for realizing the benefits that flow from trust. Thus, the level of trust can range from a degree of affection-based belief in moral character (e.g., having less than a fully effective deterrent, such as mutually assured destruction), extending up to the point at which trust is so complete as to constitute 'blind faith' in the moral character of the other (e.g., that between parent and child).

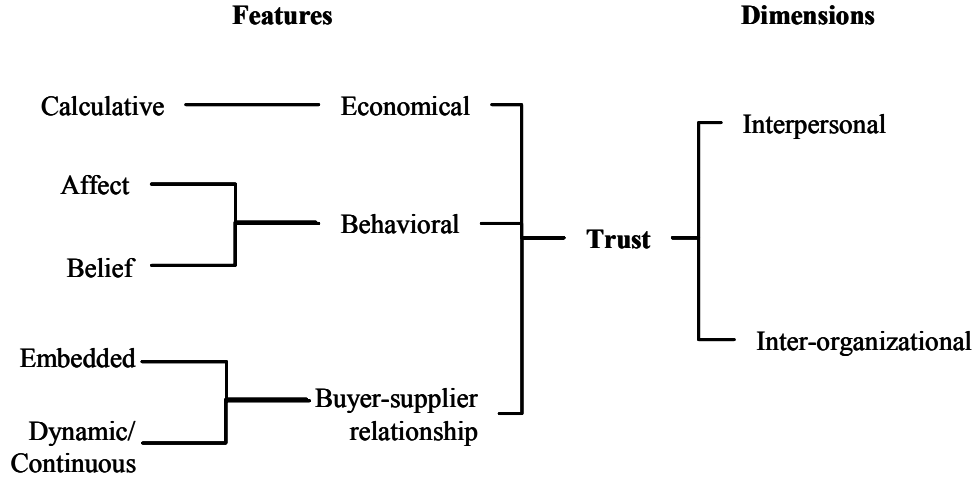
Based on this understanding, a widely accepted definition of trust refers to the belief, attitude or expectation that the actions or outcomes of another individual, group or organization will be acceptable or will serve the partner's interest (Sitkin and Roth, 1993). Although this definition embraces the calculative, affective-based and belief aspects of trust discussed previously, for buyer-supplier relationships two other features need specific elaboration. First, trust is directly influenced by the network because trust is socially embedded (Granovetter, 1985). Trust exists within a context and is shaped by the dynamics specific to a particular social setting (Powell, 1990). In his discussion of embeddedness, Granovetter (1985) demonstrated that the models used in classical and neoclassical economics (such as transaction cost economics) are undersocialized and omit the role of concrete personal relations and structures (or networks, as discussed previously). He emphasized the fundamental conceptual inadequacy of undersocialized approaches to trust (i.e., theories not taking embeddedness seriously), particularly for both describing and creating trusting relations.

Second, trust is dynamic and continuous, as opposed to being a static and discrete variable (Das and Teng, 1998; Wicks, Berman and Jones, 1999). A partner can both trust and distrust people at the same time (Sitkin and Roth, 1993). The development of trust relies on the formation of one partner's expectations about the motives and behaviors of another (Doney and Canon, 1997). Further, trust has a wide spectrum, and it can vary substantially both within and across relationships, as well as over time. As Bradach and Eccles (1989: 108) said, "*in dynamic and continuous settings, a record of prior exchange, often obtained secondhand or by imputation from outcomes of prior exchange, provides data on the exchange process. Relationships unfold so that individuals continually update their information base and their decisions to trust*."

Considering all these features of trust, two 'trust dimensions' can be defined in the buyer-supplier relationship, namely the interpersonal and the inter-organizational dimensions (see

Figure 3.4) (Rousseau et al. 1998). While some researchers have treated trust as a unidimensional construct (Anderson and Weitz, 1989; Anderson and Narus, 1990), research on interpersonal trust has shown that it is a multidimensional construct, because it relates to attitudes and behaviors (Rotter, 1967). The multidimensional approach provides a strong diagnostic instrument for examining the effects of trust. Moreover, a fundamental advantage of conceptualizing trust in these two dimensions is that the inherently individual level of the phenomenon is extended to the organizational level of analysis. Zaheer, McEvily and Perrone (1998) found significant differences between the two levels of trust in their impacts on joint actions and other relational elements of an exchange relationship. They moreover argued that interpersonal trust by itself is insufficient for managing a relationship. Rather, a combination of interpersonal and inter-organizational trust is needed.

Figure 3.4 The features and dimensions of trust



This study draws on both interpersonal and inter-organizational trust with the aim of capturing the features of trust on the personal and the organizational levels. While inter-organizational trust reflects the extent to which members of an organization have a collectively held trust orientation toward the partner firm, interpersonal trust reflects the extent to which a boundary-spanning agent trusts his or her specific counterpart within the partner organization (Zaheer, McEvily and Perrone, 1998). In a buyer-supplier relationship, interpersonal trust is that placed by the supplier's salesperson in an individual purchasing agent (or in the other direction, that placed by the buyer's purchasing agent in an individual salesperson); inter-organizational trust is that placed by the salesperson in the purchasing firm as a whole (or again conversely, the trust placed by the buyer's purchasing agent in the supplier firm).

3.2.3 Collaboration: flexibility and joint action

Collaborating partners work together to achieve mutual goals (Anderson and Narus, 1990; Morgan and Hunt, 1994). In buyer-supplier 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). Collaboration is a departure from the anchor point of discreteness that underlies spot-market transactions toward a relational, bilateral exchange. The roles of supplier and buyer are no longer narrowly defined in terms of the simple transfer of ownership of products. As discussed previously, Macneil (1981) differentiates discrete transactions from relational exchanges along several key features. Most important is the fact that relational exchange continues over time and each transaction is viewed

in terms of its history and its anticipated future. Because duties and performance may be relatively complex and occur over an extended period, the parties may direct much effort toward careful plans, which define and measure the outcomes of the exchange. Changes in agreements and problems are expected, and parties are expected to be flexible and set up a mutual mechanism to solve problems as environmental events unfold (Noordewier, John and Nevin, 1990). Thus, in relational bilateral exchange, 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).

Flexibility to make adjustments is the bilateral expectation of willingness to make adaptations in day-to-day management as circumstances change (Heide and John, 1992). 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, see Macneil, 1978: 854), which establishes the ground rules for the initial and future exchanges (Heide and John, 1992). 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 buyer-supplier 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. A high level of flexibility allows for ongoing planning and continuous adjustments of obligations between the parties, especially in a fast changing environment (Heide, 1994).

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 and Heide and John, 1992). 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 buyer-supplier 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).

The strength of these two dimensions of collaboration, joint action and flexibility, lies in their coverage of the collaboration phenomenon. They extend from ex ante to ex post actions and cover an essential relational norm. To better understand the implications of these dimensions, we now introduce the concept of performance in a buyer-supplier relationship.

3.3 Performance in the Buyer-Supplier Relationship

Research on performance of business relationships has proven arduous in organizational studies. Although various studies have been devoted to performance, the topic remains controversial. The debate derives from the fact that performance can be defined and evaluated in several ways, and few definitions and indicators of performance are widely accepted. Performance evaluation of a buyer-supplier relationship is problematic because each partner is likely to adopt idiosyncratic performance criteria, which might even be conflicting. Moreover, performance measures change over time as the buyer-supplier relationship evolves. Thus, before selecting the appropriate measures of performance for evaluating the buyer-supplier relationship, we introduce issues relevant to performance evaluation.

3.3.1 Overview of performance evaluation

In the literature of performance much attention has been devoted to three main streams: financial, organizational and strategic. In the financial stream, accounting-based indicators of performance are most popular among researchers (for a review see Murphy, Trailer and Hill, 1996). These include return on investment, return on sales, growth rate and return on assets. However, these measures are of limited value when applied to strategic issues. Seldom can all the objectives of a firm be evaluated by accounting-based measures. Furthermore, there is always some room for manipulation in the way liabilities and assets are represented, despite strict accounting legislation (Venkatraman and Ramanujam, 1986).

Organizational theory offers three approaches to measuring organizational effectiveness or performance (Murphy, Trailer and Hill, 1996). First is the goal-based approach, which suggests that a firm should be evaluated based on the degree to which it has attained the goals it set for itself. Nevertheless, firms have multiple and possibly contradictory goals. This makes cross-firm comparisons in research difficult or even impossible. Second is the system approach, which partially compensates for the weakness of the goal-based approach by considering the simultaneous attainment of multiple, generic performance targets. Neither approach, however, takes into account the fact that different stakeholders might have different perspectives on performance. The third approach, the multiple constituency approach, factors in these differences in stakeholder perspectives. The multiple constituency approach evaluates a firm by examining the extent to which the agendas of various stakeholders are satisfied.

Murphy, Trailer and Hill (1996), in comparing different measures of performance, concluded that most empirical research considered only financial performance measures. These authors argued that multiple dimensions of performance should be considered where possible, including both financial and non-financial measures. The consensus between organizational and strategic management theories about performance is found in their support of the use of multiple indicators. Combining accounting-based indicators would be typical of such an approach, with efficiency, sales growth rate and profitability (e.g., return on sales or on investments) being the indicators most commonly used (Murphy, Trailer and Hill, 1996). In addition, it is important to examine operational (non-financial) performance measures, such as product quality, customer satisfaction, new product introductions and market shares. The set of non-financial measures involves subjective as well as objective indicators. These indicators of a firm's operational effectiveness are what lead to financial performance. Thus, by examining the two dimensions, research can arrive at an accurate estimate of the performance of an organization.

This study applies a multidimensional measure of performance. Two measures of financial performance are used, profitability and the sales growth rate, alongside one operational measure, perceived satisfaction. The extant literature about performance of buyer-supplier relationships

supports this choice of indicators. The section below discusses these performance measures focusing on the literature on buyer-supplier relationships.

3.3.2 Performance evaluation in the buyer-supplier relationship

In the literature on buyer-supplier relationships, several financial and operational (i.e., non-financial) indicators are employed to measure performance (see Table 3.2). Buyer-supplier relationships depart from spot-market governance in that they involve uncertainty and risk. This departure may imply that the different parties have different performance criteria. In fact, operational and financial performance indicators of the parties differ in many buyer-supplier relationships (Rindfleish and Heide, 1997). In measuring performance for scientific purposes, objective and subjective measures can be used (Venkatraman and Ramanujam, 1986). An objective performance measure (e.g., profitability) can be collected without directly asking managers. Subjective performance measures are collected by asking managers to give their evaluation of certain criteria, like overall performance.

Table 3.2 Performance measures of buyer-supplier relationships

Performance Measures	Example of Research
Financial indicators	
Growth of sales/purchase	Mohr and Speckman (1994); Walker (1994); Kalwani and Narayandas (1995); Uzzi (1996); Moorman and Miner (1997)
Overall profitability	Mohr and Speckman (1994); Walker (1994); Kalwani and Narayandas (1995); Jap (2001); Uzzi (1996); Moorman and Miner (1997); Kemp and Ghauri (2001)
Growth of sales/purchase (share of trade accounted for by the counterpart)	Mohr and Speckman (1994); Kalwani and Narayandas (1995); Bello and Gilliland (1997); Moorman and Miner (1997)
Multiple and composite scales (includes the above mentioned and, e.g., labor productivity, market share)	Bensaou and Venkatraman (1995); Lush and Brown (1996); Bello and Gilliland (1997); Zaheer, Mcevily and Perrone (1998); Johnson (1999); Tracey and Tan (2001).
Operational indicators	
Satisfaction with counterpart	Anderson and Narus (1990); Mohr and Speckman (1994); Bensaou and Venkatraman (1995); Bello and Gilliland (1997); Zaheer, Mcevily and Perrone (1998); Calantone, Graham and Mintu-Wimsatt (1998); Geyskens, Steenkamp and Kumar (1998)
Diverse set of operational performance measures (e.g., product turnover and percentage of on-time delivery)	Noordewier, John and Nevin (1990); Walker (1994); Kalwani and Narayandas (1995); Jap (2001); Kemp and Ghauri (2001); Verhoef, Franses and Hoekstra (2002)
Continuity of the relationship	Anderson and Weitz (1989); Lush and Brown (1996); Johnson (1999); Ganesan (1994); Kalafatis (2000)
Marketing effects	Kim (1999); Cannon, Achrol and Gundlach (2000); Verhoef, Franses and Hoekstra (2002)

As can be seen in Table 3.2, studies use a variety of financial indicators (both subjective and objective), such as profitability and sales growth rate. In some cases, financial indicators are obtained from secondary sources such as newspapers and annual reports of the firms involved. These secondary sources have the advantage that they cannot be manipulated by the firm for a particular research project and are not biased by a respondent filling in a questionnaire. However,

secondary measures embody potential limitations as well. In most cases, firms are not obliged to publicly report the financial statements and besides, when the report is published, there is some room for suspecting the validity of the figures (Venkatraman and Ramanujam, 1986). Thus, secondary financial data may not be fully appropriate or interpretable in a reliable way.

In response to problems associated with secondary measures of performance, some researchers have used primary collected measures. Mohr and Speckman (1994) and Kalwani and Narayandas (1995), for example, used a single-item perceptual measure of overall profitability combined with a single, objective question about the sales growth rate. The advantage of this type of indicator is its ability to provide a reliable and comparable measure of the extent to which a firm has achieved its overall objectives. These objectives might be financial and could also be strategic. Anderson and Narus (1990) argued that the success or failure of a buyer-supplier relationship should also be evaluated based on the extent to which objectives are achieved. Some authors have focused on the increase in trade share accounted for by the counterpart (e.g. Moorman and Miner, 1997). These authors take the position that since the goals of the counterpart's trade share increases, the performance of the buyer-supplier relationship is high.

Financial indicators have also been measured in multiple-item scales containing subjective indicators. These encompass the complexity and multidimensionality of the performance concept within the buyer-supplier relationship. For instance, Lush and Brown (1996) and Bello and Gilliland (1997) developed a seven-item performance assessment scale containing items related to sales growth, profitability, labor productivity, market share, etc. Bensaou and Venkatraman (1995) used a multi-item scale to assess not only financial performance but also operational performance. The literature on buyer-supplier relationships contains references to diverse measures of operational performance, for instance, product turnover, percentage of on-time delivery and percentage of defective products. Furthermore, authors have looked at continuity and length of relationship as a measure of performance in long-term relationships; others have examined market aspects, such as product differentiation, market access and international penetration. In sum, scholars focusing on single or combined financial measures claim that performance should be measured by the extent to which goals have been achieved.

Additionally, studies have employed subjective measures of operational performance, such as satisfaction and continuity. Anderson and Narus (1990) stated that one party's satisfaction with another is determined, in part, by how well the buyer-supplier relationship achieves performance expectations. According to Walker (1994), this broad-based approach has the advantage of encompassing a variety of operational performance dimensions. In the end, the satisfaction measure includes financial performance, since it is unlikely that a manager would feel satisfied about a buyer-supplier relationship that does not maintain at least a minimal level of economic performance.

As Table 3.2 showed, performance can be evaluated in a variety of ways. Few indicators, however, are widely used and accepted. This study therefore argues that the performance measure should be a combination of various indicators – financial and operational, subjective and objective. This allows researchers to capture the complexity and multidimensionality of the construct. In a buyer-supplier relationship, performance measurement and evaluation require special attention, since at least two parties are involved. Each party might adopt idiosyncratic performance criteria.

This section has distinguished various dimensions of performance. The distinction between financial and operational performance measures is particularly critical. In evaluating the performance of buyer-supplier relationships, primary data is preferred to secondary. Financial and operational measures have been used in several studies of buyer-supplier relationships across different

research traditions. Therefore, this study uses a primary data source and a multiple measure, namely, the financial indicators of sales growth rate and profitability and perceived satisfaction as a measure of operational performance. For the purpose of our study, we define performance as the extent to which objective goals are achieved.

3.4 Concluding Remarks

This chapter elaborated on the central concepts of this study's theoretical framework. It presented the relevant dimensions of the network school of thought and the elements of the buyer-supplier relationship. To study buyer-supplier relationships in more depth, it discussed the concept of networks in terms of both the source and the content of connections, which is helpful in analyzing the network effects. Moreover, it introduced the concepts of trust, transaction-specific investments and collaboration (encompassing flexibility and joint action). For convenience, Table 3.3 summarizes the main concepts and their dimensions.

Table 3.3 Definition and dimensions of concepts

Concepts	Definition	Dimensions
Business networks	*The set of connected business relationships with organizations – be they vertical (the suppliers, customers) or horizontal (colleagues, competitors or other entities) – that are separated in subgroups and are essential sources of information that offers benefits to buyer-supplier relationships in terms of processes, sales/purchases and foreseeing actions of the counterpart.*	–
Trust	*The belief, attitude or expectation that the actions or outcomes of another individual or organization will be acceptable or will serve the partners' interest. This captures the calculative, affective, belief, embeddedness and dynamic features of trust.*	Interpersonal, inter-organizational
Transaction-specific investments	*Investments in assets that are rather customized and idiosyncratic and have considerably less value outside a focal relationship.*	Physical, human
Joint action	*The integration of activities to the extent to which a supplier becomes involved in activities that traditionally are considered the buyer's responsibility and vice-versa.*	Joint planning, joint problem solving
Flexibility	*The partners' willingness (including the bilateral expectation) to accept smooth alterations in practices and policies in the light of unforeseen or changing conditions.*	–
Performance	*The extent to which goals are achieved*	Profitability, growth rate, perceived satisfaction

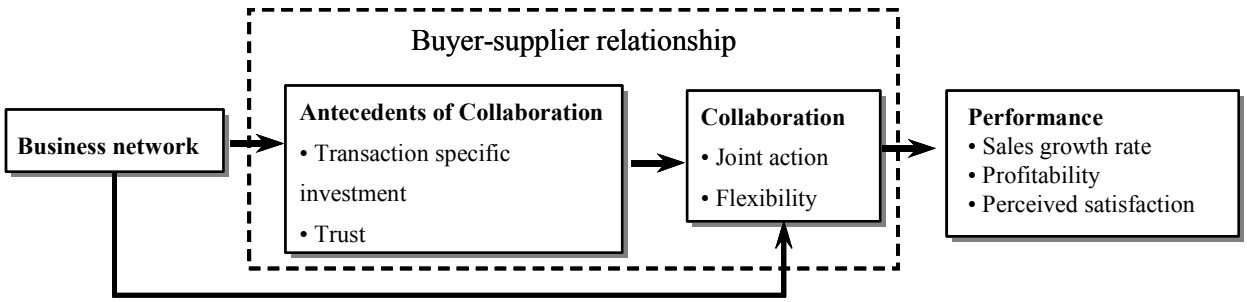
The relation between these concepts proved to be important in the reviewed literature. Some relations are widely studied, while others are rather novel. Therefore, they should be investigated in an integrated way by means of a theoretical framework that combines the network concept with the elements of the buyer-supplier relationship. As discussed in this chapter, buyer-supplier relationships are a departure from the spot-market transaction. They are relationships which enable firms to work closely together and exploit the advantages of collaboration. One challenge is how to structure a relationship in such a way that both parties are encouraged to perform well

and discouraged from acting in self-interest. Although there is no direct answer to the how question, we can put some thoughts forward. First of all, valuable information can function as a coordination and monitoring mechanism in a buyer-supplier relationship. This leads one to wonder if the information obtained from the network might influence the elements of a relationship. Such information may foster trust and encourage firms to invest in specific assets (TSI). As a result, information might significantly increase the performance of a buyer-supplier relationship. In contrast, without information from the network, there might not be enough safeguards for a firm to invest in specific assets, taking the risk of being destructively locked into a relationship with a specific counterpart. The definitions in Table 3.3 highlight the possible relations between the concepts studied in this chapter.

The literature on buyer-supplier relationships and on collaboration in general emphasizes the importance of managing a relationship between partners (e.g., Ring and Van de Ven, 1992). However, questions remain regarding the impact of the information network on the elements of a relationship and the relations among the elements. For instance, will the buyer-supplier relationship be influenced by the network? Is information valuable to encourage firms to invest in specific assets or even to foster trust and collaboration? Will trust be a central element influencing the joint actions and flexibility in a (buyer-supplier) relationship in which firms are moving away from discrete exchange? How does collaboration influence performance? These questions can be answered by a theoretical framework that explicitly considers the relations between the network concept and the elements of the buyer-supplier relationship as well as the relation between the conceptual elements of that relationship.

As exemplified by the brief discussion of some 'paradoxes' of networks in Chapter 2, research on the influence of networks on the management of buyer-supplier relationships seems to be quite a promising field of research. Although there is much literature on certain aspects of buyer-supplier relationships (e.g., the relation between trust and collaboration), up to now, there has been a lack of a framework that integrates theories on relationship management and network theory, wherein several concepts are combined and systematically tested. This study combines these concepts into one theoretical framework and empirically tests that framework by means of quantitative and qualitative research. Based on the theoretical review presented in this and the previous chapter, some relations between the central concepts of our study are posited. Figure 3.5 depicts these relations. Chapter 4 introduces the hypotheses that form the core of the theoretical framework.

Figure 3.5 General framework



Chapter 4

Hypotheses

This chapter presents the rationale underlying the hypotheses of our theoretical framework. Section 0 introduces the hypotheses referring to the influence of the network on the conceptual elements of a focal buyer-supplier relationship. The hypotheses are theoretically deduced and supported by previous theoretical and empirical studies. Section 4.2 presents the hypotheses on the relations between the elements of the buyer-supplier relationship and the influence of the collaborative mode on performance. The hypotheses regarding the interactions between the elements of the buyer-supplier relationship are to a great extent also based on previous theoretical and empirical studies. The final section summarizes the research hypotheses.

4.1 Impact of Information Obtained from the Network

How does information obtained from the network impact the buyer-supplier relationship? Relationships within a network are based on the content of information that is disseminated through the network and affects the likelihood of engaging in collaborative relations, trust and transaction-specific investments. Much of the motivation for exploring the network centers on the new logic of production that requires flexibility, as opposed to mass production (Powell, 1990). Mass production, which is mostly based on either spot-market transactions or vertical integration, has reached a crisis point. Markets for standardized goods are saturated, while higher quality and more specialized goods attract consumers (Stern, El-Ansary and Coughlan, 1996). Flexible firms willing to make the necessary investments and take joint action, combined with trusted partners, can respond quickly to changing market conditions. To meet the demands of this changing marketplace, firms obtain information from their connections with other buyers, suppliers, brokers and buyers and adopt efficient bilateral governance mechanisms. Consequently, there is a need to systematically analyze the impact of the network on the buyer-supplier relationship.

4.1.1 Network and transaction-specific investments

Information obtained from the network influences a firm's investments in specific assets for dealing with a counterpart. Transaction-specific investments (TSI) refer to the degree to which an asset cannot be redeployed to alternative uses and by alternative users without sacrifice of productive value (Williamson, 1991). Such investments go beyond the boundaries of the firm and are aimed at exploiting efficiencies of coordination of activities between companies. Consider for instance a supplier that implements just-in-time delivery for a preferred buyer. The supplier is likely to have invested in specific training of workers, purchase of equipment and development of internal processes, all of which are specifically tailored to attend to the buyer's orders (c.f. Dyer, 1996).

There are certainly advantages to investing in idiosyncratic assets, especially in business relationships that encompass recurrent transactions. However, TSI also creates dependency and the risk of opportunism. For instance, a supplier that makes specific investments might be in a vulnerable position when dealing with a buyer. The buyer might act opportunistically or hide information in order to secure higher gains. Parties in a business relationship in which there is information asymmetry have disparate sets of information, making it difficult for them to estimate the true value of a TSI. The investor firm obviously knows the value of assets because of its ownership and use. Yet that firm cannot credibly assure its counterpart firm that it will disclose all the relevant information. This underlines how high levels of TSI can subject a firm to significant threats of opportunism and dependency. A way to protect against these threats is to get information from the network, which then functions as a mechanism for reducing information incompleteness (Carney, 1998).

Members of a firm's network will not blindly support a counterpart's destructive actions, especially when the counterpart's actions may compromise economic investments or outcomes for everyone in the network. Moreover, even in cases where there is general agreement within the network about the criticality of such a destructive action, the focal firm is likely to be cautious about how its response will be perceived among members of a close-knit group (Granovetter, 1985). Without the network, firms can hardly maintain an up-to-date assessment of the integrity of a counterpart's actions and performance. We then expect the network to have a positive impact on TSI. Thus, we formulate the following hypothesis:

H1: The more information a firm obtains from the network, the more the network encourages transaction-specific investments.

4.1.2 The network and trust

The network in which a firm is embedded is likely to offer information that promotes trust in a buyer-supplier relationship. Connections via the network encourage firms to trust not only a counterpart firm but also a contact person within that firm. Networks influence trust in three ways. First, the information obtained through the network safeguards firms against opportunism and market uncertainties (Uzzi, 1996). Network members diligently transmit information about unacceptable behaviors, thus providing a mechanism for monitoring potential opportunistic behaviors. Network connections also foster common beliefs and values among member firms, leading to goal congruence and reducing the risk of opportunism.

Second, the social structure of the network stimulates trust, because firms acting in a positive atmosphere are more inclined to trust. When a transaction is made with a firm of known reputation and capabilities, there is an associated implication that social bonds will guard against trouble (Thorelli, 1986). Moreover, a firm's attitude within any one relationship is linked to other relations. Inevitably a firm compares the trust that has developed in one relationship with connections involving other firms in the network and their relationships. For example, Uzzi (1996) found that trust between a supplier and its main buyer is affected by the strength of the buyer's bonds with a connected important customer.

Third, network members may act as a referral for a given counterpart, since they might be dealing with the same counterpart (Burt, 2001). For instance, through connections with colleagues, a supplier could obtain valuable information by which to monitor the actions of a buyer, since the connected firms are likely to be dealing with the same buyer. The ability to access information about a buyer's actions supports the development and continuance of trust. Thus, we expect information provided by the network to promote trust in a focal buyer-supplier relationship. Consequently the related hypothesis is as follows:

H2: The more information a firm obtains from the network, the more the network fosters trust.

4.1.3 The network and joint actions

Information transmitted through the network encourages firms to engage in joint action, namely joint problem solving and joint planning. In fact, many problems in business relationships relate to the definition of sales conditions, and resolving such problems is dependent on information (Stern, El-Ansary and Coughlan, 1996). Information gathered outside a relationship supports the negotiation of price, quantity and quality of products. 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 that information provided by a network supports joint problem solving, we expect the network to positively influence joint problem solving.

Joint planning deals with the ex ante issues in a buyer-supplier relationship. Future plans and strategic decisions can be based partially on information obtained from a network. Information on trends and product demands are transmitted through the network by its members. Thus, we expect that valuable information obtained through a network will support joint planning with a counterpart. Considering the network's similar positive effect on joint problem solving, the related hypothesis is as follows:

H3: The more information a firm obtains from the network, the more the network encourages joint action.

4.1.4 The network and flexibility

Information obtained through the network cultivates flexibility. Firms with access to information from a network tend to develop positive bilateral expectations of their fellow network members, which makes them inclined to adapt as circumstances change (in response to, e.g., market fluctuations or shifting counterpart demands). The information 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, 1978). For instance, a firm's connections with its customers can help it learn of new consumer wishes, which also supports 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. For instance, suppliers with connections to buyers have access to information that leads them to be flexible in prices, sales conditions and other processes related to the buyer-supplier relationship. We then expect information provided by the network to support flexibility in making adjustments. Consequently, the hypothesis is as follows:

H4: The more information a firm obtains from a network, the more the network promotes flexibility in making adjustments.

4.2 Relations between the Conceptual Elements of Buyer-Supplier Relationships

This section elaborates on hypotheses regarding the buyer-supplier relationship. These relate to the effects of trust on joint actions, trust on flexibility, transaction-specific investments on joint actions and flexibility on joint actions.

4.2.1 Trust and joint actions

Considering the benefits of interpersonal and inter-organizational trust, we posit a positive causal path from trust to joint actions (Zand, 1972; Zaheer and Venkatraman, 1995). As discussed previously, trust offers not only the benefits of calculative economics but also the soft side of affection and belief in partners and the security of a continuing relationship. Joint actions offer advantages in problem solving and planning because partners in a trusting buyer-supplier relationship collectively have a greater store of knowledge, experience and creativity to identify and solve problems as well as to set up effective planning. Once trust is established, firms learn that coordinated, joint efforts lead to outcomes that exceed what the firm could achieve if it acted solely in its own best interest (Anderson and Narus, 1990). In addition, within the context of a trusting relationship firms are sometimes willing to postpone the receipt of their own gains until some later time. Trust underscores the important role of reciprocity in relationships. Firms are likely to engage in a repetitive set of joint actions to prolong the benefits of advance planning and of solving problems together (Ganesan, 1994). In their study of the relationship between providers (i.e., suppliers) and users of market research, Moorman, Zaltman and Deshpande (1992) supported the hypothesis that individuals who trust their counterpart are likely to engage in joint actions. This suggests that firms that trust one another will exchange relevant, comprehensive, accurate and timely information and thereby jointly contribute to problem-solving and planning efforts (Zand, 1972). Thus, trust forms the relational basis for the development and maintenance of joint actions. This leads to the following hypothesis:

H5: The more the partners trust each other, the higher the degree of joint actions in a buyer-supplier relationship.

4.2.2 Trust and flexibility

A higher level of flexibility and tolerance is found in trusting relationships than in relationships with low levels of trust (Morgan and Hunt, 1994). Thus, if the focal company trusts its partner, it will be more willing to react flexibly to changing conditions or demands of the partner. Trusting relationships are especially important in the ambiguous situations that often characterize buyer-supplier relationships. If a company feels that its partner's behavior is in the interest of the relationship as a whole, and not only in the interest of the partner, the flexibility norm of exchange will be high. According to Powell (1990) and Hakansson and Snehota (1995), trust leads to a more rapid flow of information and a high level of open communication. Trust creates a perceived supportive climate that encourages a firm to adapt as circumstances unfold (Anderson and Narus, 1990). Sitkin and Roth (1993) showed that individuals with less trust are more likely to rely on legalistic, formal remedies, as opposed to ones that rely on trust and which have room for maneuver and for adapting to changing situations. They also found that relationships characterized by trust are highly valued by the partners, and trusting partners have a strong desire to continue the relationship (Ganesan, 1996). Considering these aspects, we put forward the following hypothesis:

H6: The more the partners trust each other, the higher the degree of flexibility in a buyer-supplier relationship.

4.2.3 Transaction-specific investments and joint action

Transaction-specific investments (TSI) pose a contractual hazard for any investor, either supplier or buyer. The exchange partner can exploit or appropriate such assets because they are not redeployable or at least they have a reduced value in an alternative exchange relationship (Williamson, 1985). For instance, a supplier can replace the buyer with another distribution company after

the buyer has developed a market for the supplier's product. In effect, the firm is expropriating the value of the investment made by the counterpart in developing the consumer market. Even if no outright termination occurs, the supplier can opportunistically expropriate some fraction of these quasi-rents (Dyer and Singh, 1998) through increased use of house accounts, reducing commissions and other actions. The fundamental concern of TSI is to develop satisfactory safeguards against potential opportunistic behavior. One mechanism by which firms protect themselves against the hazards of TSI is by engaging in joint actions.

We propose that, in the context of the buyer-supplier relationship, joint actions serve to safeguard TSI. This is because joint actions create grounds for bilateral governance in the relationship (Williamson, 1996), which helps to reduce the opportunistic tendencies that erode the value of specific assets. It is the shared operational control over assets implied by joint action that serves this function (John and Weitz, 1988). As Heide and John (1990) described, firms that make investments in a relationship with a counterpart will want to get involved in activities that are traditionally considered the other party's exclusive domain in order to minimize the risks involved. For instance, buyers may involve suppliers to a greater degree in product development processes in order to maximize the value of the tools and equipment employed. In this way, the risk of tool obsolescence due to unilateral development changes is lowered. Studying manufacturing firms and their buyer-supplier relationships, Zaheer, McEvily and Perrone (1998) found a strong positive relation between transaction-specific assets and the level of joint action.

Joint action not only safeguards partners against opportunistic behavior, it also facilitates coordination of activities and resources in buyer-supplier relationships. The opportunities that joint efforts offer for partners to share experiences are also valuable. For example, a focal firm may have cultivated useful working interactions, learned important insider information or become knowledgeable about a counterpart's handling of products. To some extent, almost any firm's investment entails the development of some specialized knowledge that is particularly useful for the buyer-supplier relationship. Heide and John's (1990) study of equipment manufacturers and suppliers provided empirical evidence for this notion. They found that higher TSI of manufacturers was associated with increased joint problem solving and planning as a way to effectively coordinate activities and resources in the relationship. In a related argument, Kogut (1988) suggested that joint ventures – an extreme form of joint action – are a response to the presence of TSI and are useful for exploiting the coordination benefits of such investments. Considering the high levels of both human and physical TSI, engaging in joint action would seem to serve not only as a safeguard, but also in coordinating activities and resources. Thus, we formulate the following hypothesis:

H7: The higher the degree of transaction-specific investments, the higher the degree of joint action in a buyer-supplier relationship.

4.2.4 Flexibility and joint action

Firms often are called upon to react to contingencies that could not have been predicted beforehand. Noordewier, John and Nevin (1990) studied the relationship between original equipment manufacturers and their suppliers and found that flexibility encourages effective joint action. In their study, flexible suppliers were engaged in joint planning and joint problem solving, which resulted in a large percentage of acceptable products and on-time deliveries. As firms move away from spot-market transactions, they expect counterparts to display more flexibility in response to requests for adjustments in price, stock levels maintained and emergency deliveries. One should not confuse flexibility as described here with *a priori* formalization (i.e., contract) of the exchange. It is not the degree to which agreements have been tightly worded ex ante that is of con-

cern here; rather, it is the reaction to changes in requests that matter. Thus, flexibility can be seen as a norm that enhances joint action.

Flexibility is important for coping with the day-to-day changing circumstances that any firm faces, considering the complexity and risk of today's production and handling processes (e.g., perishable products). In a buyer-supplier relationship, flexibility enhances joint problem solving. Firms may set formal and rigid guidelines about how a problem should be solved, yet such rigidity reduces creativity in the teamwork (Calantone, Grahan and Wimsatt, 1998). As problems emerge, it is the partners' flexibility that fosters teamwork. This is because the parties in a relationship that adopt the norm of flexibility favor joint action rather than individual responses (Macneil, 1978). In the absence of flexibility, a firm has little or no incentive to solve problems, because there is no guarantee that their actions will be perpetuated (Heide and Miner, 1992). Therefore, flexible firms are likely to overcome problems most quickly and with a mutually satisfactory solution.

Flexibility may also influence joint planning. Since adjustments can be executed to internal plans, planning is continually attuned to trade conditions (e.g., varying quantities from order to order) (Macneil, 1981). Firms are assumed to have a bounded rationality that renders even their comprehensive plans incomplete (for a discussion of incomplete contracts see Williamson, 1996). Although incomplete, plans remain important because they formulate common goals and lay the foundation for the flexibility necessary for reformulating plans in the future. Since firms can almost always agree later to fill gaps in their relationship, the norm of flexibility becomes essential for joint action. Thus, we expect flexible firms to be more likely to engage in joint planning and joint problem solving. The following is hypothesized:

H8: The higher the degree of flexibility, the higher the degree of joint action in a buyer-supplier relationship.

4.3 Effects of Collaboration on Performance

This section discusses the influence of collaboration on the performance of a buyer-supplier relationship. This represents the far right side of the theoretical framework. The impact of joint action on sales growth rate and profitability is assessed, as well as the impact of flexibility on the same two financial measures of performance.

4.3.1 Joint action and performance

Firms engaged in joint actions are likely to perform well. Previous research has found that firms engaged in joint action with a mutual interest in finding ways to add value or save costs gain competitive advantages (Anderson and Narus, 1990; Mohr and Speckman, 1994).

When parties engage in joint problem solving, mutually satisfactory solutions to problems are likely to be found, thereby enhancing the success of the buyer-supplier relationship. In joint problem solving, a firm often tries to persuade another to adopt a particular solution to a conflict situation. These persuasive attempts are generally more constructive than the use of coercion or domination (Deutsch, 1969). The use of destructive problem-solving techniques (e.g., domination, confrontation) is seen as counterproductive and is likely to strain the cohesion of a relationship. In some relationships, a method of solving problems is institutionalized and third-party arbitration is sought (e.g., some Dutch flower companies turn to the mediation departments of auction cooperatives to solve problems within their buyer-supplier relationships). While such mediation can help bring about a satisfactory outcome (Anderson and Narus, 1990), joint problem solving shows promise of greater success (Mohr and Speckman, 1994). Although external arbi-

tration may certainly be effective for a particular problem, the ongoing use of arbitration may indicate inherent problems in the relationship.

The other joint action is planning. Dwyer and Oh (1988) suggested that input to decisions and goal formulation are aspects of participation that help a buyer-supplier relationship succeed. Joint planning reduces the risk of unexpected problems, in turn reducing the need for a sophisticated monitoring apparatus. Since future contingencies, and consequential duties and responsibilities in a relationship, are made explicit in plans ex ante, the time and resources so often spent to solve a conflict are reduced to a great extent. Planning together with the counterpart actually operates as an aid or frame of reference and can replace contracts, which are costly to write and enforce. We thus expect that firms engaged in joint action, by means of joint planning and joint problem solving, are likely to achieve a high profitability and growth rate. This idea is supported by previous research. Mohr and Speckman (1994) and Zaheer, McEvily and Perrone (1998) found that the firms that perform better are the ones engaged in joint action. Thus, we formulate the following hypothesis:

H9: The higher the degree of joint action in a buyer-supplier relationship, the better the performance will be.

4.3.2 Flexibility and performance

The flexibility of firms enhances their performance (Bello and Gilliland, 1997; Cannon, Achrol and Gundlach, 2000). In a buyer-supplier relationship, flexibility figures as an essential norm-based governance mechanism (Macneil, 1981). Flexibility enables parties to adjust to each other's needs and requests. The establishment of a bilateral mode of governance, in the form of the flexibility of both parties to make adjustments, is likely to increase the effectiveness and efficiency with which tasks are performed (Lush and Brown, 1996). In a bilateral system, individual goals are reached through joint accomplishment, and concern for the long-term benefits of the system serves to restrain individual tendencies toward self-interest (Heide, 1994). That is, because the parties have a collective incentive to maintain the buyer-supplier relationship, the buyer and supplier engage in flexible behaviors, and the resulting decision making tends to enhance performance. Flexibility is central to collaboration in relationships (Heide and John, 1992), and it leads to effective implementation of marketing strategies and to better performance (Bello and Gilliland, 1997). Thus, the following is hypothesized:

H10: The higher the degree of flexibility, the better the performance will be.

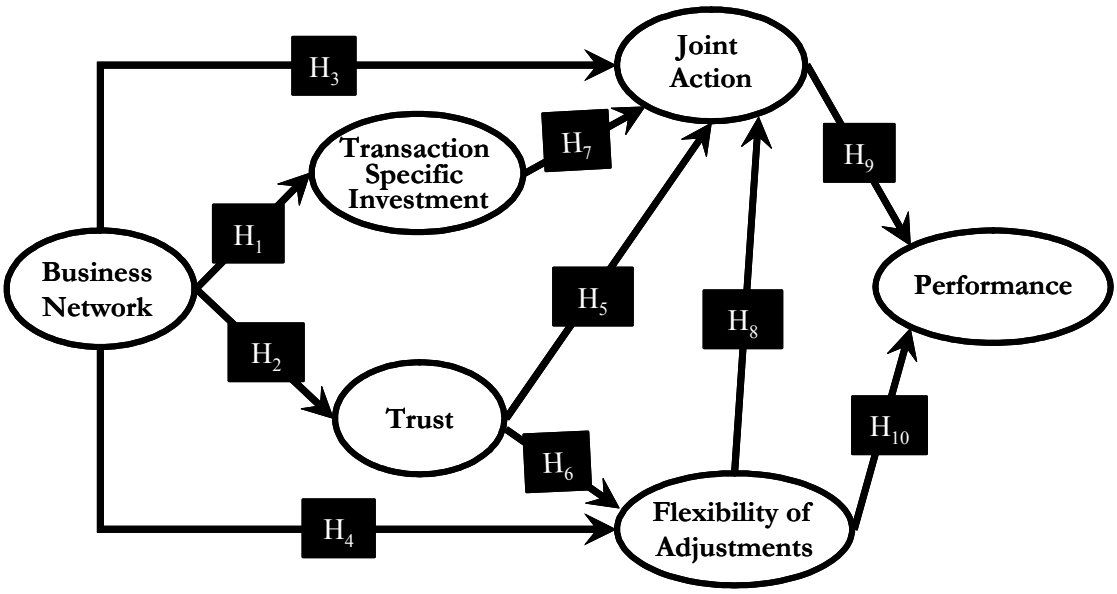
4.4 Concluding Remarks

This chapter deepened understanding of the relations between the concepts presented in Chapter 3. It also formulated ten hypotheses about the business network and buyer-supplier relationships. It began by discussing the information that a firm obtains from its network and the effect of that information on a focal buyer-supplier relationship. This relationship is anchored in collaboration, which to succeed requires transaction-specific investments and trust between parties. Despite the lack of previous empirical studies, theoretical elaboration was employed to examine the effects of the network on the elements of a buyer-supplier relationship (i.e., transaction-specific investments, trust, joint action and flexibility).

The network offers valuable information, which can serve as both a safeguard and as a coordination mechanism. These advantages of exploiting the connections in a network lead firms to strive to enhance the elements of their buyer-supplier relationships. Within such relationships, transaction-specific investments are expected to encourage joint actions and to support further integration of activities and resources. If firms then invest more in the specificities, joint problem solv-

ing and joint planning is expected to increase. In addition, trust is a central social element of buyer-supplier relationships. Trust affects not only flexibility but also joint actions. If the level of trust is high, collaboration by means of flexibility and joint actions is likely to be promoted. Finally, joint action and flexibility influence performance. In relationships characterized by close collaboration, parties tend to perform well. Based on the discussion in this chapter and this brief argumentation Figure 4.1 summarizes the hypotheses of our theoretical framework.

Figure 4.1 Theoretical framework for the study of networks and buyer-supplier relationships



H1-H4: The more information a firm obtains from the network, the more the network will encourage transaction-specific investments, trust, joint action and flexibility to make adjustments in a buyer-supplier relationship.

H5-H6: The more the partners trust each other, the higher the degree of flexibility and joint action in a buyer-supplier relationship.

H7: The higher the degree of transaction-specific investments, the higher the degree of joint action in a buyer-supplier relationship.

H8: The higher the degree of flexibility, the higher the degree of joint action in a buyer-supplier relationship.

H9: The more joint action in a buyer-supplier relationship, the better the performance.

H10: The more flexible the partners are to make adjustments, the better their performance.

It is, however, important to stress that the development of a relationship contains loops and is not always a sequential process. The formulation of the hypotheses tries to build in some sequence and causality based on the literature review in Chapters 2 and 3. Noteworthy, however, is that some variables mutually affect each other. For example, good performance might have a direct positive effect on collaboration and trust. Moreover, more direct and indirect relations between the concepts might occur in practice. Thus, more collaboration may influence the level of trust and encourage firms to seek more information through the network. The level of transaction-specific investment might reduce flexibility by creating hold-up situations. These effects might

come to the fore in our empirical hypotheses testing. We will be vigilant for such effects in our analysis.

Part 2

DESIGN

Chapter 5

Case Study Methodology

This chapter describes how the theoretical framework is applied to exploratory qualitative case studies. The cases aim primarily to refine our thoughts about the relation between business networks and buyer-supplier relationships. Section 5.1 presents the motivation for conducting the case studies. Afterwards, section 5.2 presents the case study design, and section 5.3 reviews the methods of data collection.

5.1 Motivation for the Exploratory Case Studies

Case study research is especially useful for investigating real life situations and providing rich insight into a research object (Miles and Huberman, 1994). A case study is a desirable research strategy for the exploratory phase of an investigation, because "*it investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin, 1994: 13). As a synergistic complement to a quantitative (i.e., survey) research strategy, the case study can be used to explore and fully describe the meaning of a certain phenomenon in its environment instead of through the evaluation of statistics and frequency (Eisenhardt, 1989). Using the case study as the research strategy for the exploratory phase of this study enables us to investigate business networks and buyer-supplier relationships in their 'natural' environment. To guide our exploration, the following research question was posed:

> *How do respondents perceive the relative importance and interrelation of the elements of the network and buyer-supplier relationship (i.e., trust, transaction-specific investments and collaboration) in the context of their industry?*

Part 1 discussed the concepts of network, trust, transaction-specific investments and collaboration, conferring the conceptual basis for our general framework on how a buyer-supplier relationship is managed within a network. Nevertheless, this is not enough to formulate hypotheses to be tested in a large-scale quantitative study. Answering the research question above enables us to make two essential refinements in the theoretical framework based on two kinds of knowledge. First is knowledge about practitioners' perceptions of the elements of the framework, which supports us in better understanding the operationalization of each of the concepts. In particular, the concept of the network deserves special attention, to determine the relevant subgroups and the benefits of the information that can be obtained from the network. Second is knowledge about how respondents perceive the interrelations between the elements of the theoretical framework.

Three further reasons motivated the decision to conduct case studies. Firstly, by focusing on 'how' questions, the case studies enable a descriptive and exploratory approach to the research

object. We want to hear the managers involved in a buyer-supplier relationship tell us how the concepts of trust, transaction-specific investments and collaboration are identified and recognized in their real life context and how they influence each other. Focusing on a specific regular relationship enables us to examine the interrelations between the constructs of the framework in depth and detect interesting points that support the fine-tuning of the framework and the development of the survey instrument for the quantitative phase.

Secondly, the case study method allows us to cross-check different data sources (interviews, observations, archival records, reports, etc.), multiple sources (interviews with more than one informant) and different methods of analysis (Eisenhardt, 1989; Yin, 1994). The different data sources offer more comprehensive insight into the subject matter than a single data source would. Considering this advantage, case-study research on buyer-supplier relationships can investigate the complexity of the relationship, not only the economic aspects but also the network and social aspects. Moreover, the cases involve managers from different levels and departments, each with its own motives and points requiring attention. A close relationship between respondent and researcher is necessary to facilitate the collection of information for understanding the research problem. Therefore, throughout the interviews and visits such a close relationship with respondents was developed.

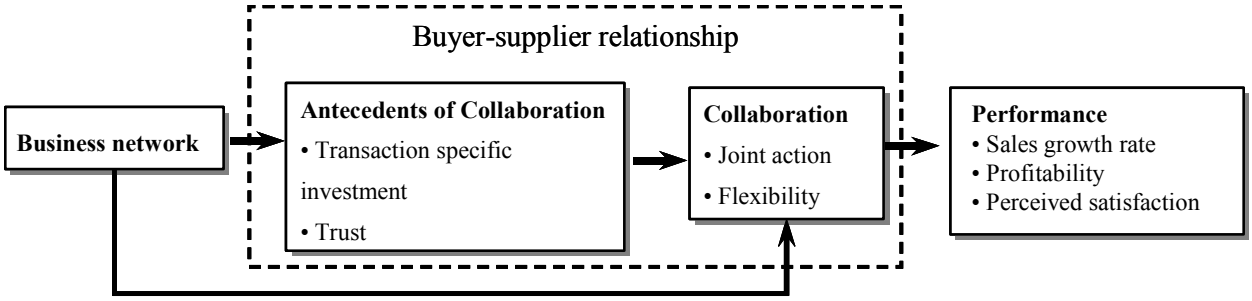
Thirdly, at the time when this case study was chosen there was some concern as to whether the Dutch potted plant and flower industry, traditionally organized for spot-market transactions, could provide the sample necessary for the quantitative phase of the study. Empirically speaking, the dominant mode of governance in the selected industry is the auction clock with short-term trades (for a detailed discussion about the focal industry, see section 1.4). However, over the last five years the industry has changed its orientation toward consumers and its mode of governance to close collaboration between suppliers and buyers. The case study provides evidence of the appropriateness of the industry for research on relationship management. Indeed, managers used to short-term relationships may have difficulties in understanding and actually managing the complexity of buyer-supplier relationships in which trust, transaction-specific investments and business networks become crucial for success. Therefore, this industry at this point in time offers a unique opportunity for an analytic exploration of networks and buyer-supplier relationships.

5.2 Case Study Design

Case studies, like other qualitative research strategies, present some disadvantages. For example, the number of observations is small and the data rather subjective. These can be alleviated by careful case study design. Design suggestions are, amongst others, to build a logical chain of evidence, use multiple sources of evidence, use a theoretical basis for the operationalization of the constructs, ask respondents to review the case reports and develop a good description of the research process (Verschuren and Doorewaard, 1999). Our study uses these suggestions to improve the validity and reliability of the case study results.

The case studies were designed using the model given by Yin (1994). According to Yin (1994), it is important to begin a case study with propositions based on theory. Our study thus used the general framework based on the theoretical discussion in Part 1. Derived from existing literature, we formulated the questions for data collection more precisely and specified variables needing special attention. Moreover the framework could be fine-tuned based on the findings from the cases. Figure 5.1 depicts the framework for the case studies.

Figure 5.1 General theoretical framework



The business network is considered to impact the buyer-supplier relationship. The dimensions of content (i.e., information) and source (i.e., network subgroups) of the business network facilitate the conceptualization and further operationalization of this impact. The elements of buyer-supplier relationships are three: transaction-specific investments, trust and collaboration (i.e., joint action and flexibility). As discussed in Chapter 2, buyer-supplier relationships are a departure from spot-market transactions. They are relationships in which firms work closely together and exploit the advantages of such close collaboration. One challenge they face is to safeguard transaction-specific investments, trust and collaboration in such a way that both parties have the incentive to perform well and not try to act in self interest. We expect that the valuable information obtained from the network can function as coordination and monitoring mechanisms for transaction-specific investments, trust and collaboration in the buyer-supplier relationship.

In addition, we expect some interrelations between these elements of the buyer-supplier relationship. As discussed in Chapter 2, the literature on relationships and collaboration emphasizes the relation between antecedents and collaboration. There is evidence from previous research that trust influences flexibility and joint action, and that transaction-specific investments increase the joint action response. Moreover, the performance of the relationship is expected to increase with the level of collaboration.

In order to guarantee the validity of the operationalization, the basics included (see Table 5.1) in the case study protocol (see Appendix B) are modeled on validated structure interviews and definitions, with the exception of the business networks, which have their items developed to better understand the effects of the information obtained from other network members. A particular attempt was made to develop an appropriate measure of performance. Thus, when asked in an open-ended question about the impact of a concept on performance, we also asked respondents to describe the indicators used by the company to evaluate whether goals are achieved.

5.3 Data Collection

Two in-depth case studies were conducted to answer this chapter's research question. One case focused on the supplier's perspective, while the other focused on the perspective of the buyer. Three main criteria were used in selecting the cases. Firstly, different companies had to be selected, to enlarge the variation in pattern of response and control for characteristics specific to one company. On the buyer side, companies using different business type were selected (i.e., wholesaler, cash-and-carry, exporter). On the supplier side, at least one firm selling potted plants and flowers was selected along with one firm providing cut flowers. Secondly, the companies had to be at least partly involved in fixed line channels. Thirdly, the companies had to be willing to invest time in one or two in-depth interview(s), allowing the researcher to visit the facilities for observations and to examine written documents. Based on these criteria, the mediation department of the Aalsmeer Auction Cooperative provided a list of prospective companies for the

case studies. A detailed description of the companies that participated in the case study is provided in Chapter 7.

Table 5.1 Variables, operationalization and basics of the case study protocol

Variable	Operationalization	Basics	Reference
Business networks	Connections with organizations through which a focal firm can obtain valuable information	Source: Subgroups downstream and upstream in the chain and third parties. Content: Information with which to forecast future actions of a counterpart and to define trade conditions (price, quantities, quality) and processes (logistics, internal handling and production)	Adapted from Anderson, Hakansson and Johanson (1994) and Blankenburg, Eriksson and Johanson (1999)
Trust	The belief, attitude or expectation that the actions or outcomes of another individual or organization will be acceptable or serve the partners' interest.	Partners' willingness to continue the relationship Personal contacts Procedures for motivating partners Previous relationships Tolerance and care with which problems are treated	Zaheer, McEvily and Perrone (1998), Ganesan (1994) and Anderson and Narus (1990)
Transaction-specific investments	Investments that can be redeployed without loss of product value	Human: Routines and process made specifically for the transaction Physical: Capital investments made specifically for the transaction	Bensaou and Venkatraman (1995), Heide and John (1992), Klein, Frazier and Roth (1990) and Williamson (1985)
Collaboration	Joint action and the norm of flexibility	Joint problem solving Joint planning Flexibility of adjustments	Heide and Miner (1992) and Heide (1994)
Performance	Achievement of goals (financial and operational)	Growth rate Overall profitability Perceived satisfaction	Mohr and Speckman (1994) and Anderson and Narus (1990)

Semi-structured interviews were held from August 2000 to May 2001. Informants were, from the supplier side, the owner or person most acquainted with fixed line channels and, from the buyer side, the purchase department head and at least one purchasing agent. The case protocol was used to investigate the elements of the theoretical framework. Each interview was tape-recorded and lasted, on average, one and a half hours. Following the interview with the key informant was a tour through the facilities and an interview with a second informant (purchasing agent or sales person). The transcripts of the tape-recorded interviews were analyzed and a case report written for each company. Some informants were contacted later by phone and/or e-mail to elucidate unclear points. The key informants received a copy of the written report and were asked to comment on the material. This served to validate the results.

To further ensure that the information was reliable, we conducted a series of cross-checking interviews. We interviewed the head of the mediation department of the Aalsmeer Auction Cooperative and three brokers from the same department. These brokers dealt directly with the buyer and supplier companies involved in the case studies.

Data was collected through a total of 13 in-depth, face-to-face interviews with key informants (five suppliers' informants, four buyers' informants and four cross-checking interviews). Another seven interviews were conducted with a second informant (three from suppliers and five

from buyers). The interviews with the second informant and those for the cross-checking were useful to confirm the information provided by the key informants.

5.4 Concluding Remarks

This chapter described how the research methodology was applied in exploratory, qualitative case studies. By focusing on the real life context and experiences of suppliers and buyers, the cases refine our thoughts about the relation in practice between the business network and buyer-supplier relationships. In addition to presenting the motivation for conducting the case studies, the chapter described the case study design and methods of data collection. Chapter 6 presents the methodology and design for the second part of our research, the quantitative survey.

Chapter 6

Survey Methodology

This chapter describes the methodology employed to set up the quantitative descriptive part of our empirical research and to collect the data with which to test the hypotheses developed in Chapter 4. As discussed in the introduction to this thesis, our empirical research combines two research strategies, namely the case study and the survey, to answer the research questions and acquire insights into the influence of information from the business network on buyer-supplier relationships. Following on this combination of research strategies, we are now confronted with the challenge of selecting a survey design that enables us to test our hypotheses.

An extensive review of the literature on methodological issues related to buyer-supplier relationship relationships underlies the methodological decisions presented throughout this chapter. Table 6.1 sketches this body of literature, including studies' sample populations, response rates and types of respondents. The table also displays the main constructs and the lowest Cronbach's alpha of these constructs, as well as the types of statistical analysis employed.

Table 6.1 Literature on buyer-supplier relationships

Author	Sample Population (response rate)	Respondent/ Industry	Main Constructs (dependent = independent)	Type of Statistical Analysis (α)
Anderson (1988) *JEBO*	16 companies with responses from 169 of 172 sales districts (response rate not reported)	buyers/ electronics	opportunism = asset specificity	OLS regression models (>0.78)
Anderson and Narus (1990) *JM*	502 companies: 249 buyers and 213 manufacturers (49.6%)	suppliers and buyers (two informants)/ several industries	satisfaction, trust, dependence, communication, conflict	CFA and SEM (not reported)
Anderson and Weitz (1989) *MS*	300 companies of which 95 responded; each informant provided information about eight principals, amounting to 690 dyads (31.7%)	buyers (sales representatives)/ several industries	trust, reputation, power imbalance, perceived continuity of relationship, cultural similarities (country)	3 stages least squares regression (>0.52)
Anderson and Weitz (1992) *JMR*	11 divisions of five companies: 518 informants provided information about 378 dyads (72.9%)	manufacturers and distributors (two informants)/ several industries	commitment, asset, reputation, conflict, exclusivity	3 stages least squares regression (>0.84 only one 0.54)
Antia and Fraizer (2001) *JM*	500 managers in franchisor companies surveyed of which 213 responded (42.6%)	buyers/franchising industries	contract enforcement = network density, network centrality, asset specificity, interdependence, joint actions	OLS (>0.61)
Bensaou, Venkatraman(1995) *JMS*	447 dyads (response rate not reported)	buyers (purchasing and engineering)/ automakers, 3 US 11 Japanese	information processing needs and capabilities = trust, uncertainty, joint action	cluster analysis across the 9 variables (>0.71)

Table 6.1 Continued

Blakenburg et al., (1999) *SMJ*	115 sales persons (response rate not reported)	suppliers/several industries	value creation, commitment, business network connections	CFA and SEM (not reported)
Ganesan (1994) *JM*	150 retail companies surveyed of which 124 responded (82.6%) and 124 vendors surveyed of which 52 responded (41.9%)	suppliers and buyers/retail industry	long-term orientation = trust (credibility and benevolence), asset specificity, uncertainty, reputation, satisfaction	SEM (suppliers)/ OLS (buyers) (>0.56)
Heide and John (1990) *JMR*	579 purchasing agents surveyed of which 155 responded (26.8%)	buyers/transportation and electronics	joint action = asset specificity, supplier qualification, continuity, uncertainty, performance ambiguity	CFA and SEM (>0.60)
Heide and John (1992) *JM*	579 buyers surveyed of which 175 responded (30.2%) and 97 suppliers surveyed of which 61 responded (62.8%)	buyers and suppliers (manufacturers)/ several industries	relationship norms, flexibility, solidarity, information exchange, buyer control	CFA and SEM (not reported)
Heide and Miner (1990) *AMJ*	579 buyers surveyed of which 137 responded, 155 suppliers surveyed of which 48 responded (23.7%)	buyers and suppliers/several industries (e.g. machinery and transportation)	flexibility, information exchange, shared problem solving = performance ambiguity, extendedness of relationship	multiple regression analysis (OLS) (>0.60)
Heide (1994) *JM*	see Heide and John (1992)		adjustment's flexibility = buyer and supplier dependence	multiple regression analysis (OLS) (>0.73)
Johnson (1999) *JAMS*	637 distributors surveyed of which 160 responded (25.1%)	buyers/machinery and equipment	performance, strategic integration, flexibility, continuity	CFA and SEM (>0.74[a])
Kalafatis (2000) *IMM*	1,250 merchants, importers and agents surveyed of which 338 responded (27%)	suppliers/timber trade	cooperation, adaptation, information exchange, social exchange	CFA and SEM (>0.81[a])
Klein, Frazier and Roth (1990) *JMR*	925 exporting managers surveyed of which 375 responded (40.5%)	suppliers/ distributor industries	degree of vertical integration = uncertainty and asset specificity	log likelihood function, multinomial logit model (not reported)
Kim (1999) *JRM*	1,000 distributors surveyed of which 276 responded (27.6%)	buyers/several industries	joint actions = dependence, transaction-specific investments	multiple regression analysis (OLS) (>0.72)
Kumar, Scheer and Steenkamp (1998) *JMR*	4,000 car dealers surveyed of which 289 responded (7.2%)	buyers/automobile	interdependence, punitive capability, reciprocity	multiple regression analysis (OLS) (>0.72)
Langerak (2001) *IJRM*	400 companies, respondents represented 72 matched relationships (18%)	suppliers, buyers and customers/several manufacturing industries	performance = customer orientation, trust, cooperation	multiple regression analysis (OLS) (>0.69)
Lush and Brown (1996) *JM*	3,225 purchasing agents surveyed of which 454 responded (14%)	buyers/wholesale and distributor industry	flexibility, information, solidarity, explicit contract and a normative one, relationship length, long-term orientation, dependency, performance	CFA and SEM (not reported)
Lyons (1994) *JEMS*	1,000 (UK) subcontractors surveyed of which 91 responded (9.1%)	suppliers/ construction industry	asset specificity and trust	probit model (no use of Likert-scales)

Table 6.1 Continued

Mcevily and Zaheer (1999) *SMJ*	sample population not reported, respondents were 309 job shop manufacturers	alliances	capabilities = network (non-redundancy, infrequency of interactions, geographical dispersion)	CFA and SEM (>0.61)
Mohr and Speckman (1994) *SMJ*	557 computer dealers surveyed of which 102 responded (18.3%)	buyers/computer industry	satisfaction and dyad sales = trust, commitment, communication behavior, joint problem-solving	multiple regression analysis (OLS) (>0.68)
Morgan and Hunt (1994) *JM*	1,394 tire retailers surveyed of which 204 responded (14.6%)	Buyers/tire industry	trust, cooperation, conflict, uncertainty, relational benefits, opportunism	CFA and SEM (>0.86)
Noordwier, John and Nevin (1990) *JM*	483 purchasing agents surveyed of which 140 responded (29%)	buyers/several industries	elements of the purchasing relationship, uncertainty, monitoring, expectation	CFA and SEM (not reported)
Nooteboom, Berger and Noorderhaven (1997) *AMJ*	97 sales managers (not reported)	suppliers /microelectronics	relational risk = trust, asset specificity, continuity	OLS, backward procedure (>0.68)
Stump and Heide (1996) *JMR*	631 companies, 164 purchasing agents chemical manufacturers responded (26%)	buyers/chemical industries	monitoring, asset specificity, qualification, performance ambiguity, technological unpredictability (uncertainty)	CFA and SEM (>0.63)
Yilmaz and Hunt (2001) *JAMS*	1,975 sales persons surveyed of which 531 responded (26.9%)	buyers/car dealers	cooperation = trust, opportunism, commitment, task interdependence	CFA and SEM (>0.77[a])
Zaheer and Venkatraman (1995) *SMJ*	1,000 agency carriers surveyed of which 329 responded (32.9%)	suppliers/insurance industries	quasi integration and joint action = trust, asset specificity, uncertainty	hierarchical regression analysis (>0.61)
Zaheer, Mcevily and Perrone (1998) *OS*	1,050 purchasing managers surveyed of which 153 and 85 responded (14.6%)	buyers (two informants)/ electrical equipment	performance = negotiation, conflict, interpersonal and inter-firm trust, joint action, uncertainty, asset specificity	CFA and SEM (>0.64)

Abbreviation: OLS: ordinary least squares; CFA: confirmatory factor analysis; SEM: Structural Equation Modeling.
Note: Acronyms of journals: AMJ: *Academy of Management Journal*; IJRM: *International Journal of Research in Marketing*; IMM: *Industrial Marketing Management*; JAMS: *Journal of the Academy of Marketing Science*; JEMS: *Journal of Economics and Management Strategy*; JEBO: *Journal of Economic Behavior and Organization*; JM: *Journal of Marketing*; JMR: *Journal of Marketing Research*; JMS: *Journal of Management Science*; SMJ: *Strategic Management Journal*; OS: *Organizational Science.*
a. Composite reliability

6.1 Data Collection and Study Population

The data was collected by means of a self-administered questionnaire that was mailed to respondents, namely, firm owners and managers. This method was selected because we wanted to examine patterns of associations, which requires quantifiable data and a large enough number of responses to allow for statistical testing. Reliance on secondary data sources was rejected at the outset because of the limitations of the existing databases on industry. Furthermore, in determining data sources this study's precise data requirements had to be carefully considered. This research required data on respondents' perceptions of a buyer-supplier relationship with a specific counterpart. Respondents, as decision makers, base their decisions not only on objective data, but

also on their subjective judgment (Churchill, 1999). Both subjective and perceptual data were relevant in our study because of our use of behavioral concepts, like trust and the norm of flexibility. These concepts are dependent on how respondents perceive certain behavior as being, for example, trustworthy or not. It is also important to know how respondents perceive the specific investments made and the partner's flexibility toward the relationship. Previous research has shown the questionnaire to be a viable research instrument for gathering such perceptual and subjective data (see Table 6.1).

The questionnaire performs the actual interrogation function in a mailed survey and therefore warrants considerable attention (Dillman, 1978). Most concepts are measured by a multiple-item scale (DeVellis, 1991). Several techniques can be used to generate questionnaire items, for instance, literature search and interviews involving relevant actors (Churchill, 1999). In our research, we explored these two techniques.

Question construction and wording began with a review of the literature, with a special focus on generating a pool of items that tap the core elements in our general framework (see figure 4.1 in Part 1). Additionally, the 13 in-depth field interviews carried out in the case study provided a great deal of information about the concepts. An eight-member panel composed of three faculty members of the Wageningen Business Administration Department, three researchers who specialize in business relationships (two in the United States and one in Brazil) and two industry experts (the head of the mediation department and the head of the marketing research department of the Aalsmeer Auction Cooperative) was used to assess the content validity of the items. For all the measurement scales we drew on published, validated scales and items. After iterations of editing and refinement, we performed a content analysis to determine the overlap of the remaining items with the conceptual domain of the measurement scale. To enhance translation equivalence (Douglas and Craig, 1983), the original English version of the questionnaire was first translated into Dutch by one person and then retranslated into English by another person, each of whom was fluent in both languages. Two business school faculty members were then invited to check the equivalence of the translations of the questionnaire. Any differences that emerged were reconciled by the two expert translators.

The questionnaire aimed at the supplier side of the business relationship was developed first, after which the questionnaire for buyers was created. Although few adjustments were found to be needed in the questionnaire for buyers, the same procedure to test content validity and translation equivalence was strictly followed for the buyers' questionnaire as well. Pre-test interviews were conducted with four owners of supplier firms and five managers representing buyers. These interviewees were asked to complete the questionnaire and raise questions where problems and ambiguities arose with wording and questionnaire layout. This yielded useful suggestions that improved the content validity of the measurement instrument.

Before mailing the questionnaires, we selected the research population considering constraints on time, access and funding of the research. The total population of eligible companies in the Dutch potted plant and flower industry[3] comprised 5,796 supplier units (i.e., 1,363 units of mainly potted plants and 4,433 of mainly potted flowers) and 1,449 buyer units (for details see section 1.4). It was important to determine a sampling method consistent with the research questions. In this regard, it must be recognized that we were not concerned about the characteristics of the sample itself. Rather, the reason for collecting data about the research population was to obtain gener-

[3] We did not consider in our empirical evaluation the companies involved with cut flowers, bulbs and foliages. This is because of the small number of suppliers using the fixed line channel of the Aalsmeer Auction Cooperative.

alizable insights about the entire population of similar businesses. To enhance the generalizability of the results, a sampling method ensuring representativeness had to be employed. A research sample of at least 10% of the total population was planned, since a sample of this size would permit the use of the selected univariate and multivariate statistical tools for data analysis.

The Aalsmeer Auction Cooperative provided a list of suppliers (i.e., growers of potted plants and flowers) and buyers (e.g., wholesalers, cash-and-carries, garden centers and exporters) most active in brokerage and fixed lines. This list contained an appropriate range of buyer-supplier relationships and provided a research population of adequate size. Using this source, we identified 600 supplier companies and 350 buyer companies representing our research populations. 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. We assumed that the remaining list of 568 suppliers and 342 buyers approximated the actual population of qualifying companies such that that no significant, systematic bias was introduced via the sampling frame's composition (Dillman, 1978).

To minimize response bias, we sought to identify the knowledgeable informant within each firm in terms of acquaintance with buyer-supplier relationships (Campbell, 1955). As noted by Anderson and Narus (1990), collecting buyer-supplier relationship data is difficult and requires considerable cooperation from the companies involved. As a great number of suppliers are owner-managed, we chose the owner as our only informant on the supplier side since no other person has the vantage point to provide the data relevant for this study (Venkatraman and Grant, 1986; Zaheer and Venkatraman, 1995).

The informant in the buyer company was the head of the purchasing department or the person most acquainted with purchases of potted plants and potted flowers. Because the great majority of buyers have a functional structure, we considered including multiple respondents per buyer company to improve the validity of our research (Campbell, 1955). The combination of a limited population of appropriately qualified respondents and the busy schedule of purchasing personnel impeded efforts to obtain multiple respondents. However, prior survey-based research (see Table 6.1) suggests that there is a relatively high level of consensus among key executives and managers. The selection of only one informant was further supported by the interviews conducted for the exploratory case studies.

When responding to the questions about the buyer-supplier relationship and network connections, 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.

To maximize the response rate, we followed the steps described by Dillman (1978). We sent a package to the focal companies containing the questionnaire, a pre-paid return envelope and an introductory letter. This letter requested that a qualified informant complete the questionnaire and provided an e-mail address and telephone number for questions. As an incentive for completing the survey we offered respondents a summary report with the main statistical findings. After the first month, a follow-up mailing was sent to the companies that had not yet responded. Another package with a new introductory letter was included reminding the recipient of the relevance of the study along with another copy of the questionnaire and pre-paid return envelope. The data was collected between January and May 2002.

6.2 Measurement of the Constructs

An important element in survey research is the operationalization of the concepts. This study used several constructs that had already been validated in previous related research (for comparisons see Table 6.1). The in-depth interviews conducted in the exploratory case studies, the input from the panel and the questionnaire pre-testing were particularly helpful in creating the different measurement scales and individual items. Before discussing the actual measures, we first introduce some of their general aspects.

The constructs represent measures of managerial perceptions, except for the objective financial measure of sales growth rate. Multiple items were used to derive a measure for the constructs. For most constructs, the questions were closed-response and measured at the ordinal level using seven-point Likert-type scales. Although the ordinal scales present the problem of the intervals between the data points not being equal, DeVellis (1991) suggested to treat, and previous study (i.e., all of the literature reviewed in Table 6.1) treated, this ordinal scales as interval measures and assume equality of the intervals between the data points. Thus, the best procedure seems to be to treat ordinal measurements as interval measures while remaining alert for possible inequalities of intervals (DeVilles, 1991).

Computation of the scores derived from the multiple-item scales was done by unweighted average (Hair et al., 1998). There are four reasons for equally weighting the items instead of using another method (e.g., with factor scores as weight). Firstly, we have no theoretical argumentation why one item should be weighted more heavily than another. In formulating the items, we expected them to measure the construct to the same degree. Secondly, factor analysis is used to check the convergence of the measurement scale, not to determine the scale. Thirdly, a weight based on a factor score is as arbitrary as any other kind of weight, and thus an unweighted average is the least arbitrary in giving an item more importance over the others. Moreover, there might be sampling variation in the factor analysis, which could result in considerable changes in the weights if the analyses were to be repeated on another random sample. Fourthly, some of our constructs contain formative indicators that assume equal and essential explanatory power for each indicator (formative versus reflective indicators are discussed in section 6.3). Finally, scales based on equal weights are easily replicated on subsequent samples, whereas exactly comparable factor scores are much harder to compute for other samples. Appendix C presents the items used in the questionnaires. The subsections below describe each of the measurement scales used in our study.

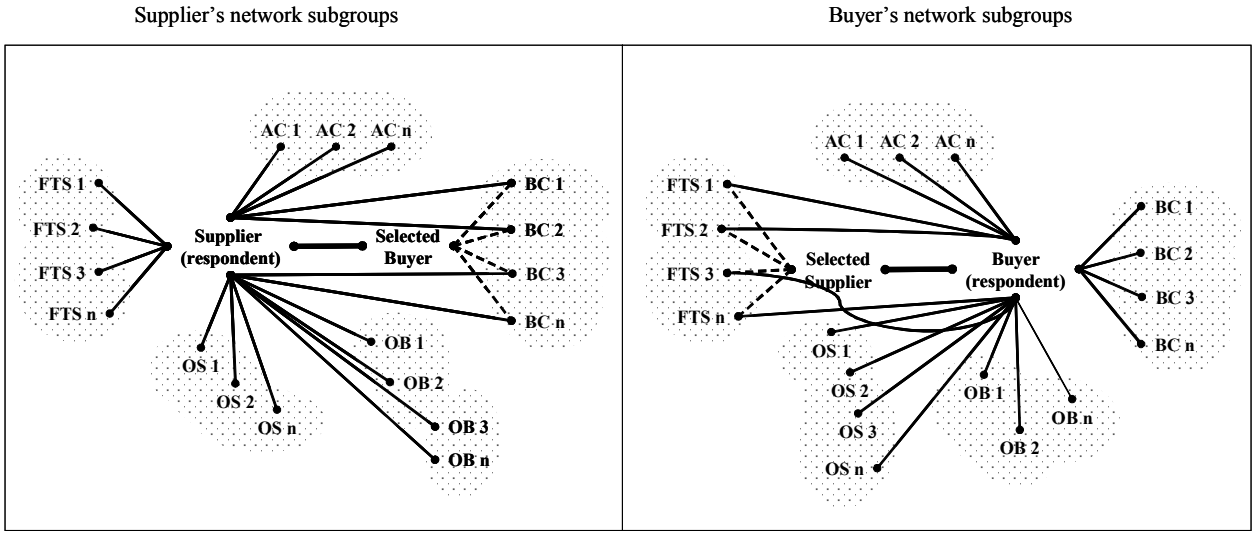
6.2.1 Business networks

Business networks are sets of connected relationships that are contingent upon each other and that influence a focal relationship (Cook and Emerson, 1978). As discussed in Chapter 1, this contingency relates to the information that is provided by the connected relationships and that support the focal business relationship. This study's measurement instrument for network connections was developed based on previous research (Anderson, Hakansson and Johanson, 1994; Blankenburg, Eriksson and Johanson, 1999). While measures used in previous studies aimed to capture the 'general effect' on a focal relationship of other relationships, the measure used in this research specifies five types of informational benefits and includes connected relationships with third parties.

To capture all the potential sets of connected relationships, this study identifies network subgroups. Figure 6.1 shows the subgroups examined. They represent actors located upstream in the supply chain (input suppliers and other suppliers of potted plants and flower products) and downstream in the chain (other buyers and buyers' customers) and third parties (agents of the

auction cooperatives). The network subgroup of *first-tier suppliers* is composed of suppliers of input materials such as young plants and seeds and firms that supply fertilizers, chemical products, pots, vases, wood and other raw materials. The network subgroup of *other buyers* is composed of wholesalers, flower exporters, cash-and-carries and garden centers. The network subgroup of *other suppliers* is composed of other firms that produce potted plants and flowers. The network subgroup of *buyers' customers* is composed of supermarkets, flower shops and wholesalers abroad. The subgroup of *agents of the auction cooperative* is composed of the agents in the mediation departments of the auction cooperatives (third parties) in the Netherlands. These agents have strong contacts with both suppliers and buyers.

Figure 6.1 Network subgroups



Abbreviations: AC: Agents of the auction cooperative (third parties); FTS: First-tier suppliers; OS: Other suppliers; BC: Buyers' customers; OB: Other buyers.

The informational benefits of each network subgroup refer to support in three areas: setting prices, quantities and qualities; coordinating production processes and logistic operations; and foreseeing possible future actions of a focal counterpart. An example of the formulation of this item in the questionnaire is as follows: "We get information from first-tier suppliers which supports us in defining prices of products for the selected counterpart." The composite score of the perception about the information obtained from each network subgroup was calculated by the unweighted average of all items. Therefore, the business network reflects the average strength of the supportive information obtained from the network subgroups.

6.2.2 Transaction-specific investments

Transaction-specific investments (TSI) are defined as one party's perception of the extent to which an investment was made specifically for a transaction with a specific other company. In the literature, we found two dimensions of TSI, namely human and physical.

Human TSI refers to investments made in human resource management, such as training staff in knowledge about the counterpart, methods to deal with the counterpart and other business practices specifically intended for operating with the selected counterpart. This dimension was measured with a scale containing three items adapted from previous studies (Heide and John, 1992; Bensaou and Venkatraman, 1995). Their Cronbach's alphas were greater than 0.81. An example of our items is as follows: "We have invested time and efforts to learn about the business prac-

tices of the selected buyer." The score of the perceptions about human TSI was calculated by the unweighted average of the three items.

The dimension of *physical TSI* refers to investments such as in equipment, machinery and special docks and wagons. This dimension was measured by a two-item scale, with the score being the unweighted average of the items. An example of our items is "In our company we have made significant investments to deliver products to the selected buyer." This is in line with the way Heide and John (1990) and Bensaou and Venkatraman (1995) measured this dimension of TSI. In their studies, Cronbach's alphas for these items were greater than 0.72.

6.2.3 Trust

Trust in operational terms refers to the belief that the other partner is honest and sincere and in no circumstances will deliberately do anything that will damage the relationship. Trust then reflects the expectation of a partner that negotiations are fair and commitments will be sustained (Anderson and Narus, 1990). Trust is also embodied in a partner's belief that its requirements will be fulfilled through future actions undertaken by the counterpart (Anderson and Weitz, 1989; Barney and Hansen, 1994). As discussed in Chapter 3, trust includes two dimensions, the interpersonal and inter-organizational.

Interpersonal trust refers to that placed by the respondent in the contact person of the selected partner. Our questionnaire assessed interpersonal trust using five items. An example formulation is as follows: "Our company's contact person (purchasing agent) has always been evenhanded in negotiations with us." The measurement scale was based on a study by Zaheer, Mcevily and Perrone (1998) in which their Cronbach's alpha was 0.88. The score of the perception of interpersonal trust was computed by an unweighted average of the four items (i.e. one item was dropped after validation procedures, see section 8.4).

Inter-organizational trust refers to that trust placed in the organization of the selected partner. This dimension was assessed with six items adapted from Zaheer, Mcevily and Perrone (1998). An example formulation is "Based on experience, we can with complete confidence rely on the selected buyer to keep promises made to us." Zaheer, Mcevily and Perrone (1998) reported a Cronach's alpha of 0.77 in their study. The score of the perceived inter-organizational trust was the unweighted average of the corresponding four items (i.e. two items were dropped after validation procedures, see section 8.4).

6.2.4 Collaboration: joint action and flexibility

Collaboration refers to situations in which partners work together to achieve mutual goals (Anderson and Narus, 1990; Morgan and Hunt, 1994). Organizational boundaries are penetrated by the integration of activities as the supplier becomes involved in tasks that are traditionally considered the buyer's responsibility and vice-versa (Yilmaz and Hunt, 2001). As discussed in the literature review in Chapter 3, collaboration has two dimensions: the norm of flexibility and joint action.

The norm of *flexibility* is defined as the extent to which a partner shows an accommodating response to changing circumstances (Heide, 1994). Flexibility to make adjustments is measured by a set of items describing parties' expectations of one another. An example item is "Our company is flexible in response to changes in the relationship with this buyer." Flexibility was measured on a three-item scale adapted from Heide and Miner (1992) and Heide (1994). Their Cronbach's alpha was greater than 0.73. We computed the score on perceived flexibility by imputing the observed variables into the measurement model in Lisrel.

Joint action was calculated by measuring the degree of joint planning and joint problem solving. The total score was based on the unweighted average of these two. 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 and John, 1990, 1992). Items on joint planning refer to the proactive joint setting of goals and making the future of the relationship foreseeable. The measurement scale was made up of four items, such as "Our company plans volume demands for the next seasons together with this buyer." This is in line with how Heide and John (1990, 1992) measured this aspect of collaboration. They did not report Cronbach's alphas however. We computed the score for joint planning as an unweighted average of the four items.

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; Lush 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 measurement scale was made up of four items, for example, "This buyer and our company deal with problems that arise in the course of the relationship together." The scale was adopted from Heide and Miner (1992). Their Cronbach's alpha was 0.79. The score for joint problem solving was calculated as the unweighted average of the four items.

6.2.5 Performance

This study applies a multidimensional measure of performance. Two measures of financial performance are used, profitability and the sales growth rate, alongside one operational measure, perceived satisfaction. *Perceived satisfaction* is an affective dimension defined as the rating of the respondent's satisfaction with its selected partner. This dimension is supported by the notion that a company's performance is determined, in part, by how well the business relationship achieves expectations. Perceived satisfaction was measured by a six-item scale adapted from previous studies. For these items, Bensaou and Venkatraman (1995) obtained a Cronbach's alpha of 0.94, Doney and Cannon (1997) of 0.85, and Zaheer, Mcevily and Perrone (1998) of 0.75. We asked respondents, for instance, how satisfied they were with the order frequency over the year. The six items were weighted equally to obtain a score.

The literature on performance measurement shows that *sales growth rate* and *profitability* are the objective financial indicators most commonly used (Mohr and Speckman, 1994; Lush and Brown, 1996). By also using indicators for overall financial performance, we incorporated into our measurement instrument both objective financial measures and non-financial (operational) measures. The sales growth rate tracks the development of sales volume over the last three years expressed as a percentage (Mohr and Speckman, 1994) and profitability refers to measures of overall profitability that allow comparisons to be made between companies of different size (Lush and Brown, 1996). Sales growth rate is a continuous variable, whereas profitability was measured by a Likert scale ranging from one to seven.

6.2.6 Control variables

Previous research suggests that the buyer-supplier relationship might be affected by the length of business interaction (Anderson and Weitz, 1989), environmental volatility and diversity (Ganesan, 1994), firm size and share of fixed line channels (Stern, El-Ansary and Coughlan, 1996).

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 companies in longer relationships are likely to invest more in transaction-specific assets and the social

bonds of trust. 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.

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, invest in trust and make transaction-specific investments (Ganesan, 1994). The measurement 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 and Roth, 1990), which found a Cronbach's alpha greater than 0.76.

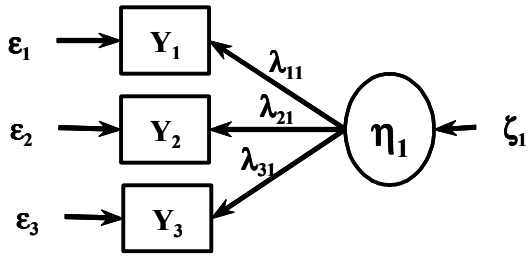
Regarding *firm size and counterpart size*, it is reasonable to suppose that larger firms have become so by virtue of achievement, which suggests a general intention to invest and take some risks (Omta, 1995). Large firms are then considered likely to collaborate and invest more in TSI and trust than medium-size and small firms. Firm size comprises the size of the buyer and the size of the supplier involved in the buyer-supplier relationship and was measured differently for the two samples. 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).

Fixed lines are like the direct channels proposed by Stern, El-Ansary and Coughlan (1996): the transactions between supplier and buyer that occur directly with no interference of a third party (Stern, El-Ansary and Coughlan, 1996). In direct modes, transactional parties make every decision independently in order to optimize gains. The fixed lines variable reflects the percentage of sales (in the sample of suppliers) or purchases (in the sample of buyers) through the mediation department of the Dutch flower cooperatives, which refers to non-auction-clock transactions.

6.3 Measurement Characteristics of Reflective and Formative Indicator Constructs

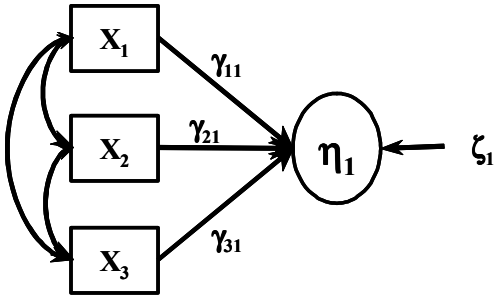
Indicators or items (i.e., observed variables) composing a scale that underlies a construct (i.e., the operationalized concept) can, broadly speaking, be distinguished as reflective or formative (Diamantopoulos and Winklhofer, 2001). Reflective (effect) indicator constructs depend on the latent variable. The latent variable is the operationalization of a construct in structural equation modeling (this method is described in section 6.5.2). A latent variable cannot be measured directly but can be computed by one or more indicators. The reflective indicator models assume that a latent variable is the common cause of its indicators. In our study, we identified the constructs of transaction-specific investments, flexibility and trust as corresponding to these properties. In equation form it is represented by $Y_i = \lambda_{i1}\, \eta_1 + \varepsilon_i$, where η_1 is the latent variable, Y_i is the ith indicator and λ_{i1} is the standardized loading coefficient giving the expected effect of η_1 on Y_i. Figure 6.2 graphically depicts an effect indicator model.

Figure 6.2 Reflective indicator construct



In formative (causal) indicator constructs, the indicators determine the latent variable. The explanatory variables are the observed variables and the dependent variable is the latent variable. A formative specification implies the following equation: $\eta_1 = \gamma_{11}X_1 + \gamma_{12}X_2 + \ldots + \gamma_{1q}X_q + \zeta_1$, where η_1 is the latent variable, X_q is the indicator variable, γ_{1q} is the coefficient giving the expected effect of X_q on η_1, and ζ_1 is the measurement error. Figure 6.3 presents this model.

Figure 6.3 Formative indicator construct



These formative indicators are sometimes called composite indicators. As Bagozzi (1994) stated: "*when a latent variable is defined as a linear sum of a set of measurements or when a linear combination of measures of independent variables is determined by a linear combination of measures of independent variables, the measures are termed formative indicators: the measures produce the constructs so to speak.*" Indicators then do not need to be positively or non-zero inter-correlated. We identified three constructs containing formative indicators. They are: the business network, joint action and perceived satisfaction. By examining the items of these constructs, we find that each indicator covers different aspects of the construct definition.

Formative indicators have several properties that sharply distinguish them from reflective indicators (for an extensive discussion see Fornell, Rhee and Yi, 1991). First, reflective indicators are interchangeable. Therefore the removal of one item does not change the essential nature of the underlying construct. With formative indicators, omitting an indicator is omitting a part of the construct (Bollen and Lennox, 1991). For instance, in our construct of the business network, omitting one information benefit could undermine the overall evaluation of the concept. Second, as illustrated in Figure 6.3, the correlations among formative indicators are not explained by the measurement model. The indicators are exogenously determined and consequently assessing their validity becomes problematic. Third, there is no reason why a specific pattern of signs (positive x negative) or magnitude (i.e., high x moderate versus low) should characterize the correlations among the formative indicators. The internal consistency is of minimal importance because two variables that might even be inversely related can both serve as meaningful indicators of the construct. Fourth, unlike reflective indicators, formative indicators do not have error terms. The error variance is represented only in the disturbance term, ζ, which is uncorrelated with the Xs. Fifth, taken in isolation, the formative indicator measurement model in Figure 6.3 is statistically under-identified. The model can only be estimated if it is placed within a larger model that incorporates consequences (i.e., effects) of the latent variable in question. Sixth even if the model is embedded within a larger model, identification of all parameters may still be problematic when a formative specification is involved.

As a result of these properties, procedures conventionally used to assess the validity and reliability of scales composed of reflective indicators (e.g., factor analysis and assessment of internal consistency) are inappropriate for composite variables with formative indicators (Diamantopoulos and Winklhofer, 2001). This implies that alternative approaches must be followed to evaluate

the quality of measures that are based on formative indicators. This, as well as methods used to assess reflective indicators, is the subject of the next section.

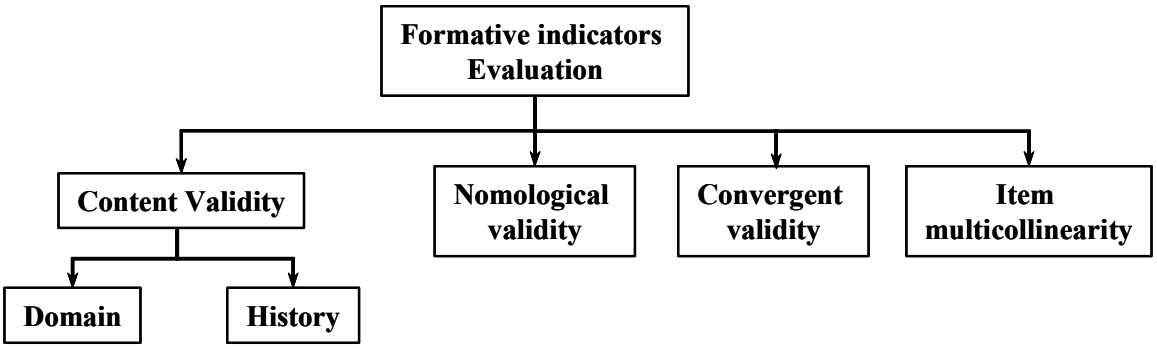
6.4 Assessing Validity and Reliability of Constructs

As previously discussed, the reliability and validity of formative and reflective indicator constructs must be assessed differently.

6.4.1 Validity and reliability of formative indicator constructs

Figure 6.4 depicts the validation procedures for formative indicators.

Figure 6.4 Assessing validity and reliability of formative indicator constructs



Content validity is the adequacy with which the domain of a concept is captured by the measure (Churchill, 1979). The key to content validity rests in the procedures that are used to develop the measurement instrument of a construct. Our study started by defining the domain of the concept. Examination of the literature was an important first step in defining the concept because a "formative indicator is more abstract and ambiguous than a latent variable measure with reflective scales" (Bagozzi, 1994), and consequently the breath of the definition is extremely important. The next step was to formulate a collection of items that broadly represents the variable as defined. In order to assure validity and reliability of our formative indicator constructs, we conducted a comprehensive literature search and tested the items during the field interviews in the exploratory case studies and during the pre-testing phase of the questionnaire development in which managers helped us to refine the items and thereby to develop the measurement instrument. This allowed us to select items that covered the entire scope of the latent variable as described by the content specification. In further evaluating the content validity, we also looked at the history of the scale. If the measurement instrument performed well in related studies, this supported the scale's validity.

Nomological validity or criterion validity is a comparison of scores on the scale of interest to the scores on other variables. Therefore, to assess nomological validity, we need to examine other variables that are effects of the latent variable (Bollen and Lennox, 1991). This study checked the nomological validity by testing the hypotheses about the relations between the formative construct of interest and other constructs, as suggested by Steenkamp and van Trijp (1991). We found support for several hypotheses that provided evidence of the nomological validity of the formative indicator constructs.

Convergent validity measures the extent to which the scale correlates positively with other measures of the same construct (Churchill, 1979). This test can also provide evidence of the validity of formative indicators (Anderson and Gerbing, 1988; Kumar, Scheer and Steenkamp, 1998: 229). We checked the correlations of single-item global assessments of the formative indi-

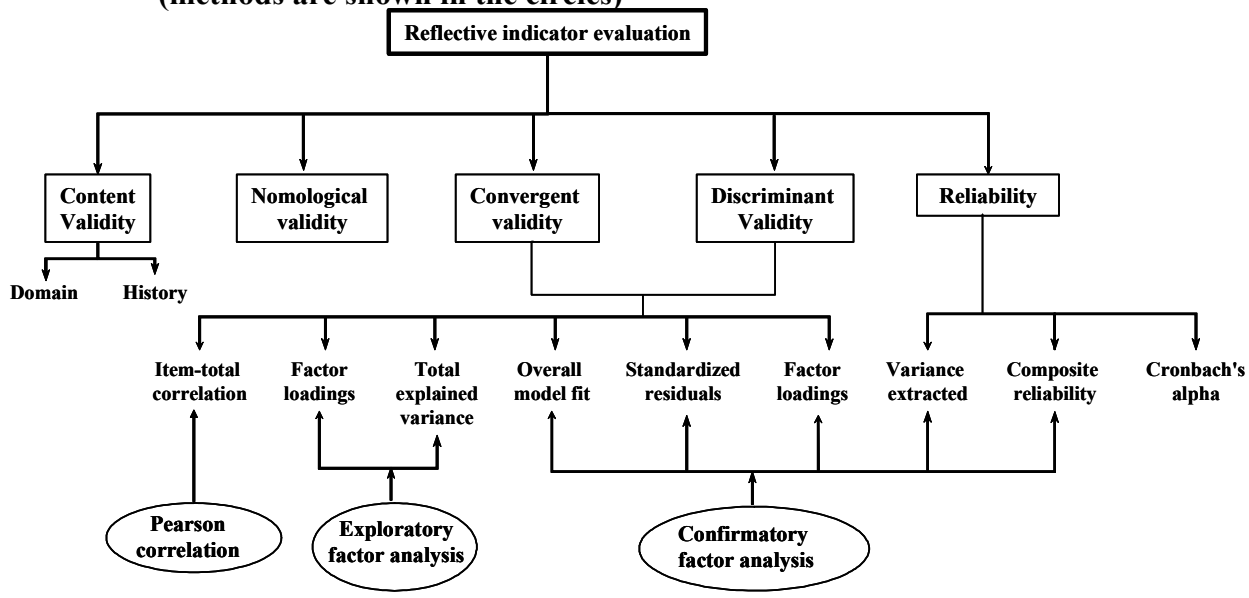
cators with the respective composite score. The coefficients were greater than 0.40 and significant.

Regarding *item multicollinearity*, Diamantopoulos and Winklhofer (2001) warned of the problem of multicollinearity. This refers to correlation between variables of the indicators. The stability of the indicator coefficients (γs, see Figure 6.3) is affected by the sample size and strength of the indicator inter-correlations. Excessive multicollinearity among indicators makes it difficult to separate the distinct influence of the individual Xs on the latent variable η. We examined the Pearson correlation[4] between the indicators of the constructs. Malhorta (1999) suggested that correlations that lie below 0.80 are not considered to exhibit a problem of multicollinearity.

6.4.2 Validity and reliability of reflective indicator constructs

The validity and reliability of reflective indicator constructs were assessed by following the procedures described by Anderson and Gerbing (1988) and Steenkaamp and van Trijp (1991). The procedure to assess the *content validity* of reflective indicator constructs is the same as that described for the formative indicators (see section 0). Other methods to assess the validity of reflective indicator constructs are based on exploratory factor analysis, confirmatory factor analysis and Pearson correlations. For construct reliability, we computed the Cronbach's alpha, composite reliability and variance extracted for each construct. Figure 6.5 depicts the procedure to assess validity and reliability.

Figure 6.5 Procedure to assess validity and reliability of reflective indicator constructs (methods are shown in the circles)



[4] The Pearson correlation presents the magnitude and direction of the association between two variables in a data set (Malhorta, 1999). It is an index used to determine whether a linear or straight-line relationship exists between the two variables. The correlation coefficient is a number between +1 and –1, which remains the same regardless of their underlying units of measurement. Calculation of the coefficient considers the mean and the standard deviation of the two variables in the sample (Churchill, 1999). The *magnitude* is the strength of the correlation. The closer the correlation is to either +1 or –1, the stronger the correlation. If the correlation is 0 or very close to zero, there is no association between the two variables. The *direction* of the correlation specifies how the two variables are related. If the correlation is positive, the two variables have a positive relationship (i.e., as one increases, the other also increases), whereas if the correlation is negative, the two variables have an inverse relationship (i.e., as one increases, the other decreases). The interpretation of the significant correlation coefficients are based on two-tailed *t* values of a 5% significant level (t>1.960).

To assess the *nomological validity* of our reflective indicator constructs, we need to examine other constructs that affect the focal construct (Bollen and Lennox, 1991). We checked the nomological validity when testing our hypotheses about the relations between the reflective construct and other constructs, as suggested by Steenkamp and van Trijp (1991). We found support for several hypotheses that provided evidence of the nomological validity of the formative indicator constructs.

The assessment of the *convergent validity* of the reflective indicator constructs uses the item-total correlation, exploratory factor analysis and confirmatory factor analysis (CFA). Item-total correlation refers to the correlation of one item of the construct with the sum of all of the other items for each respondent. The threshold value for the item-total correlation was 0.6 (Steenkaamp and van Trijp, 1991). Items with a value lower than 0.6 do not share enough variance with the rest of the items. It is then assumed that such items are not measuring the same construct and should be removed from the construct.

Exploratory factor analysis was conducted on the set of items to test whether the items are loading on one factor. If necessary, the number of items can be reduced by selecting only high factor loading items. In evaluating the results of the exploratory factor analysis, we looked at the total explained variance (>60%) and the factor loadings (>0.6), both of which were appropriate for our sample size (Hair et al., 1998). CFA is explained in Box 6.1.

Discriminant validity measures the extent to which items referring to the same construct distinguish from each other. This validity can be assessed using CFA. CFA is used to test the unidimensionality of the scale and to help refine the factor structure found in the exploratory factor analysis. Items which are believed to operationalize the same construct are combined into one model. To assess discriminant validity a pair of constructs is computed by constraining the estimated correlation parameter between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models (Anderson and Gerbing, 1988). A significantly lower chi-square value for the model in which the trait correlations are not constrained to unit would indicate that the traits are not perfectly correlated and that discriminant validity was achieved (Bagozzi, 1994). We conducted a confirmatory factor analysis model with a pair of constructs in which one had its factor correlation fixed at unity (Steenkamp and van Trijp, 1991). The unconstrained model provided a significantly superior fit, suggesting adequate discriminant validity between the tested constructs.

The assessment of *reliability* of the reflective indicator constructs uses the Cronbach's alpha, variance extracted and composite reliability. The Cronbach's alpha is typically employed to evaluate the construct reliability or the internal consistence of the measurement scale of a construct (Devilles, 1991). The total variance among a set of items is partitioned into signal (i.e., true variation in the latent variable) and noise (i.e., error) components. The proportion of total variation that is signal equals alpha and thus another way to think about alpha is that it is equal to 1 minus the error variance (Churchill, 1979). A low coefficient alpha indicates the sample of items performs poorly in capturing the construct that motivated the measurement scale. Conversely, a large alpha indicates that the item test correlates well with the true variation. This coefficient then ranges from 0 to 1. Common practice is to accept scales with alpha values of 0.7 or greater (Hair et al., 1998).

Box 6.1 Confirmatory factor analysis

In the confirmatory factor analysis (CFA) the measurement model was estimated and assessed (in Lisrel 8.5). This model estimates the paths (i.e., relations) between the observed variables and the latent variables, but it does not estimate any structural paths (relations between the latent variables). Figure 6.2 shows a measurement model of a latent variable. In more complex models, several latent variables can be estimated simultaneously.

For the analysis of CFA, we used the polychoric correlation[5] matrix (i.e., applicable for ordinal variables) as input, which was then estimated by maximum likelihood (ML) (Joreskog and Sorbom, 1993). The advantage of ML over weighted least squares (WLS) and general least squares (GLS) estimators is that a relatively small sample is required to calculate correct estimations (Anderson, 1987). Joreskog and Sorbom (1996) proposed the following requirement for WLS: the sample size should be at least 200 if $q<12$ and at least $1.5q(q+1)$ if $q>=12$, where q is the number of items. When the sample size does not meet this requirement, as is the case of both of our data sets (the buyer and the supplier data), ML is preferable to WLS (Joreskog and Sorbom, 1996). The ML technique produces the best estimations if the observed variables have a normal distribution. Based on the common practice that the kurtosis and skewness should not exceed |1| (Hair et al., 1998), it turned out that all our variables are normally distributed. Therefore, we used the ML method to estimate the CFA. Next, the analysis was performed to examine whether the empirical data can confirm the theoretical model specified previously.

Based on the results, the measurement model can be modified to give a better representation of the empirical data. Steenkaamp and van Trijp (1991) suggested looking first at the standardized residuals (residuals greater than |2.58| indicate problems) to make modifications in the proposed measurement model. It is also recommended that the standardized λ of each indicator be >0.60 and the t value be >2.0. To assess how well the specified model accounts for the data, one or more overall goodness of fit indices should be examined (Anderson and Gerbing, 1988; Marsh, Balla and McDonald, 1988; Steenkamp and Van Trijp, 1991; Hair et al., 1998; Joreskog and Sorbom, 1996). Box 6.2 describes the goodness of fit indices. Needless to say, adjustments can only be made based on theoretical arguments.

Variance extracted and composite reliability are derived from the output of the CFA. The variance extracted can be calculated as follows: $\Sigma(\lambda i^2)/(\Sigma(\lambda i^2) + \Sigma\varepsilon_i)$, where λ_i is the standardized loading coefficient of the path from the observed item and the latent variable and ε_i is error term (see Figure 6.2). As a threshold value, 0.5 is recommended (Hair et al., 1998). In CFA, the composite reliability of an indicator is defined as the direct relationship between latent variables and the indicators. The larger the direct relationship, the higher the reliability of an indicator Xi. The composite reliability of the construct can be calculated with the formula $\Sigma(\lambda i)^2/(\Sigma(\lambda i)^2 + \Sigma\varepsilon_i)$. It is recommended that the construct reliability be above 0.7.

[5] In our study, correlation matrix was preferred to covariance matrix, because it allows the analysis of the pattern of relation between the variables and more importantly it allows for direct comparisons of the coefficients within a model (Hair et al., 1998). In addition, previous studies have mostly adopted the correlation matrix for the convenience of comparisons (Malhorta, Peterson and Kleiser, 1999).

Table 6.2 Summary of statistical evaluation criteria of constructs

Validity of constructs	
Item-total correlation	≥ 0.50
Exploratory factor analysis	
Extracted variance	≥ 0.60
Factor loadings	≥ 0.60
Reliability of constructs	
Cronbach's alpha	≥ 0.70
Confirmatory factor analysis	
composite validity (variance extracted)	≥ 0.50
composite reliability	≥ 0.70
standardized residuals	≤ |2.58|
λ	≥ 0.60
t value of λ coefficient	≥ 20

6.5 Quantitative Methods for Data Analysis

This section defines the methods used for the data analysis. Chapter 3 presented the theoretical framework along with the individual relations (direction and sign of causality) between the concepts. By estimating the structural equation models, we tested whether the hypothesized relations and causalities do occur in practice. We also analyzed the effects of the business network on buyer-supplier relationships by examining the effects of each individual network subgroup. In investigating the network subgroups, the number of estimated parameters increased considerably; we thus encountered difficulties in achieving an acceptable model fit in the structural equation modeling. For this reason, we computed multiple regression equations to analyze the effects of each subgroup. According to a review of marketing science, these two methods – multiple regression and structural equation modeling – are the most applied and consolidated means of testing relations and causality in the field of buyer-supplier relationships (Malhorta, Peterson and Kleiser, 1999). The next sections discuss these two methods in detail.

6.5.1 Multiple regression

Multiple regression is a statistical technique used to analyze the relation between a single dependent variable and several independent variables. It aims to maximize the overall predictive power of the independent variables as represented in the variate. Regression analysis is mostly concerned with the degree, nature and optimization of associations between variables (Churchill, 1999).

The regression variate is a means to determine the relative importance of each independent variable in the prediction of the dependent measure. Additionally, through it we can assess the nature of the relation between the independent variables and the dependent variable. The assumed relation is a linear association based on the correlations between the independent variables and the dependent one. It is possible by transformations or additional variables to assess whether a curvilinear relation exists (Malhorta, 1999). Finally, multiple regression provides insights into the redundancy of independent variables in their predictive ability.

The most commonly used technique in multiple regression is ordinary least squares (OLS). OLS determines the best-fitting line by minimizing the vertical distances from all the points to the estimated line (Malhorta, 1999). The best-fitting line is called the regression line. The vertical distance from any point that does not fall on the regression line is the error (*e*). The distances between the points and the line are squared and added together to arrive at the sum of squared errors, which is a measure of total error. In fitting the line, the least-squares procedure minimizes

the sum of squared errors. The general form of the multiple regression equation is as follows: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k + e$, where e is the error term, the coefficient β_0 represents the intercept and the other βs are the partial regression coefficients. The least-squares criterion estimates the parameters not only in such a way as to minimize the total error, but also to maximize the correlation between the actual values of Y and the predicted values.

The relevant statistics associated with multiple regression are the adjusted coefficient of determination (adjusted R^2), the beta (β) coefficients and the collinearity tests (Hair et al., 1998; Malhorta, 1999; Churchill, 1999). The coefficient of determination (R^2) measures the proportion of the variance of the dependent variable around its mean that is explained by the independent, or predictor, variables[6]. The adjusted coefficient of determination is a modified measure that takes into account the number of independent variables included in the regression equation and the sample size. Although the addition of independent variable(s) can cause the coefficient of determination to rise, the adjusted coefficient of determination may fall if the added independent variable(s) have little explanatory power and if the degrees of freedom become too small. This statistic is quite useful for comparing equations with different numbers of independent variables and different sample sizes. The adjusted R^2 ranges from 0 to 1. The higher the value of the adjusted R^2, the greater the explanatory power of the regression equation and the better the prediction of the dependent variable. We used *F* statistics to check for the significance of the coefficient of determination.

The beta (β) coefficient is the standardized regression coefficient. Regression coefficients are expressed in terms of the units of the variables, thereby making comparisons between coefficients inappropriate. The β coefficient allows us to evaluate the relative effect of each independent variable on the dependent variable. The standardization process transforms the absolute regression coefficients into a new coefficient with a mean of 0 and a standard deviation of 1. By this transformation, the β_0 term (the intercept) turns into the value 0. Thus, β coefficients use standardized data and can be directly compared. The *t* values assess the statistical significance of the difference between two sample means for a single dependent variable. When interpreting the beta coefficients, we considered for all estimated equations the two-tailed t-test with threshold values of 1.645 (10% level of significance), 1.960 (5% level of significance) and 2.326 (1% level of significance).

The collinearity expresses the correlation between two or more independent variables. The diagnostic tests used in our study are the Pearson correlation (see footnote 4), the variance inflation factor (VIF), and condition indices (Mason and Perreault, 1991; Hair et al., 1998). Correlation coefficients higher than 0.80 were considered to be problematic in collinearity terms and dropped unless strong theoretical argumentation supported the decision to keep them. The VIF indicates the effect of independent variables on the standard error of a regression coefficient. We use the threshold value of 10 for a high degree of collinearity among the independent variables. Finally, the condition indices are used to diagnose collinearity. Condition indices are the square roots of the ratios of the largest eigenvalue (eigenvalues indicate how many distinct dimensions there are

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[6] The power in multiple regression lies in the ability to detect statistical significance in both the specific level of R^2 and the beta coefficient for a particular sample size. The effects of sample size are seen to be influential on the significance testing and the generalizability of the results (Hair et al., 1998). The size of the sample has a direct impact on the appropriateness and the statistical power of multiple regression. According to Hair et al. (1998), samples of less than 100 observations and up to 10 independent variables reduce the power of multiple regressions. The sample size of our data sets – 175 (suppliers) and 67 (buyers) – lead us to expect fairly small R^2 values.

among the independent variables) to each successive eigenvalue. A condition index greater than 15 indicates a possible problem and an index greater than 30 suggests a serious problem with collinearity.

6.5.2 Structural equation modeling

Structural equation modeling (SEM) is a multivariate technique that combines aspects of multiple regression (examining dependence relations) and factor analysis (representing the construct part of multiple variables) to estimate a series of interrelated dependence relations simultaneously. SEM is a powerful method for testing causal models, because it enables the parallel evaluation of the individual paths constituting the model, the total effects (i.e., direct and indirect effects) and the complete model's goodness of fit (Box 6.2 describes the goodness of fit indices) (Hair et al., 1998). The main difference between SEM and other multivariate techniques is the use of separate relationships (i.e., paths) for each of a set of dependent variables (Anderson, 1987). In simple terms, SEM estimates a series of separate, but interdependent, multiple regression equations simultaneously, by specifying the structural model used in the statistical program Lisrel.

Box 6.2 Goodness of fit indices

After estimating the measurement or structural model, given a converged and proper solution, we need to assess how well the specified model accounts for the data. This is done with one or more overall goodness of fit indices. These indices determine the degree to which the model predicts the observed correlation matrix (Hair et al., 1998). They are the chi-square (χ^2), the χ^2/df (degrees of freedom) statistic, the goodness of fit index (GFI), the adjusted GFI (AGFI), and the root mean squared residual (RMR). Incremental indices may also be used, such as normed fit index (NFI) and non-normed fit index (NNFI). If the proposed model fits well with the observed data, chi-square (χ^2) will be non-significant and its value should fall between one and two times the df. Statistical significance levels of χ^2 indicate the probability that these differences are caused solely by sampling variation. A large value of χ^2 relative to the df signifies that the observed and estimated matrices differ considerably. An important criticism of the χ^2 statistic is that it is too sensitive to sample size differences, especially in cases where the sample size does not exceed 100 observations (Anderson, 1987). Therefore, χ^2 statistics should be evaluated with care (Marsh, Balla and McDonald, 1988). The GFI and AGFI both assess how much better the proposed measurement model fits the data as compared to no model at all. The AGFI is a GFI adjusted by the ratio of df for the estimated model to the df for the null model. The value of both the GFI and the AGFI can range from 0 to 1, where a high value means a better fit. Hair et al. (1998) recommended a value of >0.9. The RMR measures the average of the variance of the residuals that cannot be explained by the model. A value close to 0 implies a better fit (Marsh, Balla and McDonald, 1988). The NFI is an incremental index for the χ^2 statistic, and NNFI is an incremental index for the χ^2/df. Incremental fit indices are useful for comparing the fit of the estimated model with the fit of a null model in which all the variables are assumed to be uncorrelated. If the fit of a null model is reasonable, because the sample size is small or because the observed variables are relatively uncorrelated, then the fit of the target model will automatically be reasonable. Usually, a threshold value of 0.90 is applicable to both incremental fit indices.

The evaluation criteria for the goodness of fit indices can be summarized as follows:

- χ^2: non-significant and between one or two times the number of degrees of freedom
- GFI, AGFI, NFI, NNFI: $\geq$0.9
- RMR: Close to 0

The structural model is derived from theory, prior experience and research objectives to distinguish the independent variables that predict each dependent variable. The theoretical concepts are operationalized in a set of observed variables (e.g., scales or indicators) that are later computed into latent variables. Thus, using this technique we can test a structural model between variables that reproduces the influence of latent independent variables on latent dependent variables.

6.6 Concluding Remarks

This chapter described the methods of data collection for the quantitative survey part of our study. The survey methodology was described based on the criteria for selecting the study population and the formation of the measurement instruments. The chapter also described the distinction between reflective and formative indicators, which implies the need for different procedures to assess indicator validity and reliability. Finally, the methods used to analyze the data set were presented. The results of these empirical analyses are presented in Part 3.

Part 3

RESULTS

Chapter 7

Case Study Results

By conducting two case studies in the Dutch potted plant and flower industry, we expect to tackle four major objectives. First, we inquire into the perceptions of the case study participants about the study concepts in order to seek distortions on the definitions chosen in this research. Second, we verify the operationalization of the constructs in measurable concepts, especially the concept of networks. These first two aims provide insights with which we assess the content validity of the constructs of the framework, which is the third objective. Fourth, we investigate the interrelations between the concepts, which offers insights into the constructs' nomological validity.

The sections to follow describe the participants of the case studies and present the results of the interviews. The conclusions of this chapter discuss the impact of the case studies on the rest of our study.

7.1 Baseline Description of the Companies Participating in the Case Study

Table 7.1 provides the baseline characteristics of the suppliers involved in the case study. Although there are considerable differences in the amount of fixed lines between suppliers 1 and 2 and between 4 and 5, the strategy of all suppliers is clearly toward an increase of fixed lines. Our two cut-flower suppliers, suppliers 1 and 2, seem less willing to fix a large portion of their lines. Auction cooperative reports (Deneux and Luten, 2001) corroborate this tendency of suppliers of cut flowers to be less involved in fixed lines than potted plant and flower suppliers. The interviewed suppliers said they prefer fixed lines because they enable them to attain more autonomy than when selling products through the auction clock. Suppliers 4 and 5 stated that decisions are made together with buyers in a buyer-supplier relationship. Suppliers stated that when selling products via non-fixed lines (via brokerage and the auction clock), there is little room for adjustments and transactions are heavily subject to market forces (e.g., prices, demand and supply). Although most of the transactions via fixed lines are formalized in written contracts, the transactions are in practice informal and rely on the word of the purchasing agent or on an order form. Suppliers pay more attention to the written contract when a transaction involves large quantities.

The duration of the fixed-line relationships was four years or more. The number of buyers purchasing via fixed lines increases according to the size of the supplier. Interestingly, supplier 4 is considered a large company regarding its main product (orchids), though it has a relatively small number of buyers via fixed lines and few employees. By examining the number of employees in the sales department of the potted plant suppliers and the number of buyers via fixed lines, we notice that special attention seems to be paid to relationship management. Regarding our informants, they all have a farming background (i.e., they were raised on a farm and/or hold a degree

in an agriculture-related major). Some interviewees hold a degree in business administration (the sales personnel of suppliers 1, 4 and 5).

Table 7.1 Summary of the characteristics of the suppliers

Characteristics	Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5
Percentage of fixed lines	35%	20%	55%	95%	90%
Strategy toward fixed lines (by 2004)	50%	35%	70%	stabilized	stabilized
Profile of the company					
Number of fixed employees	5 (~25 seasonal)	8 (~20 seasonal)	45	10	40
Employees in the sales department	1	1	2	1,5	4
Main product	tulips (cut flower)	red roses (cut flower)	potted plants	orchids (potted flower)	potted plants
Size relative to industry standards	medium	large	medium	large	large
Number of 'preferred' buyers in a fixed line	3	4	15	15	35
Longest duration of a fixed line (years)	4	5	4	8	6
Firm establishment	1978	1971	1985	1975	1982
Persons interviewed	1 owner, 1 salesperson	1 owner, 1 salesperson	1 head of marketing, 1 salesperson	1 owner	1 salesperson

Note: The names of the companies and individuals are omitted to ensure confidentiality.

Table 7.2 shows the characteristics of the buyers involved in the case study. The amount of fixed lines varies, but taken together the aim is clearly to increase fixed-line purchases in the coming years. The interviewed buyers perceive transactions via fixed lines as providing them more autonomy in the decision-making process than other purchasing channels. Buyers 3 and 4 stated that working closely with suppliers increases certainty about product quality and quantity. Contracts are always used in fixed lines, but the buyers only pay attention to the contract when there is a large order from their customers, especially supermarkets (sales to supermarkets are frequently based on a written contract). Among the buyers, the longest duration of the fixed-line relationship is generally higher than those mentioned by the suppliers. The frequency of transactions is high during the season, sometimes daily. The buyers perceive this long-term buyer-supplier relationship as offering not only the outcomes of the current transaction, but more importantly, long-term gains.

Buyer 3 is fully concentrated on the purchase of potted plants and has the largest number of suppliers in fixed lines, but surprisingly it has the smallest number of purchasing agents. In the period of the interviews, this buyer was going through a major reorganization aimed at unifying its computer systems and separating into different business units. While buyers 3 and 4 were functioning basically as merchants, buyers 1 and 2 sell products with added value by making flower bouquets aimed primarily for supermarkets. The department heads have a business administration background, except the department head at buyer 1 who has a farming background.

Table 7.2 Summary of the characteristics of the buyers and key informants

Characteristics	Buyer 1	Buyer 2	Buyer 3	Buyer 4
Percentage of the total purchased				
Cut flowers/potted plants and flowers	90%/10%	95%/5%	0%/100%	60%/40%
Fixed lines	35%	55%	55%	60%
Strategy toward fixed lines	60% by 2004	75% by 2005	70% by 2006	75% by 2004
Profile of the company				
Number of employees	250	190	180	550
Number of purchasing agents	16	11	9	22
Main product	flower bouquets	flower bouquets	potted plants	potted plants and cut flowers
Business concept	wholesaler/exporter	wholesaler/exporter	cash and carry	wholesaler/exporter
Size relative to industry standards	large	medium	large	large
Number of 'preferred' suppliers in fixed lines	60	35	130	100
Longest duration of a fixed line (years)	10	6	7	8
Firm establishment	1975	1965	1972	1990
Profile of the key informant				
Start at the company	1980	1997	1999	1990
Start in the industry	1980	1990	1989	1985
Persons interviewed	1 head of purchasing, 1 purchasing agent	1 head of purchasing, 1 purchasing agent	1 purchasing agent, 1 head of purchasing	1 head of purchasing for potted plants, 1 head of purchasing for cut flowers

Note: The names of the companies and individuals are omitted to ensure confidentiality.

7.2 Case Study Results

This section reports the results of the case studies conducted with the suppliers and the buyers.

7.2.1 Business networks

Suppliers have established numerous connections to gather valuable information. We found that suppliers are in close contact with other buyers and colleagues as well as with the agents of the mediation department of the auction cooperative. The interviewed suppliers have connections with about 15 buyers. They work in close cooperation via fixed lines with half of these, who are called "preferred partners". Although supplier 5 has in total 35 "fixed-line" buyers, only seven are considered to be a "real" preferred partner (i.e., can be relied on, buys products throughout the year, pays a good price). These preferred partners are the ones most contacted in order to obtain information about innovations and to investigate potential future demands and prices. The customers (e.g., street sellers and open-air market sellers, flower shops and supermarkets) of the preferred buyers were mentioned as a valuable source of information about market trends and to foresee new purchase opportunities or other buyer tendencies, such as a shift in customer preference from white to yellow flowers. Suppliers 1, 3 and 4 pointed out that input suppliers are also important sources of information about production processes, especially the sellers of young

plants. These sellers are in contact with several other suppliers that produce similar products. As a result, suppliers 1, 3 and 4 use these sellers as a source of information to improve their own production processes. All the interviewed suppliers have weak (i.e., low frequency and low impact on daily business) connections with universities, research institutes and branch organizations. In terms of the impact of information in their relationship with preferred buyers, suppliers pointed out that information on price and quantities was very important in order to negotiate with the preferred buyer, while information to foresee the actions of the buyer was considered important for safeguarding against possible problems. Information that supports logistical operations was mentioned as important; especially that obtained from agents within the mediation department of the auction cooperatives.

Judging from the way suppliers perceive the different sources of information, the network subgroups can be based on the aggregation of actors in a supply chain (e.g., downstream and upstream in the chain). In terms of the impact of the information, the suppliers stated that the information provided by the members of the different subgroups can be used not only to enhance the collaboration with the fixed-line buyer, but also to develop trust and ultimately to invest in specific assets. The information can also reduce the information asymmetry in a buyer-supplier relationship and reduce the risk of opportunistic behavior. This shows that there might be a positive effect of the business network on the buyer-supplier relationship.

The interviewed *buyers* reported maintaining connections with several organizations and institutions. In fact, they were keen to share their information and experiences in the business of buying, as illustrated by the response of buyer 4 when asked about the network connections:

> *"Yes for sure our other contacts matter. If a supplier presents good quality products, and starts delivering bad quality for some reason, he (the supplier) will lose the (fixed) line with us. And even worse, our colleagues will get to know and deliberately exclude this problematic supplier."*

Buyers have regular fixed lines with 30 to 100 suppliers of which 10% to 20% are characterized as close collaboration. They also maintain frequent and strong connections with other suppliers, colleagues, customers and agents of the auction cooperative mediation department. In contrast, there are less frequent and strong connections with competitors, branch associations and research institutes, which is in line with the responses of the interviewed suppliers. Demand orientation was apparent among the buyers; they are acquainted with the possibilities of gathering valuable information from organizations close to consumers. According to buyer 1, "*We are the eyes and the ears of our suppliers.*" This highlights the key informational role that buyers play in gathering intelligence from customers and providing it to suppliers upstream in the supply chain. There is a strong connection with suppliers with whom they do business regularly and, more importantly, buyers consider these suppliers to be an important and reliable source of information.

The information on quality and quantity was ranked by three of the interviewed buyers as the most important information obtained from the network. Buyer 1 prioritized the information about the ability of the supplier to be engaged in a buyer-supplier relationship, as reflected in trust and collaboration. For this buyer, information with which to monitor past and future actions of the supplier was important. Interestingly, information about price figured as important as well. However, buyers stated that prices are always dependent on quality and quantity. The buyers were unanimous in saying that information to support the internal handling and logistical processes can be obtained from the network and from the suppliers engaged in fixed lines with them.

We found that information is influencing the way buyers set up their modes of collaboration in terms of joint planning, joint problem solving and flexibility. In addition, buyers mentioned that information influences their level of trust and their willingness to make transaction-specific in-

vestments. The purchasing agents of buyer companies were keen to contact people with the purpose of obtaining information that supports them in doing business. However, they appear to do it unconsciously and randomly, which was also noticed among the interviewed suppliers. Buyer 4 mentioned information from the network as necessary for managing a relationship, and certainly the development of connections needs special attention. The head of purchasing of buyer 4 emphasized the importance of the network to the buyer-supplier relationship.

Table 7.3 summarizes the respondents' perceptions regarding the source and content of the information from the network as well as their perceptions regarding the impact of the network on the elements of the buyer-supplier relationship. The information obtained from the business network is revealed to be an important factor for both suppliers and buyers, and it influences the buyer-supplier relationship of fixed lines. Attention was called to the aggregation level by suppliers who obtain information from subgroups based on the supply chain actors. The buyers also perceived the network connections in groups aggregated according to chain construction, but presented a rather different perception of the benefits of information compared to the suppliers. For them, the subgroups that provide the most valuable information are located downstream the chain, close to the end consumers. The most valued type of information is that related to quantity and quality of products and to foresee the actions of the supplier. The supplier's and buyer's perceptions regarding the influence of the information were alike. They perceived the information provided by the subgroups as influencing not only collaboration, but also trust and transaction-specific investments.

Table 7.3 The network and its impact on buyer-supplier relationships

Perception of Suppliers and Buyers	Interrelations
Content: Price and quantities, coordination of processes and to foresee future actions of buyers. *Sources*: Other buyers, other suppliers, input suppliers, customers, and agents of the cooperatives.	Collaboration, trust and transaction-specific investments

7.2.2 Transaction-specific investments

Among *suppliers* the fixed line seems to require a certain degree of human and physical specific investment. Regarding physical specificity, we found that suppliers adjust and eventually acquire equipment and machinery to facilitate packaging for a buyer and to begin or expand the production of a particular plant or flower. Equipment to transport products (e.g., specially made trolleys and containers) also facilitates deliveries to the buyer's locations or directly to the warehouse of the buyer's customer.

Suppliers 1, 2 and 4 have few employees relative to their annual sales volume. However, a number of seasonal workers are added at the peak of the season. Working with fixed lines requires investments in time to learn the purchasing process of the buyer, which eventually requires training by the sales personnel, since suppliers have to develop ways to share information with buyers, making better use of communication processes. When asked whether investment in human specificity would be necessary to transact directly, supplier 5 responded as follows:

> *"Yes, we had to improve the commercial skills of our marketing people, because we needed to be close to the purchasing agents."*

Suppliers perceive transaction-specific investments as impacting collaboration and the integration of activities. Suppliers 3, 4 and 5 had made several investments that enabled joint action.

Suppliers 3 and 5 mentioned that the specific investments forced them to work closely with counterparts. For instance, these suppliers began producing certain varieties when they were required by the buyer. Supplier 2 said that one of its packing machines was set up to pack products in a specific buyer's packaging, and supplier 1 said that besides the adjustments in the packing machine, they also deliver products at night to accommodate the buyer's production line. All these investments were made possible by joint actions.

For their part, the *buyers* had made more physical and human transaction-specific investments than the suppliers. According to buyer 1, these investments enabled them to *"purchase any product at a good quality standard for a reasonable price, and to receive it on time and handle it efficiently."*

In terms of physical assets, investments were made in docks for receiving plants and flowers, special trolleys and containers (that are sometimes lent to preferred suppliers), quality-control laboratories (for testing shelf life and other consumer requirements) and ICT (software and hardware that enables accurate in-house control, integrated purchasing and sharing of information with preferred suppliers). The human resource specificity was found in the commercial skills developed by purchasing agents. These agents had previously employed techniques for spot-market transactions, for example, getting to know the cheapest products in the market, whereas in fixed lines their tasks are rather different. The purchasing agents must now identify suppliers who can provide uniform products and specialty items. They must visit the suppliers, create checklists for quality control, share information, join in the search for solutions to problems, place orders monthly and conduct motivational programs (e.g., awards for best supplier). The interviewed buyers trained their purchasing agents to build their knowledge base about buying products in a context of close cooperation. Buyers 1, 2 and 4 highlighted the importance of such investments for gaining efficiencies that easily compensate any vulnerabilities involved in the relationship with suppliers in fixed lines.

Table 7.4 summarizes our findings on transaction-specific investments as well as perceptions regarding the impact of these investments on the other conceptual elements of the buyer-supplier relationship. Both suppliers and buyers had made human and physical transaction-specific investments for the fixed line relationship. The buyers emphasize the time and resources invested in training purchasing agents to deal with suppliers in a collaborative fashion. Transaction-specific investments were mentioned to positively influence joint action. Considering the implications of the specific investments for the buyer-supplier relationship, we decided to inquire further into the two dimensions in our survey. For the theoretical framework, transaction-specific investment is considered a factor influencing joint action.

Table 7.4 Transaction-specific investments and interrelation

Perception of Suppliers and Buyers	Interrelation
Human: Investments in time and training to deal with a specific buyer	Joint action
Physical: Investments in machinery and equipment	

7.2.3 Trust

Suppliers often mentioned trusting the preferred buyer as the most important factor of fixed lines. As supplier 5 stated: "*this maintains the company running the business*". Aspects such as personal contacts, prior experience, ability to share information and reputation are attached to

trust. Personal contacts are boosted by telephone contacts and visits. By phone, suppliers are frequently in touch with the purchasing agent. As supplier 3 stated:

> *"We use many practices – such as contacting the buyer by telephone, visiting the buyer's company, meeting the buyer in the auction halls, inquiring about future purchases and asking about new trends – to keep the buyer interested in our company."*

It is common sense among suppliers that prior experience builds trust. Suppliers 3, 4 and 5 all asserted that they rarely place their full trust in a buyer in the first deals. According to these suppliers, obtaining information about the reputation of the buyer from other organizations (i.e., from the network) and conducting trial transactions (e.g., selling not so large quantities to the buyer) allows a constructive relationship to develop for future deals. The suppliers are concerned with buyers' ability to honor the long-term promises of steady purchases throughout the year. They believe that open communication allows a more transparent relationship, signaling trust and enhancing collaboration. The suppliers adopted an attitude of tolerance toward minor problems with preferred buyers in order to guarantee long-term rewards. When asked about interpersonal trust, suppliers' opinions are alike; they say that through the personal contacts and prior experiences, trust is born and can be developed further.

The interviewed *buyers* are not as concerned with trust as the suppliers. At first, we had the impression that the large number of alternative suppliers (i.e., relative to the supplier's number of alternative buyers) was the reason for this lower concern. However, "*a good supplier is not easy to find; it takes time and several attempts until we find one. So it is better to develop a good supplier*", as a buyer 1 stated. The prior relationships confer to buyers a good deal of information about the supplier's performance in terms of uniformity of supply and quality and how problems were solved. All buyers stated that trust relationships are only possible because of their prior relationships and personal contact with the suppliers. As buyer 4 stated:

> *"...it is important to consider the product and the service that he (supplier) provides to us and our past encounters. He is always doing well so we can continue dealing with him."*

We found that purchasing agents reserve a good deal of their time to visit suppliers. In buyer 4, purchasing agents spend almost a third of their time talking face-to-face with suppliers. In low season the frequency increases. They use these visits to build trust and to learn about the production process, and to give feedback. Buyer 1 awards suppliers certificates for providing quality, meeting steady demand and other attributes. Awarded suppliers are named as "the *buyer's name* supplier". Buyers 1 and 4 believe that the trust placed in the relationship enables them to exploit some benefits. The buyers stated that problem solving and planning is now carried out together with the supplier, which is only possible because of the close contacts that purchasing agents maintain with the preferred suppliers. Moreover, these buyers pointed out that the trust encourages them to be flexible whenever critical situations unfold. As buyer 4 stated:

> "*Last year, a (preferred) supplier had a severe problem with a disease in his fields that dramatically reduced the quality of the plants. My purchasing agent and I (head of purchasing) decided to make a new agreement with him in order to help him to sell the products and, of course, so as not to lose his products for the next season. We simply found a customer for the not so high quality products*".

In sum, Table 7.5 presents a summary of the perceptions of buyers and suppliers about the concept of trust and its interrelations with the other elements of the buyer-supplier relationship. Suppliers and buyers regard trust, in terms of personal contacts and prior relationships, as important. Buyers 2 and 3 do not perceive trust as a factor influencing collaboration and gains in the rela-

tionship. Considering that buyers 1 and 4 perceive trust to be critical and that trust is a complex concept, we decided to test in the quantitative phase the influence of trust on collaboration. Our decision is further supported by the fact that all of the buyers had a common interpretation of the concept of trust in a relationship. This is in line with the literature on trust, which explores the complexity of the concept (e.g. Doney, 1997). We found that buyers and suppliers perceive trust to be a multidimensional construct, namely with interpersonal and inter-organizational dimensions.

Table 7.5 Trust and its impact on other elements of the buyer-supplier relationship

Perception of Suppliers and Buyers	Interrelations
Interpersonal, inter-organizational prior experience, trustworthy and information sharing	Collaboration and transaction-specific investment

7.2.4 Collaboration in buyer-supplier relationships

The interviewed *suppliers* collaborate in fixed-line relationships. Despite the fact that the fixed lines of suppliers 1 and 2 accounted for a minority of their annual sales, there is a common sense that working closely together with the buyer and acting flexible to changing situations make a difference. All the suppliers perceive this collaborative effort to positively impact their performance. As suppliers 3 stated:

> "*It is interesting to see how fast our relationship with the buyer evolved to such a close collaboration. The purchasing agent often comes to our firm to provide us with information about the market and the production of our products. This has definitely helped us to improve our production processes and be more accurate on our decisions.*"

The suppliers point out that several critical problems were solved with the assistance of the purchasing agent. Possible disagreements about the conditions of the order were always (re-)negotiated with the agent. Suppliers 3 and 5 were able to exploit gains from their close collaboration with buyers. The suppliers could sell products that did not comply with the quality standards agreed in the original order. The interviewed suppliers notified the buyer that the product lot had, for instance, a quality problem. The buyer then sought another customer that would be willing to buy the lot, and the conditions of the order were renegotiated. The basis for joint action is the exchange of information. Suppliers receive information from the buyer, which allows them to plan the harvesting time and to grow new flower varieties or plant species, and on some occasions to use the packaging of the buyer or the buyer's customers. Regarding flexibility to make adjustments, all of the interviewed suppliers agreed that it is necessary to be flexible in order to maintain the relationship with the fixed-line buyers and that this has led to adjustments in plant production and the way suppliers deal with the buyers.

All the *buyers* want to increase the number of suppliers that are capable of working closely with them throughout the year. The meaning of working closely together suggests a collaborative approach, being flexible, and open to share information to plan and solve problems. After all, as buyer 2 mentioned:

> "W*e have to fulfill the expectations of our customers and if we do not work in close collaboration with our suppliers, a relatively small problem may become severe one. We are definitely going to get complaints from our customers as we have in the past when the decisions were taken solely by us.*"

The interviewed buyers engaged in joint planning, except buyer 3 who was in the process of a major reorganization during the interview period.[7] The joint activities with the suppliers consisted of sharing monthly and annual reports of future purchases, providing orders some days in advance, setting up quality standards agreed upon with the supplier and discussing the conditions and requirements of the purchase with the suppliers when there is a change in the process of purchasing. We observed that although they make a strong effort to plan in advance, problems occur and the way buyers cope with them makes a difference. There is a considerable problem of consistency in quality and quantities, primarily because of changes in weather conditions. The buyers devote special attention to solving such problems with suppliers involved in fixed lines. As buyer 1 stated:

> *"We support the suppliers in solving their problems. We actually don't have big problems with suppliers trying to cheat, but quite a few of them don't have such a uniform quality… although most of our suppliers employ high technology, their production relies very much on the weather conditions and other unforeseen situations."*

The buyers employ several actions in response to problems: they warn suppliers about the problem and the purchasing agent gives advice, which helps in the solving of the problems. In some serious cases, purchasing agents or other technical support personnel visit the production operation of the supplier in order to find ways to avoid future problems. Problems of low quality are the most frequent and problematic. As stated above, suppliers contact the buyers to tell them in advance about a possible low quality of the products ordered. By this means, suppliers contribute to joint problem solving. As buyer 4 pointed out:

> *"We are always open to making new deals if there is a problem with our suppliers, for instance, if the supplier knows that the quality will not be what was agreed, we will find an alternative to solve the problem. More importantly we look for other customers that might be willing to buy the lot – it is much better than sending the product to our customers and later on receiving the claims from them."*

The statement above reflects the way in which buyers show flexibility to make adjustments in the face of contingencies. They are keen on jointly solving problems and planning in advance. We found that, by being flexible and through joint planning and problem solving, buyers have increased their effectiveness.

In sum, there is a clear interrelation between the dimensions of collaboration (joint action and the norm of flexibility), and collaboration has a distinct effect on performance. Suppliers consider collaboration to be important, although they perceive buyers as sometimes reluctant to release information that would allow them to plan in advance. Indeed, a number of initiatives in the joint planning sphere are somewhat "*shy*" (as supplier 5 stated). These shy initiatives suggest that the firms in this industry are flexible and quite involved with reactive sometimes random reactions to problems and proactive action is on a slow course of implementation. Our results show that suppliers are resistant to fully changing their mindset from a spot-market orientation to a collaborative mindset when selling directly to buyers.

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[7] As discussed previously, during the period of the interviews, buyer 3 (a cash-and-carry) was going through a major reorganization. Two years afterwards, we contacted the head of the purchasing department, who stated that it had been a rather successful reorganization. We also contacted the suppliers 3 and 5 that sell directly to this buyer. They both said they were satisfied with the changes and the close collaboration developed with the purchasing agents.

Table 7.6 Collaboration and interrelations

Perception of Suppliers and Buyers	Interrelations
Suppliers: Prominent and important in terms of joint problem solving and flexibility, but less evident in joint planning. *Buyers*: Evident in joint problem solving, joint planning and flexibility.	Flexibility to take joint action, and collaboration's impact on performance

Buyers considered collaboration to be relevant in fixed lines. As opposed to the suppliers, buyers are fully active in joint planning. This recalls the idea that collaboration in the industry is under development and buyers are making efforts to begin the change. We found this collaboration to influence the overall performance.

7.3 Concluding Remarks

The case studies demonstrate that fixed lines are seen as something more than a one-shot transaction with a focus solely on the economical exchange. Rather a transaction via fixed lines is part of a long-term, close buyer-supplier relationship. This relationship contains the elements of trust, transaction-specific investments and collaboration. Moreover, the relationship is influenced by the information obtained from subgroups of the business network. These buyer-supplier relationships are becoming increasingly important for the focal industry, which is well-known for its impersonal auction-clock transactions. Although there is a trend toward fixed lines, as opposed to auction-clock and brokered ones, as revealed in our cases (see Table 7.1 and Table 7.2), the interviewed companies are reluctant to fully change from a market-based orientation to fixed-line collaboration. This seems partly due to uncertainties of quality and quantity of supply, for example, because of unfavorable weather conditions. Our case study results nonetheless show the benefits that suppliers and buyers can reap when working in close collaboration.

The interrelations of the concepts found in the case studies are to a great extent in line with the pattern proposed in our theoretical framework. Three relevant implications emerge.

First, the case studies provide indications that the business network is used to obtain information that is regarded as "valuable" by suppliers and buyers. It appears that the information from the subgroups contributes to foresee actions of the counterpart in terms of avoiding "cheaters" and moreover this information supports them in setting the price, quantity and quality of products that are to be traded. The case studies provide evidence of such information benefits and of the existence of certain network subgroups. The aggregation into subgroups follows the chain concept. Therefore, the concept of connection with network subgroups is worthy of a more detailed investigation in the quantitative phase. The case studies reveal the connections to be contingent on the elements of the buyer-supplier relationship (i.e., trust, transaction-specific investments and collaboration).

Second, we verified the complexity of trust. Trust was always referred to as a multidimensional concept containing the economic, social and relationship features discussed in Chapter 3. Surprisingly, two of the interviewed buyers did not perceive trust to be contingent on the buyer-supplier relationship; rather they perceive the relationship to be contingent on the elements of trust (e.g., past experience, frequent contacts and long-term orientation). Based on these findings, we can state that trust is aptly defined as the belief, attitude and expectation that the actions and outcomes of the counterpart will be acceptable.

Third, the evaluation of performance drew our attention. Suppliers and buyers clearly perceive the gains of close collaboration via fixed lines. For the suppliers, gains made in terms of efficiencies of the production process increase the overall performance of the firm. Financial benefits were mentioned, such as higher margins, better benefit-cost ratios, sales growth and profitability, as well as more subjective benefits, such as making more deals with the buyer, enlarging sales to a specific buyer and receiving more information. Also the buyers perceive a certain advantage from purchasing via fixed lines, though they argue that performance is influenced by many other factors, such as internal wasting of time and resources by inefficient handling of products. When asked about performance measures, buyers were keen to mention the financial ones, such as profitability, return on investment, sales growth, profit per unit purchased and benefit-cost ratio. Also, some subjective measures were mentioned, for example, level of satisfaction and increased products purchased per supplier.

The next chapter develops our understanding further by presenting the results of the quantitative phase of this research, the survey of buyer and supplier samples.

Chapter 8

Survey Results

This chapter presents the results of the statistical analysis of our two study samples. The supplier sample is composed of 175 relationships that suppliers (growers) have with a selected buyer; the buyer sample is composed of 67 relationships that buyers (e.g., wholesalers and other merchant distributors) have with a selected supplier. For data management and preliminary evaluation of the data set, we used SPSS 10.0 and Microsoft Excel. The software packages used for carrying out the statistical analysis were SPSS 10.0 and Lisrel 8.5.

Section 8.1 describes our samples. Section 8.2 discusses the matter of non-response and how we evaluated whether non-respondents pose a problem to the evaluation of the data. Also, we discuss the credentials of the informants who answered the questionnaires. The subsequent sections (8.3 and 8.4) present the results of the reliability and validity assessment of the constructs. Attention is focused on the evaluation of the measurement instruments. In quantitative empirical research it is important to ensure that the measuring devices are both reliable and valid. Based on the measurement characteristics of the constructs, namely formative and reflective, we discuss the steps we took to evaluate the reliability and validity of the constructs. Section 8.5 presents the estimated models based on the theoretical framework. Finally, section 8.6 presents the exploratory analysis of the effect of each network subgroup on the buyer-supplier relationships.

8.1 Description of the Study Samples of Suppliers and Buyers

This section conveys some general characteristics of the study samples. Our data collection effort in the supplier sample yielded 195 responses, of which 20 were incomplete questionnaires and other non-eligible companies. The data collection effort in the buyer sample yielded 81 responses, of which 14 were incomplete questionnaires and other non-eligible companies. The effective response rate of the supplier sample was 31.6% and of the buyer sample 20.2%, which compare favorably with those obtained in prior research in this field (see Chapter 6, Table 6.1). Of the 175 usable responses from suppliers, 124 were received in the first wave. Of the 67 usable responses of the buyers, 34 were received in the first wave. Table 8.1 summarizes the response.

Table 8.1 Summary of the survey response

Sample	Supplier	Buyer
Total sample	600	350
- Non-eligible companies*	32	8
Total sample mailed	*568*	*342*
Received in the first wave	134	41
- Incomplete and blank questionnaires	2	1
- Non-eligible companies*	8	6
Usable questionnaires in the first wave	*124*	*34*
Received in the second wave	61	40
- Incomplete and blank questionnaires	6	3
- Non-eligible companies*	6	4
Usable questionnaires in the second wave	*51*	*33*
Total usable questionnaires	***175***	***67***
Response rate	***31.6%***	***20.2%***

* Non-eligible companies are duplicate addresses, suppliers of cut flowers only, foreign companies, only importers and liquidated companies.
Note: Response rate = (total usable questionnaires) / ((total sample mailed) – (non-eligible companies))

8.1.1 Profile of the companies

Table 8.2 reports the average and standard deviation of the number of employees in the buyer and supplier respondent companies. Although it appears that the number of employees is not comparable across samples, up to 90% of respondents in both samples have less than 60 employees and half have less than 15 employees.

Table 8.2 Mean and standard deviation of the number of employees (Standard deviation: SD)

Categories of Employee	Supplier	Buyer
Seasonal	5.93 SD: 11.97	–
Production	10.45 SD: 15.00	–
Tenured	12.92 SD: 17.28	27.30 SD: 48.70
Purchasing department	–	3.64 SD: 2.83

In the buyer sample, we were concerned with the credentials of our respondents. We asked respondents how long they had worked in the purchasing function and in the company. Table 8.3 shows that our respondents were involved on average for more than 15 years (SD: 8) in their function and about 14 years (SD: 14) in the company. The time span of responses to both questions ranges from 2 years to 40 years.

Table 8.3 Distribution of the period of time respondents worked in the same function.

Period of Time (years)	Purchasing Function	In the Company
1– 5	19%	15%
5–10	22%	21%
10–15	25%	18%
15–20	19%	29%
>20	15%	17%

The tables show that up to 64% of the respondents have been in charge of the purchasing department for more than 10 years. Likewise, up to 60% of the respondents have worked in the same company for more than 10 years. This provides evidence that informants are well acquainted with their tasks and are the appropriate people to respond to the questionnaire.

Table 8.4 reports the total sales of respondents. In both samples, the sales figures present a normal distribution. The sales differences between the companies are remarkable. While buyers record up to €5 million in sales, 42% of suppliers make less than €800,000 annually. This is not so striking since distributors work with large volumes of products.

Table 8.4 Number of respondent companies by annual sales volume

	Supplier Companies	Percentage
Less than €800,000	77	44%
Greater than €800,000	98	56%
	Buyer Companies	
Less than €5 million	33	49%
Greater than €5 million	34	51%

The companies show a general intention to replace auction-clock and brokerage transactions by fixed lines, as Table 8.5 confirms. The table reports the average of respondents' answers regarding the percentage of their total trades. It appears that suppliers are more aggressive in acquiring fixed lines. The expected share in 2004 indicates that suppliers tend to promptly respond to (or dictate) the trend. When examining the frequency of these fixed lines, 20% of firms (suppliers and buyers) trade more than 50% of products via fixed lines. While 50% of the buyers purchase more than 10% via fixed lines, 70% of the suppliers sell more than 10% via fixed lines. This is another indication that a greater number of suppliers are focused on fixed lines compared to buyers.

Table 8.5 Share of trades through each of the different channels

Channels	1998		2001		Expected in 2004	
	Supplier	Buyers	Supplier	Buyers	Supplier	Buyers
Fixed lines	25%	19%	30%	24%	37%	28%
Auction clock and brokerage	75%	81%	70%	76%	63%	72%

In the buyer sample, we controlled for the share of each type of product in the total sales of the buyers. The buyers mainly deal in potted plants and flowers (see Table 8.6), and most of them (90%) also trade in other products (e.g., cut flowers, foliages and garden products).

Table 8.6 Average buyers' assortment

	Potted Plants and Flowers	Cut Flowers and Foliages	Garden Products
The average buyer's assortment	61% (SD: 28)	18% (SD: 29)	21% (SD: 17)
Min – Max	10% – 100%	0 – 90%	0 – 70%

8.1.2 General characteristics of the relationship

The length of the focal relationship in the supplier sample averages more than 8 years (SD: 5.6) and in the buyer sample over 7 years (SD: 4.67). Lengths range from 1 to 30 years in the supplier sample and from 2 to 21 years in the buyer sample. Most buyers (79%) have maintained a rela-

tionship for up to 10 years. Slightly fewer suppliers (70%) report having maintained a 10-year relationship.

Table 8.7 shows a cross of supplier size with the size of its selected buyer. There is a large concentration of suppliers dealing with relatively smaller buyers.

Table 8.7 Supplier size versus size of the counterpart buyer

	Counterpart Size (Buyer)		
Supplier Size	**Less than € 5 Million**	**Greater than € 5 Million**	**Total**
Less than €800,000	37%	6%	43%
Greater than €800,000	50%	7%	57%
Total	87%	13%	100%

Interestingly, the buyers also deal with relatively smaller suppliers. The pattern found in the supplier sample is visible in the buyer sample, as presented in Table 8.8.

Table 8.8 Buyer size versus size of the counterpart supplier

	Counterpart Size (supplier)		
Buyer Size	**Less than €1 Million**	**Greater than € 1 Million**	**Total**
Less than € 5 million	39%	10%	49%
Greater than € 5 million	30%	21%	51%
Total	69%	31%	100%

We included an item in the questionnaire regarding respondents' perceptions of the number of alternative counterparts in the market. In the supplier sample, 62% of respondents perceive that there are many alternative counterpart buyers in the market (see Table 8.9). In the buyer sample, 38% of buyers perceive many alternative counterpart suppliers in the market. Thus, suppliers perceive being dependent on only one buyer as less problematic than buyers' perception of being dependent on only one supplier. Therefore, we can speculate that suppliers have less fear of becoming locked into a specific counterpart and the potential negative outcomes of dependence (Kemp, 1999). This is in line with the results of our case study and the size correlations of counterpart buyers showed in Table 8.7.

Table 8.9 Firms' perceptions about the number of alternative partners

	Supplier	**Buyer**
There are many alternative counterparts	62%	38%

The buyer selected by suppliers is mostly a wholesaler (35%) (see Table 8.10). Suppliers also have relationships with exporter/retailers, cash-and-carries and garden centers.

Table 8.10 Business counterparts of selected buyers

Business Counterparts	**Percentage**
Wholesaler	35%
Exporter/retailer	24%
Cash-and-carry	27%
Garden centers	10%
Others	5%

8.2 Non-response Bias and Informant Selection

In order to evaluate the representativeness of our samples, we tested the non-response bias by means of the extrapolation method (Armstrong and Overton, 1977). This method is based on the assumption that respondents who returned the completed questionnaire less readily are more likely to be non-respondents. "Less readily" has been defined as answering later or as being prodded into answering by sending a reminder (follow-up) (Armstrong and Overton, 1977). Although the problem with late respondents is that it is difficult to measure the time from the respondent's awareness of the questionnaire until completion, this method is the most acceptable among researchers conducting quantitative analysis (for examples, see review in Chapter 6, Table 6.1).

In the extrapolation method, the responses of early respondents (first wave) are compared with late (second wave) respondents, based on the respective scores of each construct of the study. The late 51 respondents (about 30% of the total 175 respondents) of the supplier sample were considered to be close to non-respondents. In the buyer sample, the last 33 respondents (about 50% of the total of 67 respondents) were considered to be close to non-respondents. A parametric test (*t*-test) and a non-parametric test (Mann-Whitney test) were used to evaluate the differences in the two samples. Based on the early versus late respondent method, no significant differences were found for any of our constructs (95% significance level) in any of the samples. As an overall conclusion, it appears that non-response bias poses no significant problem in our study.

The selection of the appropriate informant can increase the quality of the responses. In the supplier companies, we focused primarily on the owner of the company, considering the average size of the suppliers in the Dutch potted plant and flower industry (Deneux and Luten, 2001). Following Venkatraman and Grant (1986), we chose the owner as our only informant since no other person has the vantage point of providing the relevant data. In the buyer sample, the informant was the head of the purchasing department or the person most acquainted with purchases of potted plants and flowers. According to the profile of our informants provided by questions at the beginning of the questionnaire, up to 64% of informants have been involved with purchases for more than 10 years (for more details on the informants, see section 8.1.1). Additionally, up to 60% of the informants have worked in the purchasing department of the same company for more than 10 years. Therefore, we feel confident that our informants were sufficiently knowledgeable to provide information about the relationships with suppliers.

8.3 Validity of Formative Indicator Constructs

Three constructs contain formative indicators, namely business network, joint action and perceived satisfaction (see Chapter 6). The constructs are computed by equally weighting the relevant items. For these constructs, the validity is assessed in terms of content validity, nomological validity, convergent validity and item multicollinearity (Diamantopoulos and Winklhofer, 2001). These validation procedures are used because one of the remarkable properties of formative constructs is that they contain unique characteristics of the concept; thus omitting an indicator is omitting a part of the construct (Bollen and Lennox, 1991).

Our business network construct is strongly based on our literature review presented in Part 1. Our inspection of the items in the measurement scale indicates *content validity*. The content validity is further confirmed by the case study evidence. The items capture the relevant dimensions of information (content) and subgroups (source). In addition, previous research used comparable measurement instruments successfully. For instance, Anderson, Hakansson and Johanson (1994) conducted preliminary tests with a comparable instrument, and Blankenburg, Eriksson and Jo-

hanson (1999) conducted a study with a measurement instrument containing four subgroups and focusing on general effects. The literature review and our case studies provide enough indication that the instrument has performed well. Furthermore, we carefully evaluated the items during the pretest of the questionnaire in order to find inaccuracies. Thus, content validity of the construct of network is verified.

The joint action construct is based on the dimensions of joint planning and joint problem solving. Previous studies used the items to measure joint action, which proved to be significantly related to other constructs (Heide and John, 1990; Heide and Miner, 1992). In the case studies, we inquired into the activities and problems that were being held and solved together. All of this information indicates that our scale is able to measure joint action. Thus, content validity can be confirmed.

The construct of perceived satisfaction was judged to contain formative indicators with acceptable content validity. Inspection of the items shows enough coverage of opinions on satisfaction in terms of operations, trade conditions and behavior, as discussed in Part 1. The evaluation of performance, by using the perceived satisfaction construct, has a history of wide acceptance in the business literature. Several authors used this scale to measure performance (e.g., Bensaou and Venkatraman, 1995).

The *nomological validity* of these three formative indicator constructs is assessed by the support of our hypotheses. By estimating the structural equations in our theoretical model, we expect to confirm nomological validity of the formative constructs. Section 8.5 below presents the estimated models for the buyer and supplier samples. The results of these models show a substantial number of significant relationships between the formative indicator constructs and other constructs in the model. Considering such a performance of our formative indicators, we can with confidence confirm the nomological validity of these constructs.

The *convergent validity* of these constructs was also assessed (Kumar, Scheer and Steenkamp, 1998: 229). We checked the correlations of single-item global assessment of the formative indicators with the respective composite score (unweighted average of items). The coefficients were greater than 0.40 and significant in the samples of both suppliers and buyers. This confirms the convergent validity of the formative indicators.

Finally, we checked for multicollinearity of the set of items that composes each formative indicator construct by examining the size of the correlation coefficient for each (Diamantopoulos and Winklhofer, 2001). The coefficient sizes do not suggest any obvious problem of item multicollinearity that would preclude their use. The coefficients that lie below the threshold value of 0.80 are considered not to have problems of multicollinearity (Malhotra, 1999). All of the correlations are below 0.80, except for two between items of the network subgroup of supplier's supplier, in the supplier sample, that were slightly above the threshold value. Thus, we can dismiss item multicollinearity problems in our formative indicator constructs.

8.4 Reliability and Validity of Reflective Indicator Constructs

This section evaluates the reliability and validity of our reflective indicator constructs. They are transaction-specific investment, trust, flexibility and performance. We followed the procedure for assessing reliability and validity as described in Chapter 6. This enabled us to evaluate the content, nomological, convergent and discriminant validity of the reflective constructs.

To test *content* and *nomological validity*, we followed the same procedure as that used to validate the formative constructs. The reflective constructs proved acceptable in terms of content validity, because of the domain and the history of the constructs (see Chapter 6, section 6.2) as well as the

procedures described in Chapter 6 to develop the questionnaire. Evidence from the testing of the hypotheses (see section 8.5 below) permits us to conclude that the measures are valid in nomological terms.

We assessed *discriminant validity* of all the reflective constructs following the procedure of Anderson and Gerbing (1988). The measurement model of a pair of constructs was estimated in a confirmatory factor analysis. Constraining the estimated correlation parameter between them to 1.0, we then performed a chi-square (χ^2) difference test with a model in which the correlation was not constrained to unity. In total, 20 different measurement models were estimated for each of the samples, containing pairs of constructs from which 10 models presented the correlation between the pair of constructs set to one and 10 models presented no constrained correlation. We found significantly lower χ^2 values for all of the models not constrained to unit. This confirms the discriminant validity of all our reflective constructs.

The methods suggested to evaluate *convergent validity* and further evaluate *discriminant validity* of the constructs are item-total correlation, exploratory factor analysis (factor loadings and total explained variance) and confirmatory factor analysis of the constructs (standardized residuals and factor loadings, λ). Additionally, we evaluated the reliability of the constructs by computing the Cronbach's alpha, composite reliability and variance extracted. The results of these evaluations for each reflective construct are reported below.

8.4.1 Transaction-specific investment

The construct of transaction-specific investment (TSI) was measured by two dimensions, physical and human specificity. Physical specificity was measured by two items and human specificity by three items. Table 8.11 shows that all the item-total correlations exceeded our threshold value of 0.60 (Steenkaamp and Van Trijp, 1991). By computing exploratory factor analysis (EFA) for each of the dimensions of TSI, we found factor loadings that confirm the relevance of the items, since all of them exceeded the value of 0.60. The total explained variance was above or approached 60% and thereby met our criteria.

Table 8.11 Analysis of transaction-specific investment indicators

Indicator	Supplier Sample		Buyer Sample	
	Item-Total Correlation	Factor Loading	Item-Total Correlation	Factor Loading
Physical 1	0.908	0.910	0.931	0.918
Physical 2	0.912	0.910	0.903	0.918
Human 1	0.796	0.775	0.875	0.878
Human 2	0.739	0.782	0.837	0.850
Human 3	0.818	0.800	0.879	0.865

Note: In the exploratory factor analysis, the total explained variance was for the supplier sample 58% physical and 84% human and for the buyer sample 82% physical and 61% human.

In the confirmatory factor analysis (CFA), we combined the two dimensions to estimate the second-order factor of TSI and to obtain the necessary indicators of validity and reliability. Figure 8.1 presents the results of the CFA for the supplier and buyer samples. The overall fit of the model is good, as indicated by the overall fit indices presented at the bottom of each estimated model. The criteria were met, except for the high chi-square (χ^2) and the AGFI, which falls slightly below the desired threshold of 0.90. Although a desirable chi-square value is one not higher than twice the value of the degrees of freedom (df), the statistical significance level (p-value) indicates that the observed and estimated matrices differ, as required (i.e., to not be significant and reject the null hypothesis). The AGFI is a parsimonious fit measure that evaluates

the extent to which the model's overall goodness of fit is suitable for each estimated coefficient (Joreskog and Sorbom, 1996; Hair et al., 1998). By verifying the factor loadings and the number of df, we can suppose that AGFI was influenced by the small number of df used to estimate the model and one factor loading that was below the threshold value of 0.70 (Hum2: λ=0.61). Nevertheless, the other goodness of fit statistics (e.g., p value, GFI, NFI, NNFI) and the size of factor loadings (λ) show support for accepting the estimated model.

Figure 8.1 Confirmatory factor analysis of transaction-specific investment items: Supplier sample (above) and buyer sample (below)

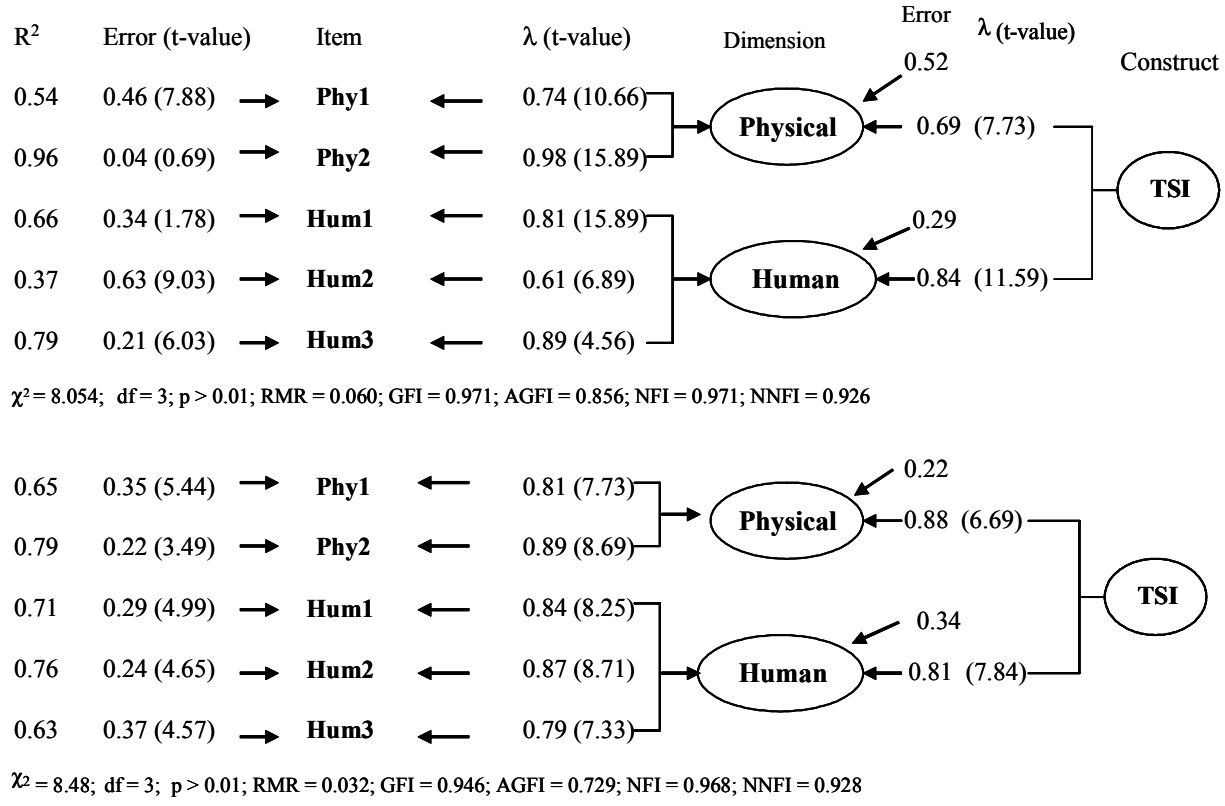


Table 8.12 reports the results of the reliability tests of the TSI construct. All of the coefficients were above th suggested threshold value (i.e., Cronbach's α and composite reliability >0.70; variance extracted >0.50), except for the human dimension in the supplier sample, which was slightly below the threshold value. Thus, in the supplier sample, our TSI construct consisted of two dimensions, physical with two items and human with three items, and proved to be both valid and reliable. In the buyer sample, we can also conclude that the TSI construct consisted of two dimensions, physical with two items and human with three items, and that the construct is both valid and reliable.

Table 8.12 Coefficients of reliability of TSI: Supplier and buyer samples

	Supplier Sample			*Buyer Sample*		
	Cronbach's α	**Variance Extracted**	**Composite Reliability**	**Cronbach's α**	**Variance Extracted**	**Composite Reliability**
TSI construct	0.72	0.59	0.74	0.82	0.71	0.84
Physical dimension	0.79	0.75	0.85	0.80	0.72	0.84
Human dimension	0.68	0.60	0.82	0.83	0.70	0.87

8.4.2 Trust

Our construct of trust was measured by two dimensions: interpersonal and inter-organizational. Both were measured by four items.[8] Table 8.13 shows that all item-total correlation exceeded the threshold value of 0.70, except one item of interpersonal trust in the supplier sample that was near to the threshold value. In the EFA, the total explained variance was above the threshold value of 0.70 for the inter-organizational dimension in both samples (supplier 69%; buyer 67%). The total variance explained in the EFA for the interpersonal trust measure approached the threshold value in both samples (supplier 53%; buyer 58%). All the items achieved factor loadings greater than 0.70.

Table 8.13 Analysis of trust items

Items of the Trust Construct	Supplier Sample		Buyer Sample	
	Item-Total Correlation	Factor Loading	Item-Total Correlation	Factor Loading
Interpersonal dimension:				
PerT1	0.776	0.819	0.789	0.845
PerT2	0.655	0.697	0.739	0.751
PerT3	0.780	0.849	0.823	0.892
PerT4	0.748	0.714	0.759	0.748
Inter-organizational dimension:				
OrgT1	0.804	0.777	0.817	0.837
OrgT2	0.790	0.790	0.864	0.934
OrgT3	0.829	0.835	0.880	0.950
OrgT4	0.878	0.900	0.813	0.915

Note: In the exploratory factor analysis, the total explained variance was for the supplier sample 69% inter-organizational and 53% interpersonal; for the buyer sample 67% inter-organizational and 58% interpersonal.

In the CFA model for both samples, the overall fit indices were satisfactory, as shown in Figure 8.2. We combined the dimensions of interpersonal and inter-organizational trust to estimate the second-order factor of trust. Apart from the AGFI, which was slightly below the threshold value, the other goodness of fit indices met our criteria. This reveals a satisfactory model fit. Moreover, the *t* value of the factor loadings (λ) exceeded by far the expected value of |2|.

We computed the factor loadings (λ) to calculate the composite reliability and variance extracted for both samples. All of the coefficients were above the threshold value, except for the composite reliability in the buyer sample (0.68), and that was near the cut-off point of 0.70. All of the Cronbach's alphas were greater than the required 0.70 cut-off value. Table 8.14 displays the coefficients of reliability.

In sum, the results of the item-total correlation, EFA and CFA confirm the validity and reliability of our trust construct. The assessment of the construct resulted in two dimensions, interpersonal and inter-organizational, with four items in both samples.

[8] We included two items containing reversed scales in the questionnaires. These were excluded after analysis of the descriptive statistics of the individual items (mean and standard deviation) and preliminary calculations of the Cronbach's alpha, which was very low when the reversed scale items were included. Moreover, the results of the exploratory factor analysis showed two factors, of which all the items loaded at the first factor except for the reversed scale items. We believe that respondents misunderstood these items and therefore we dropped them from the analysis.

Figure 8.2 Confirmatory factor analysis of trust items: Supplier sample (above) and buyer sample (below)

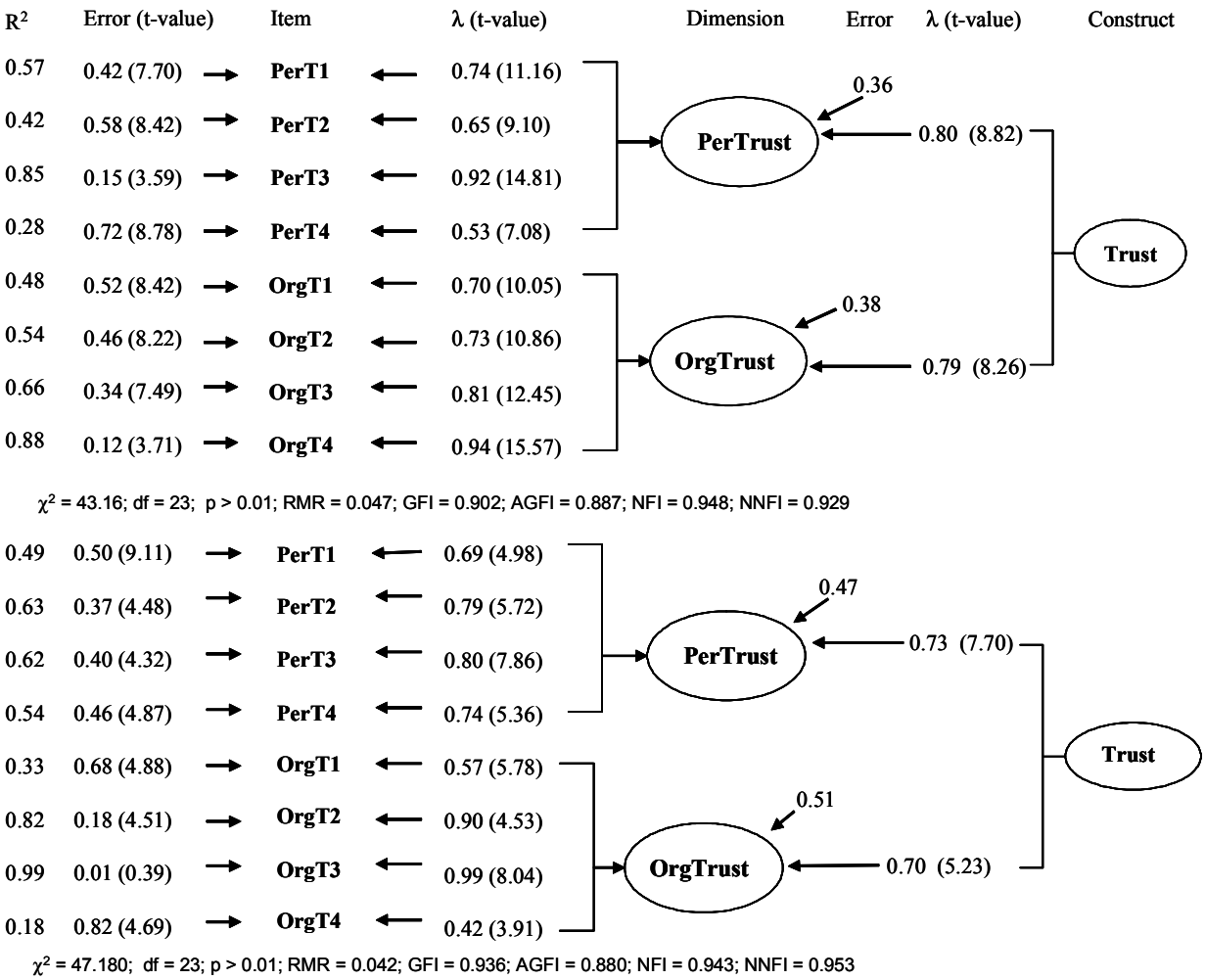


Table 8.14 Coefficients of reliability of trust construct: Supplier and buyer samples

	Supplier Sample			Buyer Sample		
	Cronbach's α	Variance Extracted	Composite Reliability	Cronbach's α	Variance Extracted	Composite Reliability
Trust construct	0.78	0.63	0.77	0.78	0.51	0.68
Interpersonal dimension	0.75	0.43	0.77	0.80	0.57	0.84
Inter-organizational dimension	0.83	0.64	0.87	0.80	0.57	0.83

8.4.3 Flexibility

The construct of flexibility was measured by three items. Table 8.15 shows that all the item-total correlations were greater than 0.70. By computing all three items in an EFA, we found high values of factor loadings. The factor loadings of 0.712 or higher confirm the relevance of the three items. The explained variance exceeded the threshold value of 60% in the buyer sample (64%), and approached the threshold value in the supplier sample (56%), both meeting our criteria.

Table 8.15 Analysis of flexibility items

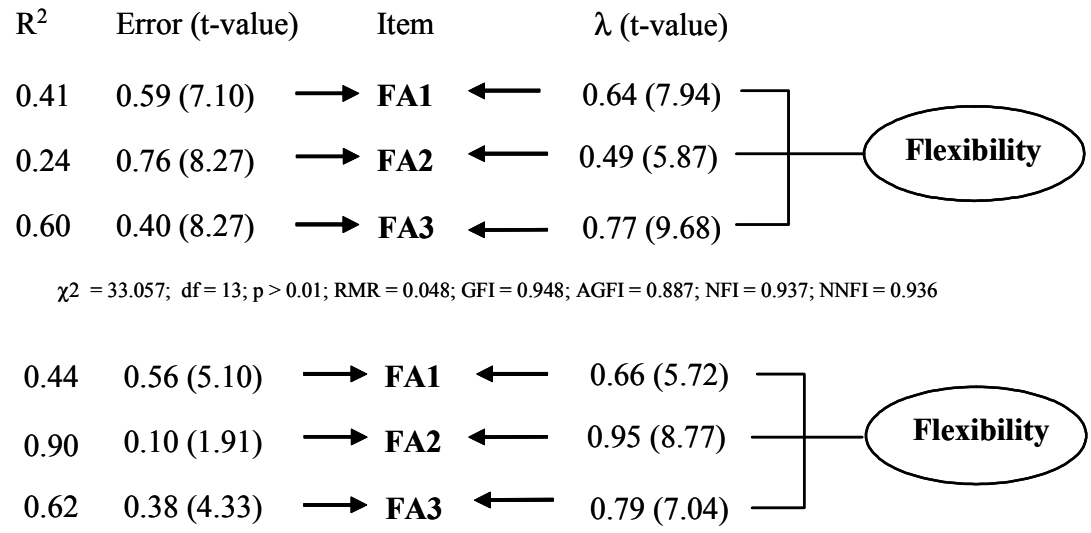
	Supplier Sample		Buyer Sample	
Items	**Item-Total Correlation**	**Factor Loading**	**Item-Total Correlation**	**Factor Loading**
FA1	0.757	0.774	0.712	0.737
FA2	0.715	0.672	0.860	0.874
FA3	0.771	0.795	0.811	0.775

Note: In the exploratory factor analysis, the total explained variance was for the supplier sample 56% and for the buyer sample 64%.

In the CFA, we combined the flexibility items with the inter-organizational trust items. If a construct has only three items, the estimated model has zero degrees of freedom (df), which is considered to be a saturated model. This would result in a perfect model fit. It is therefore not possible to evaluate the overall model fit because chi-square and other goodness of fit indices cannot be calculated. This problem can be solved by decreasing the number of parameters to be estimated by, for instance, assigning a fixed value to one or more parameters (e.g., $\lambda_1 = 1$), or assuming that some parameters are equal ($\lambda_1 = \lambda_2$) (see Bollen and Lennox, 1991). The problem can also be solved by estimating two constructs simultaneously, which is common practice among researchers and allows the parameters to be estimated (Hair et al., 1998). We opted for the common practice solution, in which the model was estimated with the focal construct (flexibility) and including another construct (inter-organizational trust, since it is a construct with large number of observed variables as desirable). We present only the results of the CFA for the focal construct of flexibility. The goodness of fit indices are reported for the whole model.

In both samples, the overall fit of the model is good, as indicated by the overall fit indices (Figure 8.3). All our criteria were met. The AGFI is close to the threshold value of 0.90 and thus no problems in the model are suggested. The *t* values of the factor loadings (λ) far exceeded the value of |2|.

Figure 8.3 Confirmatory factor analysis of flexibility items: Supplier sample (above) and buyer sample (below)



The composite reliability and the variance extracted of the buyer sample met our criteria (see Table 8.16). The coefficients of reliability in the supplier sample fall near the threshold value. In sum, the results of the item-total correlation, EFA and CFA confirm the validity and reliability of our construct. The assessment of our flexibility construct resulted in three items in both samples.

Table 8.16 Coefficients of reliability of the flexibility construct: Supplier and buyer samples

	Supplier Sample			Buyer Sample		
	Cronbach's α	Variance Extracted	Composite Reliability	Cronbach's α	Variance Extracted	Composite Reliability
Flexibility construct	0.61	0.41	0.67	0.70	0.65	0.85

8.4.4 Performance

The construct of performance is measured by three items. As discussed in Chapter 1, performance is a complex concept to capture in a study of buyer-supplier relationships. Chapter 4 introduced the items selected to evaluate performance in the context of our research. We selected two financial measures (sales growth rate (P3) and profitability (P2)), and one non-financial measure (perceived satisfaction (P1)). To assess the construct of performance, we conducted the CFA to estimate the factor loadings and the goodness of fit indices.[9] As in the assessment of our flexibility construct (i.e., containing only three items), we estimated the items of performance together with another construct simultaneously. As the focus here is on the performance construct, we only show the coefficients for this construct and report the goodness of fit indices for the whole model.

Figure 8.4 depicts the results of the performance construct for the supplier and buyer sample. The *t* values exceeded the cut-off value of |2|. Inspecting the factor loadings (λ), we found not so high coefficients for the measure of performance in both samples. This low factor loading might be influencing the result of the AGFI. AGFI is sensitive to the number of degrees of freedom and to the impact of each individual coefficient of the estimated items. Although the AGFI is below the threshold value of 0.90, the model of performance can be considered acceptable based on the other indicators of goodness of fit (e.g., chi-square and GFI).

Table 8.7 reports the extracted variance, the composite reliability and the Cronbach's alpha of the performance construct. Although most of these coefficients are below the required cut-off value, we maintain all three measures in the analysis (i.e., following previous research in the field of performance) while remaining vigilant for the need for modifications during the estimation of the structural model for testing the hypotheses.

[9] We did not compute EFA and item-total correlation, because of the nature of the variables forming the performance construct. While the variable of growth rate is continuous (i.e., an open-ended question), the variables of profitability and perceived satisfaction are ordinal (i.e., Likert-scale ranging from 1 to 7). In contrast, a polychoric correlation matrix is the basis for estimating a model in CFA, which permits variables with distinct characteristics to be assessed simultaneously (Hair et al., 1998).

Figure 8.4 Confirmatory factor analysis of performance items: Supplier sample (above) and buyer sample (below)

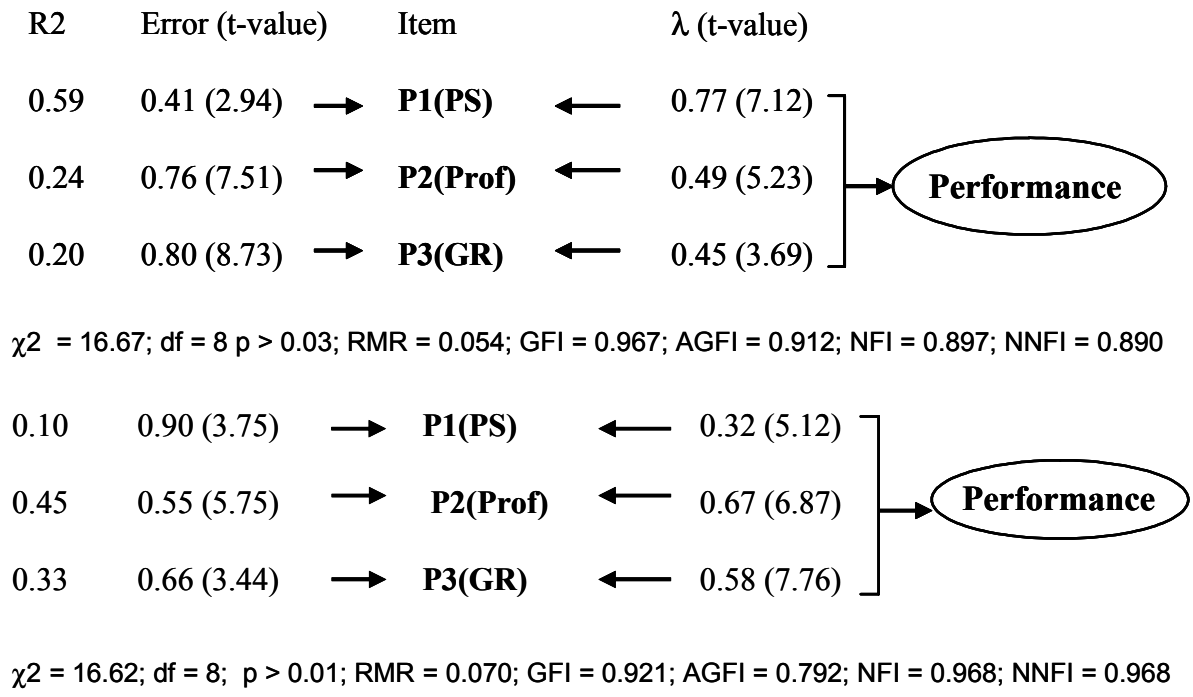


Table 8.7 Coefficients of reliability of the performance construct: Supplier and buyer samples

	Supplier Sample			Buyer Sample		
	Cronbach's α*	Variance Extracted	Composite Reliability	Cronbach's α*	Variance Extracted	Composite Reliability
Flexibility construct	0.71	0.34	0.60	0.68	0.30	0.54

* Cronbach α was estimated without the growth rate measure, since it is not an ordinal variable.

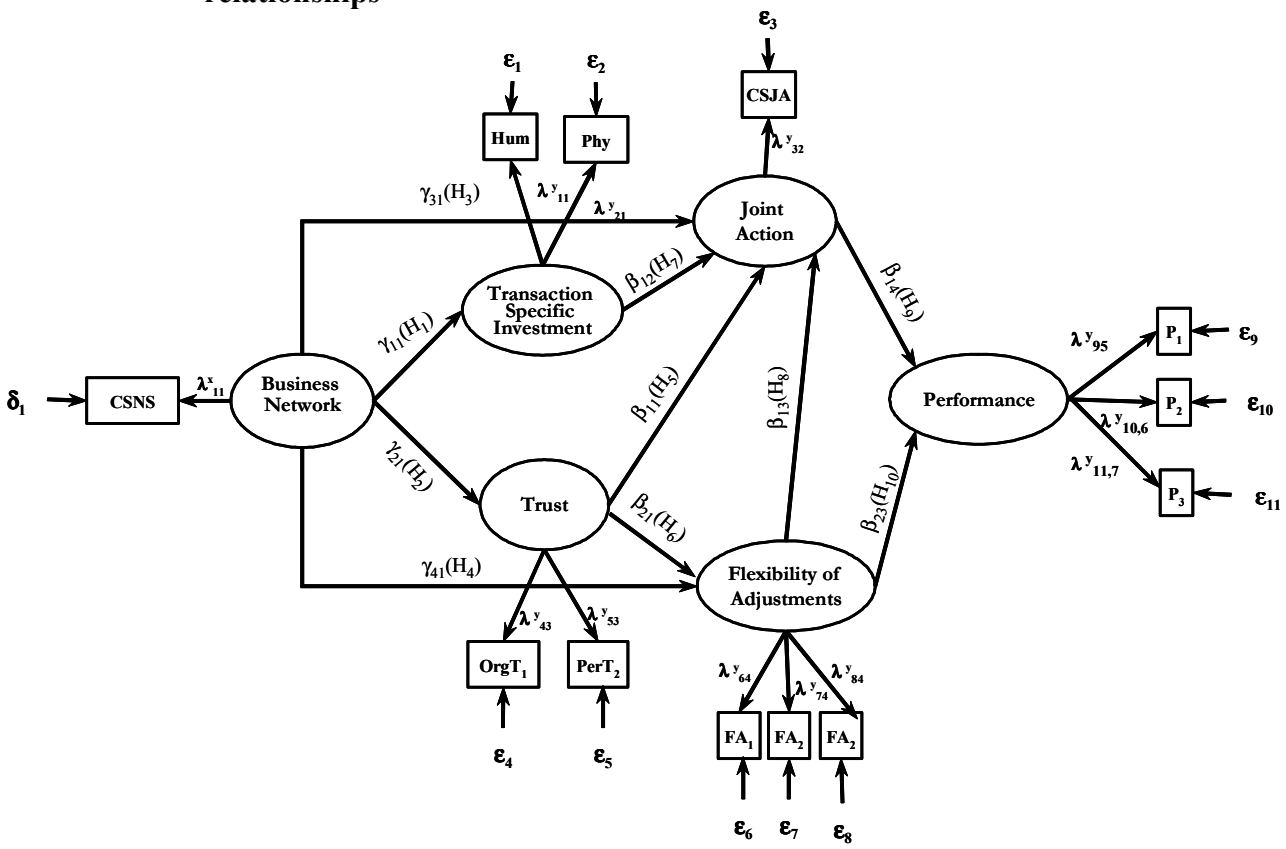
8.5 Model of the Business Network and Buyer-Supplier Relationships

Structural equation modeling was used (SEM) to test our theoretical framework. SEM estimates a series of separate, but interdependent, multiple regression equations simultaneously by specifying the structural model using the statistical program Lisrel. As discussed in Chapter 6, the advantage of SEM over standard regression analysis (i.e., OLS) is its explicit consideration of the measurement error in the indicators and simultaneous estimation of a system of structural equations. Moreover, SEM is a powerful method for testing causal models, because it enables the simultaneous evaluation of the individual paths constituting the model, total effects (i.e., direct and indirect effects) and the complete model's goodness of fit (Hair et al., 1998).

By assessing the validity and reliability of the constructs (see sections 8.2 and 8.3), we identified the items that compose each construct. These constructs reflect the concepts of our theoretical model and form the basis of our analysis. We use the structural model of the SEM to describe our theoretical framework by confirming the paths with the data. If necessary, the model will be modified and tested against alternative models in order to check the strength of the estimated model. Any modifications will be made in a meaningful way in light of theory.

The models for the supplier and buyer samples were estimated in a one-step procedure in which the measurement and structural parts were calculated at once. Figure 8.5 illustrates our theoretical model. The structural part is represented by the latent variables within the circles. The measurement part in the squares reflects the observed variables that are used to calculate the latent variables. Finally, the observed variables have an estimated error.

Figure 8.5 Measurement and structural model for network and buyer-supplier relationships



In the reflective constructs (trust, transaction-specific investment, flexibility and performance), the dimensions were computed as the observed variables. In the formative constructs, the observed variables were considered as the unweighted average of the dimensions in total. We did not compute the dimensions of business network, joint action and perceived satisfaction in the measurement part. This is consistent with the properties of formative indicators, which suggests that all the items have the same importance and that no weight can be attributed to them.

The observed variable of the formative business network construct (CSNS) refers to the unweighted average of the information obtained from the five network subgroups. For the joint action construct, the CSJA is a composite scale of joint action calculated by the unweighted average of the items of the dimensions of joint problem solving and joint planning. Also perceived satisfaction (P1) is computed as the unweighted average of the items of the scale.

The observed variables of the reflective indicators are computed on the basis of the dimensions, following the partial aggregation approach of Bagozzi (1994). Considering the complexity of our model and the relatively large number of observed variables, the partial aggregation approach (i.e., computing the dimensions that are second-order factors) addresses possible modeling problems by consolidating the items of the latent variable into a smaller number of composite indicators, namely the dimensions. Thus, for the construct of transaction-specific investment, the

observed variables are the unweighted average of the dimensions of human (Hum) and physical (Phy) specific investments. Also, the construct of trust is computed on the basis of the unweighted average of the dimensions of inter-organizational trust (OrgT) and interpersonal trust (PerT). This computation method based on dimensions is in line with previous research (Williams and Hazer, 1986; Zaheer, McEvilly and Perrone, 1998), and with the partial aggregation model proposed by Bagozzi (1994). The flexibility to make adjustments is the only reflective indicator construct that was computed by its actual items (FAn).

Before presenting the estimated models, the following section reports the baseline statistics. The correlation, mean and standard deviation of the constructs are shown. In addition, the estimated models based on Figure 8.5 are shown for the samples of suppliers and buyers, respectively.

8.5.1 Baseline statistics

Table 8.8 and Table 8.9 show the correlation, mean and standard deviation for the constructs of the supplier and buyer samples respectively.

Table 8.8 Correlation matrix, mean and standard deviation of the supplier sample

	Mean	SD	CSNS	Hum	Phy	CSJA	OrgT	PerT	FA1	FA2	FA3	P1	P2
Business network (CSNS)	2.76	.94											
Human specific investments (Hum)	3.32	1.36	**.30**										
Physical specific investments (Phy)	3.48	1.85	**.26**	**.54**									
Joint action (CSJA)	4.26	1.10	**.32**	**.41**	**.32**								
Inter-organizational trust (OrgT)	5.31	1.16	.07	**.36**	**.18**	**.57**							
Interpersonal trust (PerT)	4.70	1.13	.10	**.19**	**.23**	**.49**	**.60**						
Flexibility to make adjustments 1 (FA1)	4.94	1.87	.06	**.19**	.10	**.44**	**.35**	**.22**					
Flexibility to make adjustments 2 (FA2)	3.60	1.94	.10	.17	.06	**.43**	**.41**	**.31**	**.28**				
Flexibility to make adjustments 3 (FA3)	4.92	1.86	**.23**	**.29**	.16	**.57**	**.52**	**.34**	**.43**	**.31**			
Perceived satisfaction (P1)	5.28	1.00	.01	**.23**	.16	**.44**	**.68**	**.41**	**.29**	**.36**	**.35**		
Profitability (P2)	4.45	1.90	.02	–.05	.04	.08	**.29**	.11	.09	**.23**	.13	**.36**	
Growth rate in % (P3)	9.14	15.15	–.05	.05	–.01	**.21**	**.18**	.02	**.18**	.06	**.20**	.14	**.18**

Note: Bolded correlation coefficients are significant at a 5% level.

In this correlation matrix, correlations are significant at a value of at least 0.18 (5% significance level). We call attention to the mean and standard deviation of sales growth rate of firms over the last three years in both buyer and supplier samples. The mean shows that the sales are growing at about 10% (suppliers) to 14% (buyers) a year with a standard deviation indicating that some companies have a negative growth, while others' sales are growing at a rate of 50% annually. Comparing the mean of the business network construct, buyers (3.04) appear to obtain somewhat more information from the network than the suppliers (2.76). Also, buyers exhibit higher trust levels (5.37 for inter-organizational and 5.09 for interpersonal) compared to the suppliers (5.31 and 4.70). By looking at the three performance measures (growth rate, profitability and perceived

satisfaction), buyers performed better in terms of means than the suppliers. Overall, the means of the business network and the human and physical specific investment constructs are below the middle point (4.00) of our 7-point scale in both samples. Also, in the supplier sample, the flexibility to make adjustments construct falls below the middle point.

Table 8.9 Correlation matrix, mean and standard deviation of the buyer sample

	Mean	SD	CSNS	Hum	Phy	CSJA	OrgT	PerT	FA1	FA2	FA3	P1	P2
Business network (CSNS)	3.04	1.12											
Human specific investments (Hum)	3.32	1.69	**.36**										
Physical specific investments (Phy)	3.14	1.77	**.32**	**.74**									
Joint action (CSJA)	4.53	1.34	**.26**	**.57**	**.43**								
Inter-organizational trust (OrgT)	5.37	1.06	**–.26**	.05	–.02	**.32**							
Interpersonal trust (PerT)	5.09	1.07	–.10	**.20**	**.20**	**.32**	**.51**						
Flexibility to make adjustments 1 (FA1)	5.44	1.60	.13	**.48**	**.33**	**.48**	**.31**	.14					
Flexibility to make adjustments 2 (FA2)	4.71	1.88	**.32**	**.55**	**.44**	**.57**	**.32**	**.31**	**.50**				
Flexibility to make adjustments 3 (FA3)	4.57	2.08	**.36**	**.41**	**.30**	**.63**	**.23**	.17	**.30**	**.55**			
Perceived satisfaction (P1)	5.52	.94	**–.26**	.15	.06	**.31**	**.78**	**.40**	**.36**	**.27**	.06		
Profitability (P2)	5.03	1.75	.09	–.03	.02	**.21**	–.12	.14	.07	.06	–.01	–.11	
Growth rate (P3)	13.86	18.80	.01	.11	.10	.10	.08	-.05	.09	.06	.14	.12	.07

Note: Bolded correlation coefficients are significant at a 5% level.

In both samples, we found significant bivariate correlations between the construct of the business network and several constructs of the buyer-supplier relationship and performance, as expected. The network construct appears to be positively associated with both dimensions of transaction-specific investments and joint action. Surprisingly, in the buyer sample network is negatively associated with perceived satisfaction and inter-organizational trust. This might indicate that the more information is obtained from the network the lower the degree of inter-organizational trust and perceived satisfaction.

The highest correlation was found between inter-organizational trust and perceived satisfaction. In the supplier sample, both dimensions of trust are positively associated with perceived satisfaction, growth rate and profitability. Flexibility is also associated with the performance measures. In the buyer sample, flexibility is associated with perceived satisfaction but not with the other measures of performance.

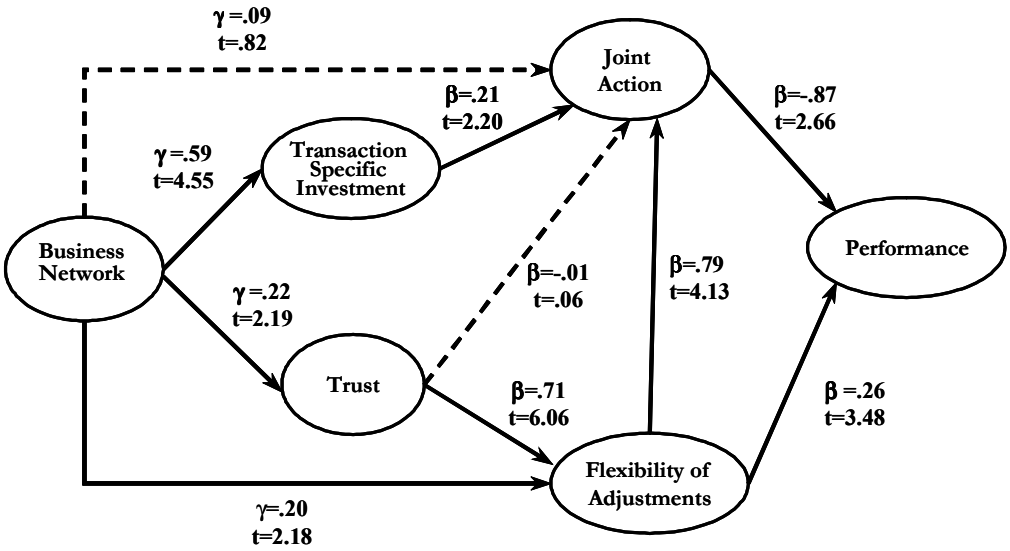
The individual magnitude of the correlations between the constructs does not suggest obvious problems of pairwise collinearity that would preclude the use of all constructs in one equation. Researchers commonly use a cut-off of 0.80 for correlations among variables for dismissing multicollinearity problems (Malhotra, 1999). As can be seen in Table 8.8 and Table 8.9, all of the correlations are below 0.60, except for three correlations that fall below 0.78. They are the correlation between inter-organizational trust and perceived satisfaction (0.68 in the supplier sample and 0.78 in the buyer sample) and the correlation between the dimensions of transaction-

specific investments (0.74 in the buyer sample). Thus, we can dismiss multicollinearity problems.[10]

8.5.2 The model for the supplier's perspective

Figure 8.6 shows the results of the structural equation model for the supplier sample. The structural model is estimated based on our theoretical framework (see Figure 4.1, Chapter 4). As can be seen from the results, several paths are significant and the overall model fit is good. The chi-square value is twice the number of degrees of freedom and not significant at p>0.01, which indicates that the model explains the empirical correlation matrix adequately. Also the other fit indices meet our criteria, except the AGFI and NFI, which were slightly below the cut-off point of 0.90. These two indices are sensitive to the number of significant paths in the model compared to the number of degrees of freedom (Hair et al., 1998). Taking the goodness of fit indices collectively, the model fits the data adequately and the fit of the model is sufficient for interpretation of the individual parameter estimates.

Figure 8.6 The supplier's perspective: Structural model for the network and buyer-supplier relationships



$\chi 2$ = 82.075 (P > 0.01) df=45; GFI=0.93; AGFI=0.87; RMSR= 0.08; NFI=0.87; NNFI=0.91

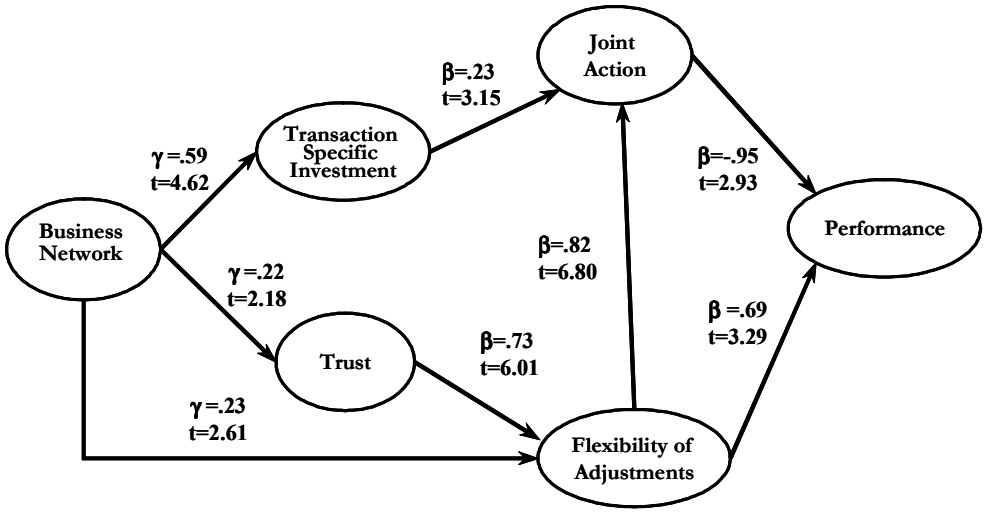
Note: Continuous lines represent significant coefficients.

In order to provide greater confidence of the explanatory strength of the model in Figure 8.6, we tested our model against an alternative constrained model where our theoretical model is a nested

[10] To further check for multicollinearity, and ensure that the data did not present multicollinearity problems, we estimated for each sample (buyer and supplier) a series of five equations (OLS) based on the theoretical model where the dependent variables (i.e. the unweighted average of the dimensions) were the second-order constructs of transaction-specific investment, trust, joint action, flexibility and performance. The examination of the condition indices and the variance inflation factors (VIF) confirmed that there is no problem of multicollinearity (Mason and Perreault, 1991; Hair et al., 1995). The highest VIF value was 3.920 (below the threshold value of 10), and the highest condition index was 15.672 (below the threshold value of 30). Thus, individual correlations, VIF and condition indices do not suggest obvious problems of multicollinearity that would preclude the use of all independent variables in the model.

model (i.e., a model that has the same constructs and fewer paths to be estimated than an alternative model). In further testing of our theoretical framework, we set to zero the nonsignificant paths of the estimated model (i.e., from business network to joint action and from trust to joint action). This is common practice among researchers to test if the coefficient is really zero (Hair et al., 1998, see also Bello and Gilliland, 1997; Kemp, 1999). Anderson and Gerbing (1988) recommended this procedure and suggested that a chi-square difference test (CDT) for nested models be used to test the null hypothesis (i.e., *alternative constrained model – theoretical model = 0*). Figure 8.7 displays the results of the alternative constrained model.

Figure 8.7 The alternative constrained model for the supplier's perspective (nonsignificant paths are set to zero)



$\chi 2 = 85.702$ (P > 0.01) df=47; GFI=0.92; AGFI=0.87; RMSR= 0.08; NFI=0.87; NNFI=0.91

To verify whether the theoretical model is preferred to the alternative model, we performed the CDT. Table 8.10 reports the results. The two nonsignificant paths set to zero in the alternative constrained model resulted in no significant increase of chi-square. The theoretical model does not significantly differ from the alternative constrained model, which indicates that the alternative constrained model is a more parsimonious model that maximally fits the observed correlations between the concepts.

Table 8.10 Fit statistic and chi-square difference test (CDT) of theoretical and alternative models (buyer sample)

Absolute Fit Statistics

Model	χ^2	df	p	CDT	$\Delta\chi^2$	Δdf	p	
Theoretical model (TM)	82.075	45	0.01					
Alternative constrained model (ACM)	85.702	47	0.01	ACM–TM	3.627	2	0.18	ACM is better

The preference is for the alternative constrained model with not significant paths set to zero, which indicates that the parameters of the paths from business network to joint action and from trust to joint action are not significant and do not need to be included in the estimated model. Although there is no direct path estimated, there is an indirect effect of the network on trust and of trust on joint action. The total effects refer to the sum of the indirect and the direct effects of one construct on another. Table 8.11 reports the coefficients and the *t* values of the total effects.

Table 8.11 Total effects (direct and indirect) of the theoretical model for the suppliers in Figure 8.7

	Transaction- Specific Investment	Trust	Joint Action	Flexibility	Performance
Business network	**0.60****	**0.23***	**0.46****	**0.40****	0.03
	(4.62)	**(2.19)**	**(5.05)**	**(3.42)**	(0.46)
Transaction-specific investment	–	–	**0.23***	–	**–0.22****
			(3.15)		**(2.81)**
Trust	–	–	**0.60****	**0.73****	**0.30****
			(8.01)	**(6.09)**	**(4.25)**
Joint action	–	–	–	–	**–0.95****
					(2.93)
Flexibility	–	–	**0.82****	–	**0.41****
			(6.80)		**(4.03)**

**p<0.01, *p<0.05 (two-tailed).
Note: |t-test| within parentheses.

Remarkably, the not estimated paths are significant in an indirect way. The network has a strong indirect effect on joint action ($TE_{(\gamma+\beta)}$=0.46; t=5.05), and trust has a strong indirect effect on joint action (TE_{β}=.60; t=8.01). In addition, there is a negative indirect effect of transaction-specific investment on performance (TE_{β}=–0.22; t=2.81). This suggests that the investments are leading to more costs than benefits in financial terms, and in non-financial terms it appears that the investments are reducing the perception of satisfaction. Nevertheless, neither theoretical nor empirical foundation was found to support the hypothesis that transaction-specific investment influences performance. Rather, previous research has focused on transaction-specific investments as an antecedent of the governance structure and not a factor influencing performance directly (e.g., Zaheer and Venkatraman, 1995). There is also a strong indirect effect of trust on performance (TE_{β}=0.30; t=4.21). The other significant effects displayed in Table 8.11 refer solely to direct effects, which were already pointed out in Figure 8.7.

8.5.3 The model for the buyer's perspective

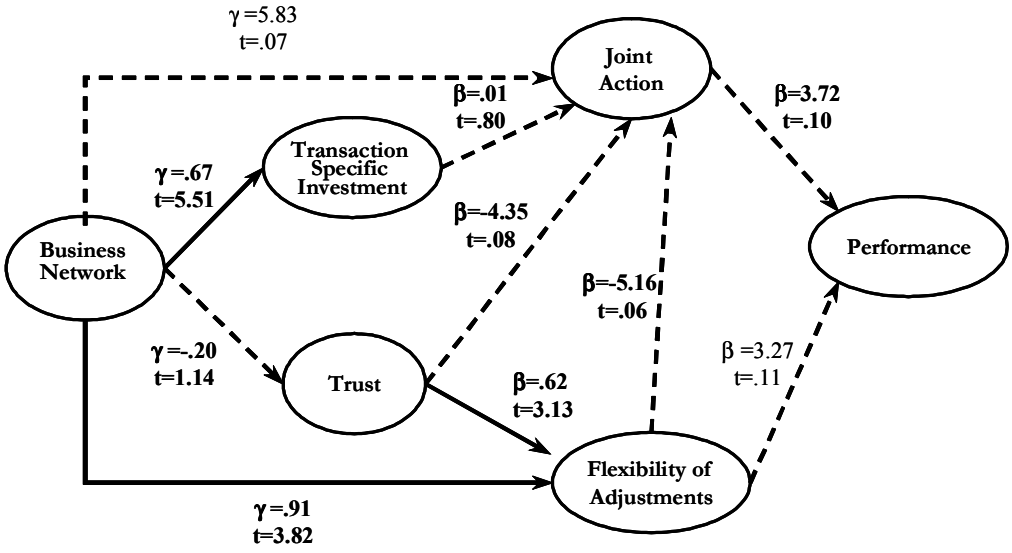
Figure 8.8 shows the results of the structural equation model for the buyer sample. As previously discussed regarding the supplier sample, the estimated structural model is based on the theoretical framework put forward in Chapter 4. The overall goodness of fit indices could not be calculated because the model did not converge after the iterations.

As the model in Figure 8.8 did not explain the hypothesized paths between the concepts of the theoretical framework, we decided to improve the model. We then tested a similar alternative model in which the composite performance variable was replaced by the three measures of performance (growth rate, profitability and perceived satisfaction). The output of this similar model did not provide us with acceptable goodness of fit indices. By evaluating the modification indices and the standardized residuals (i.e., in order to assess how the fit of the overall model could be improved by adding or dropping parameters between concepts), we estimated an alternative model excluding the variable of perceived satisfaction.[11] The standardized residuals and the modification indices indicated that the problem could be related to this type of performance measure. Figure 8.9 depicts the alternative model containing the two variables

[11] In the assessment of the validity and reliability of the performance constructs, we found low factor loadings (CFA) and low coefficients of reliability of the perceived satisfaction construct. This was another indication to modify the performance measurement instrument for the estimation of the structural model.

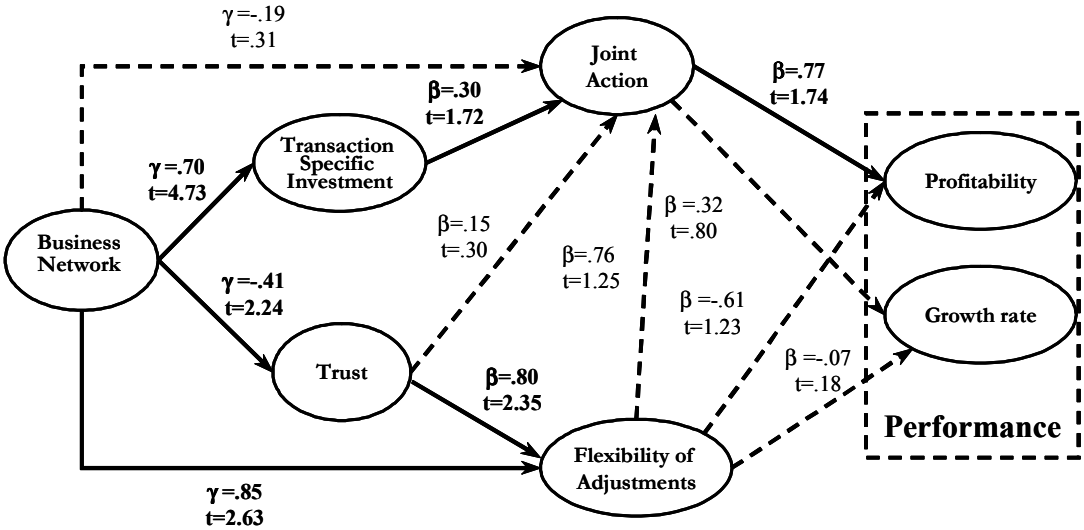
based on the financial measures of performance (i.e., growth rate and profitability). Noteworthy, the alternative model is exactly the same as the theoretical model, except for the measures of performance. This alternative model showed acceptable goodness of fit indices, which demonstrated the explanatory power of the alternative model. The only exceptions are the indices AGFI, NFI and NNFI that are sensitive to sample size. In the case of relatively small samples, Bagozzi (1994) suggests focusing on the chi-square value and GFI index to assess the overall fit of the model.

Figure 8.8 The buyer's perspective: Structural model for the network and buyer-supplier relationships



Goodness of fit indices and χ^2 could not be calculated because the model did not converge after iterations

Figure 8.9 The alternative theoretical model for the buyer's perspective (different measurement construction for performance)

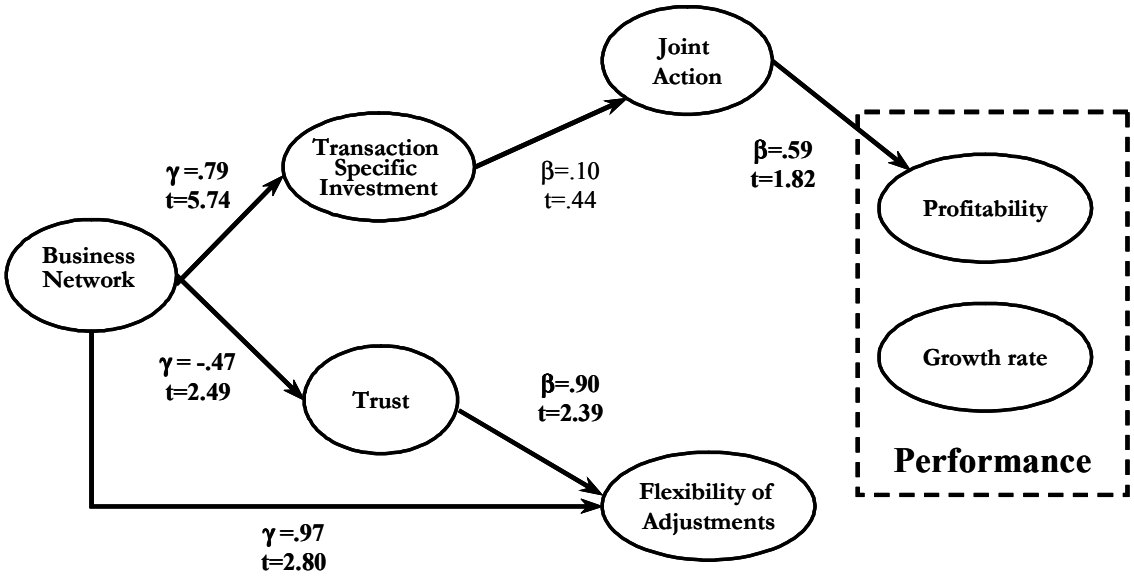


$\chi 2$ = 64.47 (P>0.01) df=28; GFI=0.90; AGFI=0.78; RMSR= 0.07; NFI=0.76; NNFI=0.75

Note: Continuous lines represent significant coefficients.

In order to select a model to be used for the analysis, we estimated an alternative constrained model (i.e., also referred to as a nested model). A test of the explanatory strength of the alternative theoretical model in the figure above was conducted against an alternative constrained model, in which we set to zero the six not significant paths of the alternative estimated model (i.e., from business network to joint action, from trust to joint action, from flexibility to joint action, from flexibility to the two performance measures, and from joint action to growth rate). According to Anderson and Gerbing (1988) a chi-square difference test (CDT) must be conducted in order to identify which model fits the data better (i.e., test the null hypothesis: *alternative constrained model – alternative theoretical model = 0*). Figure 8.10 displays the results of the alternative constrained model.

Figure 8.10 The alternative constrained model for the buyer's perspective (not significant paths were set to zero)



$\chi 2 = 97.84$ (P<0.00) df=26; GFI=0.84; AGFI=0.73; RMSR= 0.07; NFI=0.68; NNFI=0.62

Table 8.12 reports the results of the CDT. We performed the CDT to see whether the alternative constrained model is preferable to the alternative theoretical model. The results of the CDT show that there is a significant difference in the chi-square. This suggests that our alternative theoretical model is preferable. Moreover, the overall fit indices of the alternative constrained model (i.e., with the six nonsignificant paths set to zero) did not provide an acceptable model fit. All the fit indices were below the acceptable threshold value and the chi-square statistic was significant. This suggests that the alternative theoretical model is better than the alternative constrained one and, as a result, the alternative theoretical model will be evaluated in its direct and indirect effects.

Table 8.13 shows the total effects of the model in Figure 8.9. As can be seen in the table, the model contains two significant indirect effects (i.e., the other significant effects refer to direct effects, which were already pointed out in Figure 8.9). The network indirectly influences joint action ($TE_{(\gamma+\beta)}$=0.36; *t*=2.23) and trust indirectly influences joint action (TE_{β}=0.76; *t*=3.67).

Table 8.12 Fit statistic and chi-square difference test (CDT) of theoretical and alternative models (buyer sample)

	Absolute Fit Statistics							
Model	**χ^2**	**df**	**p**	**CDT**	**$\Delta\chi^2$**	**Δdf**	**p**	
Alternative theoretical model (ATM)	64.46	28	>0.01					
Alternative constrained model (ACM)	228.04	34	<0.00	ACM–ATM	163.58	6	<0.00	ATM is better

Table 8.13 Total effects (direct and indirect) of the theoretical model for the buyers in Figure 8.9

	Transaction-Specific Investment	**Trust**	**Joint Action**	**Flexibility**	**Profitability**	**Growth Rate**
Business network	**0.70****	**–0.41***	**0.36***	**0.52***	–0.04	0.07
	(4.73)	(2.23)	(2.23)	(2.25)	(0.30)	(0.70)
Transaction-specific investment	–	–	**0.30**†	–	0.23	0.09
			(1.72)		(1.30)	(0.73)
Trust	–	–	**0.76****	**0.79****	0.10	0.18
			(3.67)	(2.35)	(0.67)	(1.34)
Joint action	–	–	–	–	**0.77**†	0.32
					(1.74)	(0.80)
Flexibility	–	–	0.76	–	–0.02	0.18
			(1.25)		(0.05)	(0.66)

**p<0.01, *p<0.05, †p<0.10 (two-tailed).
Note: |t-test| within parentheses.

8.6 Analysis of the Network Subgroups

This section explores our data set to find further detailed evidence about the business network and buyer-supplier relationships. After presenting the results of the models for testing the hypotheses, we explore the influence of the individual network subgroups and some control variables on the elements of a focal buyer-supplier relationship.

Employing structural equation modeling (SEM), we estimated the same model as shown in Figure 8.5, except for the construct of the business network, which is replaced by the individual subgroups. Rather than computing a latent variable for the business network based on the composite scale of all of the network subgroups (as was done for the selected models in Figure 8.7 and Figure 8.9), we computed in one competing model the five network subgroups separately, and in a second competing model we computed two network variables (i.e., one contained the subgroups downstream in the chain and the second contained the other subgroups: those upstream in the chain and third parties). The rest of the model was the same in terms of latent variables (i.e., trust, transaction-specific investment, joint action and flexibility) and estimated paths (i.e., all hypotheses put forward in Chapter 4).

The overall fit indices for both competing models were unacceptable in the two samples. After checking the modification indices and error variances, we estimated another model with some observed variable errors correlating with each other. However, in both samples, none of the

goodness of fit indices was above the acceptable threshold value. This suggests that the overall estimated models do not sufficiently support us in considering the results an acceptable representation of the five and two latent variables of the business network in the model as each having its own effects on the buyer-supplier relationship. The complexity of the model for the network subgroups presents a relatively large number of parameters to be estimated.

We followed the same procedure to evaluate the effects of the control variables, which also failed to achieve acceptable fit indices. As the estimation of a structural equation modeling was unsuccessful, we estimated several independent ordinary least squares regressions for each sample. The power of multiple regression lies in the probability of detecting statistical significance of both the specific level of R^2 and the beta coefficient for a specific sample, and moreover the sign and size of the beta coefficient.

The five individual network subgroups served as the independent variables and the elements of the relationship as the dependent variables. As the equations were estimated independently, we had the opportunity to evaluate the effects of control variables on the buyer-supplier relationships. The control variables were the length of the business interactions, environmental volatility and diversity (uncertainty), firm size, counterpart's size and percentage of fixed lines in total sales. Appendix D presents the baseline statistics, including the results of the factor analysis of the network subgroups.

For the supplier sample, Table 8.14 shows the results of the regression equations.

Table 8.14 Results of the regression analysis of network subgroups and control variables on the elements of buyer-supplier relationships: Supplier sample

Predictor	Transaction-Specific Investments		Trust		Joint Action		Flexi-bility	Performance		
	Physical	Human	Inter-organizational	Interpersonal	Joint Problem Solving	Joint Planning		Growth Rate	Profitability	Perceived Satisfaction
Network subgroups										
First-tier suppliers	0.10 (1.28)	0.08 (0.95)	–0.07 (0.85)	0.11 (1.23)	–0.06 (0.72)	0.09 (1.03)	–0.06 (0.65)	–0.12 (1.27)	**–0.16**† (1.85)	–0.09 (1.05)
Other suppliers	0.12 (1.49)	0.04 (0.52)	0.02 (0.22)	0.03 (0.28)	0.13 (1.51)	**0.18*** (2.09)	–0.02 (0.24)	–0.05 (0.52)	–0.05 (0.53)	–0.01 (0.12)
Other buyers	–0.06 (0.69)	0.09 (1.05)	0.13 (1.43)	0.01 (0.10)	**0.15**† (1.71)	0.13 (1.50)	**0.18*** (1.96)	–0.06 (0.66)	0.13 (1.45)	0.11 (1.20)
Buyer's customers	**0.33**** (4.08)	**0.21**** (2.42)	0.02 (0.18)	0.06 (0.64)	**0.17**† (1.77)	**0.15**† (1.73)	0.09 (1.02)	0.04 (0.40)	0.08 (0.92)	0.04 (0.41)
Cooperative agents	**–0.16*** (2.26)	–0.04 (0.51)	–0.08 (1.07)	–0.10 (1.28)	–0.12 (1.60)	–0.07 (0.91)	–0.03 (0.35)	–0.09 (1.04)	–0.02 (0.27)	**–0.22** (2.83)
Control variables										
Length of business interaction	**–0.16*** (2.18)	0.04 (0.58)	0.07 (0.90)	0.10 (1.22)	0.07 (0.94)	0.09 (1.28)	0.01 (0.10)	**–.19**** (2.35)	0.03 (0.40)	0.04 (0.56)
Environmental volatility and diversity	**0.13**† (1.79)	0.05 (0.62)	–0.04 (0.57)	0.03 (0.38)	–0.04 (0.55)	0.07 (0.98)	–0.10 (1.40)	0.02 (0.26)	**–0.27**** (3.63)	–0.04 (0.55)
Firm size	**0.19**** (2.65)	**0.24**** (3.20)	**0.16**** (2.09)	0.07 (0.91)	**0.24**** (3.26)	**0.15**** (2.06)	**0.17*** (2.20)	**0.14*** (1.76)	–0.02 (0.26)	0.05 (0.70)
Buyer size	–0.01 (0.13)	0.08 (1.05)	–0.02 (0.25)	**–0.70*** (2.11)	–0.11 (1.46)	–0.07 (1.01)	–0.03 (0.33)	–0.04 (0.43)	–0.08 (1.06)	0.02 (0.21)
% of fixed lines	–0.04 (0.44)	–0.01 (0.15)	**0.20**** (2.47)	**0.21**** (2.47)	**0.20**** (2.45)	0.08 (1.02)	**0.19**** (2.36)	0.01 (0.11)	**0.19**** (2.34)	**0.27**** (3.30)
R^2 adj	0.217**	0.149**	0.086**	0.070**	0.151**	0.174**	0.115**	0.016	0.137**	0.131**

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

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

Table 8.14 presents the standardized coefficients of the estimated regression models. This standardized coefficient allows for comparison of "coefficient size" because all measures are in the same metric. All the equations are statistically significant below the 0.01 level, except for the equation for growth rate. The adjusted R^2 for all significant equations ranges from 0.070 to 0.217. Although the empirical evidence shows a moderate explanatory power for the significant equations, we want to deepen our insights in the effects of the business network on the elements of the buyer-supplier relationship. The moderate, consistent explanatory power of the equations supports the further examination of individual coefficients, to check the effects of each individual network subgroup and the control variables on the elements of the buyer-supplier relationship.

Table 8.15 shows the results of the regression equations for the buyer sample. This table summarizes the results of the seven regression equations. Six equations were statistically significant below the 0.01 level, one equation was significant below the level of 0.05, two below 0.10, and only one (for growth rate) was not significant. The adjusted R^2 for the significant equations ranges from 0.025 to 0.258, which is in line with the results of the suppliers. The empirical evidence shows a moderate explanatory power for the significant equations. The moderate, consistent explanatory power of the equations supports our further examining individual coefficients, testing the effects of each variable and comparing the results with those found for the supplier sample.

Table 8.15 Results of the regression analysis of network subgroups and the control variables on the elements of buyer-supplier relationships: Buyer sample

Predictor	Transaction-specific investments		Trust		Joint action		Flexibility	Performance		
	Physical	Human	Inter-organizational	Interpersonal	Joint Problem Solving	Joint Planning		Growth Rate	Profitability	Perceived Satisfaction
Network subgroups										
First-tier suppliers	**0.30***	–0.04	–0.23	–0.20	–0.21	–0.20	**–0.26**†	–0.25	0.03	–0.05
	(1.96)	(0.25)	(1.52)	(1.25)	(1.32)	(1.38)	(1.74)	(1.44)	(0.18)	(0.33)
Other suppliers	–0.03	–0.11	–0.19	–0.22	–0.24	–0.11	0.03	0.14	0.02	**–0.29**†
	(0.17)	(0.64)	(1.10)	(1.18)	(1.38)	(0.71)	(0.17)	(0.75)	(0.11)	(1.72)
Other buyers	0.18	**0.28**†	–0.04	0.05	0.22	**0.44****	**0.41****	0.00	0.03	0.05
	(1.04)	(1.71)	(0.21)	(0.28)	(1.35)	(2.90)	(2.67)	(0.00)	(0.16)	(0.29)
Buyer's customers	0.09	**0.36****	0.19	**0.31***	**0.34****	**0.33****	**0.27***	0.05	0.13	0.02
	(0.64)	(2.57)	(1.33)	(2.06)	(2.32)	(2.51)	(2.00)	(0.30)	(0.84)	(0.16)
Cooperative agents	0.02	0.20	–0.05	–0.06	0.01	0.06	0.08	–0.02	**–0.23**	–0.12
	(0.12)	(1.59)	(0.41)	(0.45)	(0.11)	(0.51)	(0.71)	(0.14)	(1.68)	(0.93)
Control variables										
Length of business interaction	0.05	0.09	**0.29***	0.12	**0.30****	**0.40****	**0.44****	0.10	0.02	**0.31***
	(0.36)	(0.63)	(2.03)	(0.80)	(2.05)	(3.00)	(3.25)	(0.61)	(0.14)	(2.18)
Environmental volatility and diversity	0.10	–0.14	–0.04	0.03	0.01	0.03	–0.06	0.18	**0.31***	–0.05
	(0.67)	(0.98)	(0.24)	(0.18)	(0.11)	(0.25)	(0.49)	(1.15)	(2.08)	(0.33)
Supplier size	0.10	–0.15	–0.19	–0.04	–0.13	–0.10	0.07	0.12	0.18	**–0.36****
	(0.71)	(1.13)	(1.46)	(0.25)	(0.97)	(0.86)	(0.60)	(0.85)	(1.36)	(2.82)
Firm size	–0.22	–0.21	**–0.26***	**–0.26**†	–0.19	–0.08	–0.20	0.10	**–0.29**	–0.20
	(1.56)	(1.60)	(1.90)	(1.80)	(1.47)	(0.65)	(1.64)	(0.69)	(2.11)	(0.51)
% of fixed lines	0.12	0.16	0.03	–0.09	0.22	**0.24***	–0.05	–0.11	–0.16	–0.02
	(0.76)	(1.08)	(0.19)	(0.56)	(1.48)	(1.75)	(0.33)	(0.68)	(0.98)	(0.15)
R^2 adj	0.071**	0.156**	0.120**	0.070**	0.105†	0.258**	0.249**	0.025†	0.065	0.147*

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

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

8.7 Concluding Remarks

This chapter presented the results of the quantitative part of our study. It began by discussing the measurement instruments. The constructs were divided into formative and reflective indicators. Each was evaluated in line with its measurement characteristics. The formative indicator constructs (business network, joint action and perceived satisfaction) were evaluated based on content, nomological and convergent validity and on item multicollinearity (Diamantopoulos and Winklhofer, 2001). The reflective constructs were tested for reliability and validity. We followed the procedure of Anderson and Gerbing (1988) and Steenkaamp and Van Trijp, (1991). We checked the validity by examining the item-total correlation, exploratory factor analysis (factor loadings and total explained variance) and confirmatory factor analysis of the constructs (standardized residuals and factor loadings, λ). Additionally, we checked the reliability by computing the Cronbach's alpha, composite reliability and variance extracted.

This chapter further presented the results of the analysis of the two samples: suppliers (175 relationships with buyers) and buyers (67 relationships with suppliers). This allowed us to elaborate empirically based on a discussion of the different relations between the concepts of the theoretical framework, which was to a great extent in line with the findings of the case studies. We tested the hypotheses of our framework by estimating structural equation models in Lisrel. To analyze the effects of the business network in depth, we estimated multiple regression equations where the network subgroups were the independent variables and the elements of the buyer-supplier relationship the dependent variables. In this analysis, we included control variables.

Part 4

DISCUSSION AND CONCLUSIONS

Chapter 9

The Business Network and Buyer-Supplier Relationships

This chapter discusses the results of the statistical models estimated based on the survey data. The results for the supplier sample are analyzed on the basis of the theoretical model in Figure 8.7 (Chapter 8), and the results for the buyer sample are based on the alternative theoretical model in Figure 8.9 (Chapter 8). The discussion follows the hypotheses of our theoretical framework developed in Chapter 4. The case study findings complement the discussion of the hypotheses by adding rich insights to the survey results.

9.1 Impact of Information Obtained from the Network

The sections below discuss the hypotheses related to the effect of the business network on the conceptual elements of the buyer-supplier relationship. The effect of the business network is evaluated in terms of its valuable information. This information is valuable because it may support a firm in its buyer-supplier relationship with a focal counterpart. The support relates to foreseeing future actions of the counterpart and setting trade conditions and (internal and logistics) processes.

9.1.1 The impact on transaction-specific investments

The relation between the network and transaction-specific investments was expressed in the following hypothesis:

H1: The more information a firm obtains from the network, the more the network encourages transaction-specific investments.

As presented in Figure 8.7 and Figure 8.9 we found a significant, positive influence of the network on transaction-specific investments (supplier $\gamma = 0.59$, $t = 4.62$; buyer $\gamma = 0.70$, $t = 4.73$). This suggests that we can accept the hypothesis. Thus, the more information that a supplier or buyer obtains from the network, the more the network encourages transaction-specific investments.

This implies that parties in a buyer-supplier relationship receive information that supports them in making transaction-specific investments. The effect might be related to coordination and safeguarding mechanisms. It appears that the information the parties receive from the network safeguard them against risks of opportunistic behaviors by counterparts. Moreover, the information that is obtained from colleagues and agents of the auction cooperatives, who are familiar with such investments, may be helpful in the development or purchase of an asset. The information can also influence the training of personnel (i.e., human specificity), for example, to qualify them to deal with the counterpart's trading system. The results of the estimated paths in both samples

are in line with the results of the case studies. In the cases, we also found that both buyers and suppliers are aware of the integrative benefits of specific assets and use the network to safeguard and better coordinate these investments.

9.1.2 The impact on trust

Hypothesis 2 expressed the relation between information from the network and trust in a buyer-supplier relationship. Hypothesis 2 is as follows:

H2: The more information a firm obtains from the network, the more the network fosters trust.

Here, our structural models show interesting results. In the supplier sample, we found a significant positive effect of the business network on trust ($\gamma = 0.22$, $t = 2.18$). This supports our hypothesis 2. In contrast, the model estimated for the buyer sample presents a significant negative effect of the network on trust ($\gamma = -0.41$, $t = 2.24$). This implies that for buyers, the more information that is provided by the network, the lower the degree of trust expected in the relationship. Two possible explanations can be derived from this negative result.

First, the valuable information that buyers obtain from the network might replace the need for trust in a focal buyer-supplier relationship. Buyers might face high levels of information asymmetry when purchasing products from a given supplier (Zylbersztajn and Farina, 1999). Suppliers might have to change order specifications, for example, given adverse weather conditions that could reduce the quantity or quality of products. Consequently, buyers need to set up a mechanism to protect themselves against this type of information asymmetry. Since buyers depend on the supply of products, they are expected to be keen to obtain information – to support the definition of purchasing conditions (e.g., price), the supplier's reputation and product handling processes. This implies that there is no need to spend time and other resources developing trust in the buyer-supplier relationship. In the case studies, two buyers (2 and 3) were rather unconvinced about the existence of trust in their buyer-supplier relationships. This line of explanation leads us to believe that the information from the network is so valuable that trust is unnecessary for the relationship that buyers have with suppliers. The importance of a buyer's network is further supported by the proactive behavior and tasks of purchasing agents. Buyers purchase a number of different products in order to make up a complete assortment. Also, in the case studies we found that buyers are active in their network and their purchasing agents are assigned to constantly visit and meet with people. Compared to the supplier's business, buyer's business is primarily focused on seeking opportunities via the network.

A second explanation draws from literature that emphasizes the need for trust in relationships (e.g., Wicks, Berman and Jones, 1999). The buyer's perception of trust in the focal buyer-supplier relationship might be restricted to the dyadic and not include the network of connected relationships. In the estimated models, trust influences flexibility positively and directly (see section 9.1.4), and it impacts joint action indirectly (see section 9.1.3). These significant causal relations show that trust is a necessary element of buyer-supplier relationships. Thus, buyers do not obtain information that encourages trust because trust might be already present in the relationship. Section 9.5 discusses this result further, presenting the analysis of the influence of each individual network subgroup on the dimensions of trust.

9.1.3 The impact on joint action

Hypothesis 3 describes the relation between the network and joint action. The hypothesis is as follows:

H3: The more information a firm obtains from the network, the more the network encourages joint action.

In the estimated models, there was no significant coefficient in the buyer sample ($\gamma = -0.19$, $t = 0.31$), and in the selected alternative model for the supplier sample we set the direct effect to zero. The total effects (direct + indirect) of the network on joint action show that although there is no direct effect, there is a significant positive indirect effect (supplier $t = 5.05$; buyer $t = 2.23$). This result suggests that information from the network fosters joint action through trust, flexibility and transaction-specific investment. It appears that joint action is exclusive to the dyadic relationship, because the degree of joint planning and joint problem solving is not directly contingent on the information from the network. Previous studies found joint action to be influenced by the exchange of information within the dyadic relation, such as in exchanging future plans and procedures to solve problems (Dwyer and Oh, 1988; Mohr and Speckman, 1994). Since neither direct nor indirect network effects were considered in previous research, our results reveal the interesting finding that joint action is indirectly affected by the information from the network. Thus, we could state that the more information a firm obtains from the network that supports the buyer-supplier relationship, the more the firm's network "indirectly" affects joint action.

Surprisingly, this result of the quantitative phase is the contrary of that found in our case studies. In the case studies, buyers stated that they are the eyes and the ears of their suppliers and, by playing such a role, the information from the network would be important for joint problem solving and planning. Furthermore, the suppliers stated that information from the agents of the cooperatives and the input suppliers was useful for joint problem solving and planning. Section 9.5 further analyzes the network effect in order to evaluate this hypothesis in more detail.

9.1.4 The impact on flexibility

In our theoretical model we suggest a relation between the business network and flexibility to make adjustments. The hypothesis is below:

H4: The more information a firm obtains from a network, the more the network promotes flexibility in making adjustments.

In our estimated model, we found evidence for this relationship. It is clear that the information from the network positively influences the flexibility of suppliers ($\gamma = 0.23$, $t = 2.61$) and buyers ($\gamma = 0.85$, $t = 2.63$). This suggests that firms with access to information tend to develop a bilateral expectation in a buyer-supplier relationship that makes them willing to adapt as circumstances change. The information 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. This result is further supported by the findings of the case studies. In the case studies, suppliers and buyers stated the importance of the information from the business network to increase flexibility.

9.2 Relations between the Conceptual Elements of Buyer-Supplier Relationships

Our theoretical framework also considers interrelations between effects within the buyer-supplier relationship. This section presents the results of the path between the elements of the relationship. We analyzed the relations between trust and collaboration and between transaction-specific investment and collaboration. The hypotheses related to collaboration were elaborated separately and tested by means of joint action and flexibility.

9.2.1 The impact of trust on joint action

Hypothesis 5 expresses the relation between trust and joint action in a buyer-supplier relationship. Our argumentation is based on the findings of Zaheer and Venkatraman (1995) and Moorman, Zaltman and Deshpande (1992), indicating that trust encourages joint action.

H5: The more the partners trust each other, the higher the degree of joint actions in a buyer-supplier relationship.

The results of the estimated model for the buyer sample offer no significant evidence to support this hypothesis ($\beta = 0.15$, $t = 0.30$), whereas for the supplier sample the path was not estimated in the alternative model. However, we did find a significant indirect effect of trust on joint action in both the supplier ($t = 8.01$) and buyer ($t = 3.67$) sample. This implies that trust influences joint action through the norm of flexibility. The so-called "mediating effect" of flexibility suggests that joint action is contingent on trust to the extent that the firms involved show flexibility to make adjustments when required. Trust is a necessary element of buyer-supplier relationships because it indirectly affects the degree of joint planning and joint problem solving. Once trust is established, suppliers and buyers learn that coordinated, joint efforts will lead to outcomes that exceed what the firm would achieve by acting solely in its own best interest. The results of the case studies also showed the common perception among firms that trust encourages joint action.

9.2.2 The impact of trust on flexibility

The relation between trust and the norm of flexibility is expressed in hypothesis 6, indicating a positive effect of trust on flexibility. This relation is stated as follows:

H6: The more the partners trust each other, the higher the degree of flexibility in a buyer-supplier relationship.

In the supplier sample, the result of the path from trust to flexibility in our model was positive and significant ($\beta = 0.82$, $t = 6.80$). In addition, the model estimated for the buyer sample showed a significant positive effect of trust on flexibility ($\beta = 0.80$, $t = 2.35$). These results support our hypothesis 6. In the case studies, suppliers perceived trust as positively influencing the norm of flexibility, whereas the perception of buyers was rather dispersed. Buyers 1 and 4 were clearly confident that trust is necessary. Yet buyers 2 and 3 were skeptical about the influence of trust in a relationship. Nevertheless, approaching a large number of buyers as we did in the survey served to confirm that trust is influential and does encourage flexibility in a buyer-supplier relationship. If the parties to a relationship trust each other, they are willing to flexibly react to changing conditions or demand/supply of their counterpart. Our findings support the argument of Morgan and Hunt (1994) that in trusting relationships, the level of flexibility and tolerance is higher than if the level of trust is low. Trust creates a perceived supportive climate where there is a rapid flow of information exchange and open communication between the partners (Hakansson and Snehota, 1995).

9.2.3 The impact of transaction-specific investment on joint actions

Hypothesis 7 expresses the relation between transaction-specific investment (TSI) and joint action. Our hypothesis indicates a positive effect, as is described below:

H7: The higher the degree of transaction-specific investments, the higher the degree of joint action in a buyer-supplier relationship.

The results of the estimated models show that if suppliers and buyers invest in assets specifically for transactions with a particular counterpart, they (suppliers and buyers) will be engaged in joint

action. The coefficient was $\beta = 0.23$ ($t = 3.15$) for the supplier sample and $\beta = 0.70$ ($t = 4.73$) for the buyer sample. These results are in line with previous research on buyer-supplier relationships in the electronic and electrical components industry (Zaheer, McEvily and Perrone, 1998).

The joint action response to high levels of TSI creates enough ground for bilateral governance in the buyer-supplier relationship (Macneil, 1981), which responds to the potentiality for opportunistic behavior that might erode the value of specific assets. The joint action also creates a shared operational control over assets, which serves a safeguarding function (John and Weitz, 1988). If specific investments have been made, a joint action response can be expected. As we found in the case studies, these joint actions allow for suppliers and buyers to cultivate useful working interactions, to learn important insider information and to become knowledgeable about the counterpart's products and needs.

9.2.4 The impact of flexibility on joint action

Following previous research regarding the relational contracting theory, we hypothesized that the norm of flexibility fosters joint action in a buyer-supplier relationship. Our hypothesis is as follows:

H8: The higher the degree of flexibility, the higher the degree of joint action in a buyer-supplier relationship.

Joint action can be promoted by the norm of flexibility. In the estimated models, we found that flexibility of the supplier to make adjustments ($\beta = 0.82$, $t = 6.80$) positively affects joint action in a buyer-supplier relationship. This result shows that as problems arise, the required flexibility fosters teamwork between suppliers and buyers. Calantone, Grahan and Wimsatt (1998) stated that firms that follow formal and rigid guidelines for behavior in a relationship are likely to reduce the creative role of teamwork. For suppliers, it appears that flexibility is necessary to develop plans, since it is difficult to foresee what changes will be needed to fit all possible future circumstances (Heide and John, 1992). The norm of flexibility permits adjustments to be made in the process of internal planning, to attune plans with current trade conditions (e.g., varying order quantities both up and down) throughout the relationship.

Surprisingly, although the coefficient of the effect of the norm of flexibility of buyers on joint action is according to the hypothesized sign, the coefficient is not significant ($\beta = 0.76$, $t = 1.25$). In the case studies, we found that both suppliers and buyers were concerned about the need for joint action and the importance of flexibility to make necessary adjustments. One explanation for the not significant effect in the buyer sample might relate to the buyers' approach to performance. Perhaps buyers concentrate more effort on joint action than on flexibility. The following sections discuss our approach to performance and the effect of collaboration (joint action and flexibility) on performance.

9.3 Effects of Collaboration on Performance

As observed in Chapter 3, the evaluation of performance in organizational studies has proven arduous. This is because performance can be defined and evaluated in several ways, and few indicators of performance are widely accepted. We selected three indicators of performance: perceived satisfaction (i.e., relationship evaluation), growth rate of the overall sales volume and profitability.

In the buyer sample, an alternative model containing a different construction of the performance measure proved preferable. Instead of using a latent variable to measure performance, as was de-

fined in our theoretical model, we used the measures of profitability and sales growth rate to evaluate performance.

The sections to follow discuss the path from joint action to performance and the path from flexibility to performance of the supplier sample. We also discuss the paths from joint action to growth rate and to profitability and the paths from flexibility to growth rate and to profitability.

9.3.1 The impact of joint action on performance

Hypothesis 9 refers to the relation between joint action and performance:

H9: The higher the degree of joint action in a buyer-supplier relationship, the better the performance will be.

In the results of the supplier sample, we found a significant negative effect of joint action on performance ($\beta = -0.95$, $t = 2.93$). This result suggests that the more joint action there is in a buyer-supplier relationship, the lower the performance. One possible explanation for this result is that the expense incurred in joint action might influence performance (measured in financial terms by growth rate and profitability) and the perception of satisfaction (operational terms). Perhaps the investments required for joint actions have a low return and a long payback period (i.e., at least longer than three years, since our growth rate measure takes into account the rate over the last three years). In addition, transaction-specific investment has an indirect negative effect on performance. This negative indirect effect of investments further supports the supposition that TSI related to the joint action might be affecting the results.

In the case studies, we found enough evidence to conclude that joint action leads to higher performance in terms of customer satisfaction, reduced losses in-house and increased efficiency of handling processes. Both buyers and suppliers stated that the more they share information with the counterpart, the more the goals of the collaboration are achieved.

In addition, researchers in the supply chain management school identify joint action and close collaboration as important elements of supply chain performance (e.g., Lambert and Cooper, 2000; van der Vorst, 2001). By working closely together, firms can achieve higher levels of efficiency that goes beyond the boundaries of the firm and as a result firms achieve higher overall performance. Furthermore, previous studies of buyer-supplier relationships indicate that firms that perform better are the ones engaged in joint action (Mohr and Speckman, 1994; Zaheer, McEvily and Perrone, 1998). Considering the case study findings and these previous studies, we decided to further evaluate the negative impact of joint action on performance.

We carried out a series of multiple regression analysis (OLS) in which the indicators of performance (perceived satisfaction, growth rate and profitability) were the dependent variables and joint action the independent variable. In order to find evidence that justifies the negative effect, we added some other independent variables, namely duration of the relationship, percentage of fixed lines in total sales, size of the respondent (supplier), size of the buyer, sales to business-to-business (B2B) customers (wholesalers and exporters) and sales to business-to-customer (B2C) customers (cash-and-carries and garden centers). By adding these independent variables, one finding appeared to be remarkable with regard to the financial measures (growth rate and profitability).[13] Suppliers dealing with wholesalers and exporters (B2B customers) achieve a lower

[13] The results of the estimated equations were satisfactory in terms of explanatory power (R^2) and significance levels of the coefficients. We found that joint action ($\beta = 0.42$, $t = 5.87$) and the size of the buyers ($\beta = 0.13$, $t = 1.81$) are significantly positively related to perceived satisfaction with an adjusted R^2 of 0.173, significant at 1% (F-test). Also, suppliers maintaining relationships

financial performance than those selling to B2C customers.[14] This finding leads us to believe that the B2B buyers buy large quantities of items with low unit margin, which influences the long- and short-term performance evaluation.

In the buyer sample, the results were according to our hypothesis. Joint action positively influences profitability ($\beta = 0.77$, $t = 1.74$) and there is a positive coefficient to growth rate ($\beta = 0.32$, $t = 0.80$), though it is not significant. This suggests that joint problem solving and joint planning increase the profitability of buyers. In addition, the case studies showed that buyers engage in joint action with the purpose of achieving performance goals.

9.3.2 The impact of flexibility on performance

Hypothesis 10 presents our premise on the relation between flexibility to make adjustments and performance:

H10: The higher the degree of flexibility, the better the performance will be.

The results show that performance is influenced by the flexibility to make adjustments in the supplier sample ($\beta = 0.69$, $t = 3.29$). According to Lush and Brown (1996), flexibility allows for parties to effectively adjust to each other's needs and requests, which as a result increases the effectiveness and efficiency with which tasks are performed. Although we found no significant relation between flexibility and the measures of performance in the buyer sample, the case studies provided evidence that flexible buyers have achieved their goals in terms of profitability and growth rate. The results of the case studies indicate that performance is contingent on the norm of flexibility.

9.4 Firms' Approach to Performance

Although there are several similarities between the samples in the results of our estimated models, buyers and suppliers show distinct patterns in their approach to achieving performance. By isolating the performance measure and examining the chain of causal relations, the distinction between the suppliers' and buyers' approach becomes clear. While buyers tend to focus on the "hard" conceptual elements of the relationship, the suppliers tend to focus on the "soft" elements. The buyer's approach to performance is shown in Figure 9.1. In order to achieve high performance, buyers use the information from the network to foster specific investments. Buyers then engage in joint action, which safeguards and coordinates the transaction-specific investments. By taking such an approach, buyers achieve performance in their purchasing relationship. The litera-

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with B2B customers are significantly related to low profitability ($\beta = 0.28$, $t = 2.37$) with an adjusted R^2 of 0.038, significant at 5% (F-test). We found a significant negative relation between the suppliers of B2B customers and growth rate ($\beta = -0.14$, $t = 1.84$) with an R^2 of 0.086, significant at 1% (F-test). In the same equation, we found that shorter relationships are related to higher growth rates ($\beta = -0.23$, $t = 2.97$). Considering that the average length of the focal relationships was 8.5 years with a minimum of 1 year and maximum of 30 years (standard deviation = 5.63 years), this result is not alarming. Moreover, the interviews in the case studies showed that the frequency of contacts is quite high throughout the year, especially in the peak season. Thus, the referred short relationships are longer than at least 2.5 years (i.e., mean – SD), which is rather long according to previous research (Spekman, 1988; Ganesan, 1994; Kalwani and Narayandas, 1995).

[14] This indicates that the channel with B2B customers is not so profitable and does not permit suppliers to grow in the long run. This might be related to the fact that B2B customers focus more on quantities than qualities, which implies that the price of items sold has a low unit margin.

ture about purchasing management emphasizes that the supply side of many firms is dominated by a few suppliers that provide a representative share of the product lines purchased. There are also suppliers that provide items critical to the success of the buyer's offerings. Failure in even one of these relationships with suppliers can be critical to a firm's operation. Without the information from the network, transaction-specific investments and joint actions, the relationship takes on an adversarial tone that leads to a destructive path and to low performance. Therefore, buyers that have followed the hard side of the relationship are likely to achieve success.

Figure 9.1 The buyer's approach to performance

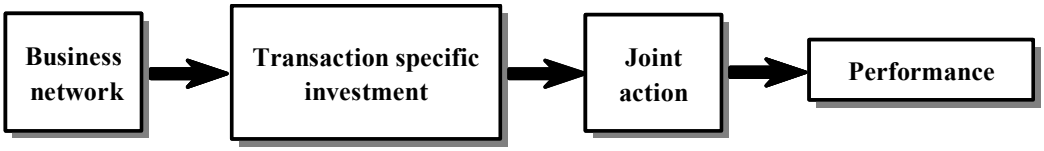
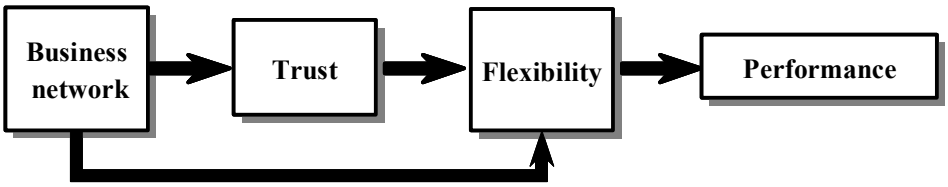


Figure 9.2 shows the supplier's approach to performance. Suppliers are oriented to the soft side of the theoretical framework. Their performance is influenced by flexibility, which is influenced by trust and the information obtained through the network. The network plays a central role since it also influences trust. The approach that suppliers take to deal with buyers is in line with the framework of customer relationship management (Rigby, Reichheld and Schefter, 2002). Customers are concerned about a supplier's performance in areas that extend beyond the supplier's price or the quality of its product. They assess the supplier's willingness to develop or adapt its standard offerings to their requirements or the ways that suppliers may behave in the relationship. This involves expectations of long-term benefits and ease of working in the relationship. This customer relationship is unlikely to be a one-shot, stand-alone transaction. Rather, the relationship is complex and requires a combination of external information (i.e., from the network), fluid exchange of information in a dyadic (i.e., part of trust) and a flexible attitude. Suppliers that take these elements into account are likely to be successful in a buyer-supplier relationship.

Figure 9.2 The supplier's approach to performance



9.5 Analysis of the Network Subgroups and Buyer-Supplier Relationships

This section explores the effects of the network subgroups and control variables on buyer-supplier relationships. The analysis is based on the OLS regression equations reported in Table 8.14, for the supplier sample, and Table 8.15, for the buyer sample. For the supplier and buyer samples, several individual network subgroups and control variables were significantly related to the elements of the buyer-supplier relationship. The next sections discuss these results and compare them with the results of the hypotheses testing.

9.5.1 Network subgroups and the buyer-supplier relationship

On the supplying side of the relationship, the supplier's human and physical transaction-specific investments are contingent on the information from the network subgroup of buyer's customers.

The valuable information flows from supermarkets, florists and street sellers, who are likely to dictate the necessary investments of their distributors and firms farther upstream in the chain. 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; White, 2000).

As the information from buyer's customers positively influences transaction-specific investments, this information is also valuable for fostering joint planning and joint problem solving. Information from these retailers can be helpful in finding solutions for problems and in discussing future plans with the counterpart in the buyer-supplier relationship. The information that suppliers obtain from the network subgroup of other buyers also increases the joint problem solving. Joint problem solving is a dimension of joint action, which is significantly influenced by the downstream network subgroups.

Interestingly, joint planning is also fostered by information upstream in the chain. The network subgroups of 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 downstream network subgroup 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.

Regarding performance, two negative coefficients were the only significant effects found. First, the subgroup of agents of the cooperative negatively influences perceived satisfaction. The valuable information that suppliers obtain from the agents appears either to increase the satisfaction criteria or to reduce the satisfaction evaluation of the buyer counterpart. Since agents are in close contact with both parties in the relationship, the agents might inform suppliers about buyers with a bad reputation or about changes in a supplier's quality standard. Second, the subgroup first-tier suppliers negatively influences profitability. This might indicate that suppliers may carefully evaluate the content of information they receive and may temper the investments they make to gather information from this subgroup.

The agents of the cooperatives are negatively related to all of the elements of the buyer-supplier relationship, revealing the surprising role played by these third parties toward suppliers. This negative result suggests that information from the network can function on two fronts. First, the information can replace the elements of the relationship, because the information provides details to coordinate production and logistic processes and in turn functions as a mechanism for suppliers to believe that the buyer will act as expected. Second, the information obtained by suppliers from the agents of the cooperatives can block the elements by providing suppliers with intelligence about potential negative actions of a buyer, thus discouraging the further development of the elements of the buyer-supplier relationship.

On the buying side of the relationship, the downstream network subgroups, namely other buyers and buyer's customers, were significantly related to all elements of the buyer-supplier relationship, except for inter-organizational trust and physical transaction-specific investments. Although the buyer-supplier 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 focal supplier counterpart is contingent on the information from retailers and other distributors. The information from the first-tier suppliers (e.g., suppliers of young plants) positively influences the physical specific investments.

The network subgroups do not significantly influence the performance measures, except for the negative effect of the network subgroups of other suppliers and the agents of the cooperative.

The reasoning follows the same line as the one provided for the supplier sample. This reinforces the need for carefully considering these two network subgroups.

Examining the equations together, a pattern is noticeable in the buyer and supplier samples. The information from the downstream network subgroups (i.e., other buyers and buyer's customers) significantly impacts several elements of the buyer-supplier relationship. This contrasts with the results of a previous study on industrial marketing, which found suppliers to be strongly connected to first-tier suppliers (Blakenburg-Holm and 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 and Morlacchi, 2001). In our study, the information that firms obtain from actors downstream in the chain (retailers and distributors) supports collaboration, investments and trust in a relationship more than other network subgroups.

By then comparing the discussion of our hypotheses in the previous sections with the discussion of network subgroups above, we notice two distinctive effects according to the aggregation level of the network. First, in some instances the network affects the elements of the buyer-supplier relationship as an aggregation of all the subgroups and not by means of the subgroups individually (see Table 9.1). For instance, in the supplier sample, we found that the entire network fosters inter-organizational and interpersonal trust, whereas there is no significant effect of the individual network subgroups on the dimensions of trust. These instances can also be noticed in the buyer sample regarding trust in the relationship. Second, in neither sample are there effects of the entire network on joint action, whereas individual network subgroups significantly affect joint action. The type of information required to encourage joint action might be more objective and easier to check among members of the same subgroup than information to foster trust.

Table 9.1 Distinct impact of the entire business network and the individual subgroups

	Trust	***Joint Action***
Entire business network		
Supplier sample	Positive impact	No significant impact
Buyer sample	Negative impact	No significant impact
Individual network subgroups		
Supplier sample	No significant impact	Positive impact of the information from the downstream subgroups
Buyer sample	Positive impact of the information from the buyer's customers subgroup (only on interpersonal trust)	Positive impact of the information from the downstream subgroups

Regarding trust in the relationship, the effect of the network depends on the combination of the effects of the individual subgroups, because there might be a need to cross-check or double check the valuable information with several different individuals, not only within a subgroup but also across subgroups. This enables firms to confirm the value (i.e., validity and reliability) of the information obtained from the sources. The discussion of redundant connections (see section 3.1 in Chapter 3) based on the theory of weak ties (Granovetter, 1973) may not fully work in considering the content (i.e., type of information) and its purpose (i.e., supporting trust in a buyer-supplier relationship). As the theory of weak ties is associated primarily with individuals seeking jobs, the purpose and content of the information discussed in our thesis appears to offer a new approach to the inefficient effects of redundancy. Our study focuses on information for coordinating production processes, setting up trade conditions and monitoring future actions of a counterpart, all of which support the elements of the buyer-supplier relationship.

While none of the individual subgroups significantly influences trust in a relationship, the entire network does show significant effects (positive in the supplier sample and negative in the buyer sample). In contrast, by examining the effects of the individual subgroups on the dimensions of trust, we found a significant, positive effect of network subgroups on trust and additionally a few other coefficients are also positive, though not significant. Based on our analysis of the individual subgroups, we can argue that the network is an aggregation of network subgroups, and must be considered in some instances in its entirety and in other instances disaggregated into its individual subgroups.

9.5.2 The control variables and the buyer-supplier relationship

The length of the relationship appears to be important for buyers, because it increases the level of inter-organizational trust, joint action, flexibility and perceived satisfaction (the operational measure of performance). In contrast, the length of the relationship does not matter to suppliers. For them, length has no significant influence on the buyer-supplier relationship, except for a significant negative impact on physical transaction-specific investments. What appears to be important to suppliers is their size. The larger the supplier, the higher their growth rate and, more importantly, the higher the level of all of the elements of the buyer-supplier relationship, with the exception of interpersonal trust. Suppliers appear to be more confident in the relationship when they have a relatively large size, and this encourages them to invest and trust. In contrast, the smaller the size of a buyer's operation, the higher the level of interpersonal and inter-organizational trust. Smaller buyers might perceive and enforce trust more because of the smaller number of suppliers in their portfolio, as the buyer case study showed.

The size of the buyer's counterpart influences the evaluation of the counterpart's operational performance (perceived satisfaction). The larger the counterpart, the more likely the buyer is to perceive a lower operational performance. On the supplier side, as the size of the counterpart increases, the level of interpersonal trust decreases. This is in line with the results of the buyer sample previously discussed. The buyers tend to trust the counterpart less as they become bigger. Thus, the larger the buyer the larger is its number of suppliers and consequently the suppliers perceive the interpersonal trust to be less.

As environmental volatility and diversity increase, the suppliers' physical transaction-specific investments decrease along with their profitability. Since suppliers achieve low profitability when working in a highly uncertain environment, they tend to be more sensible with regard to physical investments. Interestingly, buyers make more profit under high uncertainty. For example, more volatile prices and a greater number of competitors are likely to be associated with improvements in buyers' short-term performance.

In terms of the share of fixed-line channels, suppliers that sell more via fixed lines are likely to trust, engage in joint problem solving and be flexible. Also, the suppliers more active in fixed lines achieve higher profitability and perceive better operational performance of the counterpart. Moreover, buyers' larger share of fixed-line channels encourages joint planning. The other conceptual elements of the relationship are not influenced, due to the already relatively larger amount of purchases with which buyers are involved when compared to suppliers.

9.6 Concluding Remarks

In this chapter we learned the important lesson that buyer-supplier relationships and the business network can make a difference between success and failure for a firm. We presented empirical evidence from two samples, suppliers (175 relationships with buyers) and buyers (67 relationships with suppliers). We tested the hypotheses of the theoretical framework by estimating struc-

tural equation models in Lisrel. This allowed us to elaborate an empirically-based discussion about the different relations between the concepts of the theoretical framework, complemented with findings from the case studies. Table 9.2 summarizes our analysis of the hypotheses.

Table 9.2 Summary of hypotheses and results of the quantitative analysis

Hypotheses	*Supplier Sample*	*Buyer Sample*
Information obtained from the business network		
H1: Business network → transaction-specific investment	Supported	Supported
H2: Business network → trust	Supported	Negative significant effect
H3: Business network → joint action	Indirect effect	Indirect effect
H4: Business network → flexibility to make adjustments	Supported	Supported
Relations between the elements of the buyer-supplier relationship		
H5: Trust → joint action	Significant indirect impact	Significant indirect impact
H6: Trust → flexibility	Supported	Supported
H7: Transaction-specific investment → joint action	Supported	Supported
H8: Flexibility → joint action	Supported	Not supported
Impact of collaboration on performance		
H9: Joint action → performance	Negative significant effect	Supported[a]
H10: Flexibility → performance	Supported	Not supported

a. Only profitability measure

The information that firms obtain from the network affects the elements of the buyer-supplier relationship. The network encourages firms to invest in assets specifically meant for transactions with a counterpart. In the supplier sample, we found that the network fosters trust in a buyer-supplier relationship, whereas the effect of buyers' network on trust is negative, as opposed to the hypothesized sign. Regarding collaboration, the network exerts an indirect effect on joint action and has a direct impact on flexibility. This shows that the management of a relationship is contingent on the effect of the network and must be consciously considered by managers. The final chapter discusses the implications of these findings for the management of buyer-supplier relationships.

Furthermore, we investigated the interrelations between the elements of the buyer-supplier relationship. Overall, trust appears to be rather important for collaboration in buyer-supplier relationships, as posited in previous research (see Chapter 3). Trust indirectly influences joint action and directly impacts flexibility. As expected, transaction-specific investment offers coordination and further integration of activities and resources, which promotes joint problem solving and joint planning (i.e., joint action). According to the argumentation of our hypothesis (H7) and previous research (Dyer and Singh, 1998), the joint action response also functions as a mechanism to safeguard a firm against opportunistic behavior, considering the vulnerable position of the inves-

tor firm. The effect of flexibility was supported in the supplier sample. In contrast, there was no significant effect of flexibility on joint action in the buyer sample. One of the possible explanations put forward is that buyers appear to focus on joint action since joint action increases their profitability, and flexibility does not significantly influence performance.

This quantitative test also examined the influence of collaboration on performance. In the supplier sample, there was a surprising negative effect of joint action on performance. This result suggests that high investments linked to joint action and transaction-specific investment depress the performance of companies. In further evaluating the negative effect of joint action on performance, we found that suppliers transacting with B2B buyers (e.g., wholesalers and exporters) are actually negatively related to performance. This finding led us to believe that the B2B buyers buy large quantities of items with low unit margin. Furthermore, in the buyer sample, we found that joint action positively influences the profitability of the respondent firms.

We further examined the impact of the information from each of the individual network subgroups on the conceptual elements of the buyer-supplier relationship. Table 9.3 summarizes the results. The impact of the downstream network subgroups on the buyer-supplier relationship is remarkable. By then comparing the results shown in Table 9.2 to the results in Table 9.3, we notice that there are two distinctive effects according to the aggregation level of the network. Firstly, we found that the entire business network fosters trust, while there is no significant effect of the individual network subgroups on the dimensions of trust, except for interpersonal trust in the buyer sample. Secondly, there are no effects of the entire network on joint action, though individual network subgroups significantly affect joint action. We speculate that the type of information required to encourage joint action is more objective and more easily checked among members of the same subgroup than information to foster trust.

Table 9.3 Summary of the impact of the network subgroups

	Supplier Sample	***Buyer Sample***
Downstream network subgroups		
Other buyers	(+) Joint problem solving (+ +) Flexibility to make adjustments	(+) Human TSI (+ +) Joint planning (+ +) Flexibility to make adjustments
Buyer's customers	(+ +) Physical and human TSI (+) Joint planning and joint problem solving	(+ +) Human TSI (+ +) Interpersonal trust (+ +) Joint planning and joint problem solving (+ +) Flexibility to make adjustments
Other network subgroups		
First tier suppliers	(–) Profitability	(+ +) Physical TSI (–) Flexibility to make adjustments
Other suppliers	(+ +) Joint planning	(–) Perceived satisfaction
Cooperative agents	(– –) Physical TSI (– –) Perceived satisfaction	(–) Profitability

Note: The significant effects are shown according to the following signs: + + strong positive effect (<5% level), + positive effect, – negative effect, – – strong negative effect (<5% level).
Abbreviations: TSI: transaction-specific investments.

Overall, this chapter taught the lesson that suppliers and buyers take different approaches to achieve performance. While buyers value the hard side of the relationship (i.e., the business network, transaction-specific investments and joint actions), suppliers value the soft side of the relationship (i.e., the business network, trust and flexibility). This chapter also taught the lesson that

buyer-supplier relationships are contingent on the downstream network subgroups. The comparison between the impact of the entire network and the impact of the individual network subgroups raised an interesting discussion about the dilemma of redundancy versus efficiency. Our results show the information from the entire network affects the degree of trust. This suggests that redundancy is necessary to assure the value of the information, whereas for increasing the degree of joint action the information from the downstream network subgroups is enough. Our final chapter addresses the conclusions that can be drawn from our results and discusses implications for managers, methods and theory.

Chapter 10

Conclusions

This final chapter draws conclusions regarding the research questions and hypotheses. The possible contributions that our theoretical discussion and empirical results can make to theory, methodology and management are also addressed. This chapter takes a more holistic approach in looking at results and addressing some conclusions about the theoretical framework.

We started this thesis by stating that firms are increasingly embedded in business networks, with significant informational implications for the management of buyer-supplier relationships. These initial thoughts led us to formulate two research questions:

1. How does the information from the business network affect trust, transaction-specific investments and collaboration in a buyer-supplier relationship and how does collaboration affect performance?
2. What is the impact of individual network subgroups on a buyer-supplier relationship?

In the course of our study, we found empirical evidence that firms are indeed embedded in a network of connected relationships that affects the way they manage a focal buyer-supplier relationship. More specifically, the answer to the *first research question* is threefold.

Firstly, to a great extent we found support for the hypothesis that the information obtained from the business network encourages transaction-specific investments, trust, joint action and flexibility to make adjustments in a buyer-supplier relationship.

- The information obtained from the network was found to positively influence transaction-specific investments in both samples, namely supplier and buyer. Such information appears to assist firms in coordinating and safeguarding specific investments and in reducing the risk of opportunism and dependence. This has relevant implications for transaction cost economics and marketing channels.
- The suppliers' business network encourages trust in a focal relationship, as hypothesized. Quite the opposite, however, the buyers' network negatively influences the level of trust, as opposed to our hypothesis. We speculate that the information that buyers obtain from the network might be either irrelevant for developing trust in a buyer-supplier relationship or replaces the need for trust. Since the buyers depend on the supply of products, they are expected to be keen to obtain information from the network. This information appears to reduce the risks associated with information asymmetry and to ease buyers' collaboration with suppliers. This implies that there is no need to spend time and resources developing trust in a specific buyer-supplier relationship. Overall, this negative result in the buyer sample has implications for the study of the network and trust in buyer-supplier relation-

ships, because it shows that there might be situations in which the network plays a more important role than trust for firms.

- Information from the business network encourages collaboration, namely joint action and the norm of flexibility. While the effect of the network on the norm of flexibility is direct, we found that the network influences joint action indirectly. Literature on marketing channels and supply chain management emphasizes the importance of working closely together in order to coordinate the buyer-supplier relationship. Surprisingly, the effect of the information obtained from the network is only indirectly mediated by other conceptual elements of the buyer-supplier relationship, namely transaction-specific investments, trust and flexibility.

Secondly, the hypothesized relations between the conceptual elements of the buyer-supplier relationship were mostly supported.

- The more partners trust each other, the more they show flexibility to make adjustments, as hypothesized. Trust creates a perceived supportive climate where there is a mutual interest in quickly responding to changing circumstances.
- The effect of trust on joint action is mediated by the norm of flexibility. This implies that the two constructs forming collaboration are crucial in any relationship. The so-called "mediating effect" of flexibility suggests that joint action is contingent upon trust to the extent that the firms involved adopt an attitude of flexibility.
- The higher the degree of transaction-specific investment, the higher is the joint action response. Suppliers and buyers respond to the specific investments by engaging in joint action, because these actions can offer important insider information and enable a firm to become knowledgeable about the counterpart's products and applications.
- While flexible suppliers are engaged in joint action, buyers' joint action is not influenced by flexibility. For suppliers, the norm of flexibility permits adjustments to be made in processes of internal planning and problem solving, to match actions of the counterpart and changes in circumstances. Buyers appear to be influenced by a distinct approach to performance, because buyers pay more attention to the hard side of our model (i.e., transaction-specific investments and joint action) to achieve performance.

Thirdly, collaborative relationships may improve firms' performance.

- Buyers engaged in joint actions are more profitable, as hypothesized. In joint actions, buyers find ways to add value or save costs by jointly solving problems and planning. In contrast, the suppliers engaged in joint actions present a worse performance. This might be due to the significant investments required for suppliers to engage in integrated actions with a buyer. Perhaps, the high investments incurred in joint problem solving and planning are related to changes required in production systems, improvements in plant disease control and transportation, and training of personnel. All of these investments were found among the buyers participating in the case studies, though they were less well developed among the suppliers. In a *post hoc* analysis, we found that suppliers dealing with wholesalers and exporters (B2B customers) show a lower performance in financial terms. This finding leads us to believe that the B2B buyers buy large quantities of items with low unit margin, which influences the long- and short-term performance measures, regardless of the level of joint action.
- Flexible suppliers perform well while flexibility of buyers has no significant effect on performance. Flexibility allows suppliers to effectively adjust to needs and requests, which in-

creases the effectiveness and efficiency with which the day-to-day management is performed.

Taking the overall results of the estimated models, we identified two distinct approaches followed by buyers and suppliers to achieve performance. While buyers tend to focus on the "hard" conceptual elements of the relationship, the suppliers tend to focus on the "soft" elements.

- Buyers use information from the network to foster transaction-specific investments. Buyers then engage in joint action, which safeguards and coordinates the specific investments. Buyers engaging in joint action achieve better performance.
- Suppliers use information from the network primarily to foster trust and flexibility. Suppliers that place trust in the counterpart are flexible. Performance then is influenced by flexibility. This customer relationship is complex and requires a combination of external information (i.e., the network), fluid exchange of information in a dyadic (i.e., part of trust) and flexible attitude.

Regarding *research question 2*, we found that the network must be considered in some cases in its entirety and in others cases by its subgroups. In an attempt to examine the network effect by subgroups, we found that the downstream network subgroups (i.e., buyer's customers and other buyers) positively influence elements of the focal buyer-supplier relationship. Interestingly, the entire business network significantly influences trust (positively in the supplier sample and negatively in the buyer sample), but there are no significant effects of the individual subgroups on trust. Conversely, we found that the individual subgroups positively influence joint actions, but there are no significant effects of the entire network in either sample. These two patterns lead us to think that in some instances there is a need to cross-check and double check information with other members within a subgroup and, in other instances, to check information across subgroups. The type of information required to encourage joint action might be more objective and more easily checked among members of the same subgroup than information to foster trust. We can state that previous considerations regarding the weak ties (Granovetter, 1973) and aggregation level (Burt, 1980) must be looked at carefully in terms of the content and purpose of the network. We found that in our study, which considers information as the content and supporting the buyer-supplier relationship as the purpose, redundant connections are actually helpful because of the opportunities they provide to cross-check and double check input, thus assuring the value of the information.

10.1 Theoretical Contribution

This thesis proposed to exploit cross-fertilization, combining the network theory with four schools of thought: supply chain management, transaction cost economics (TCE), marketing channels and relational contracting theory. Specifically, we complement the emphasis of TCE on transaction-specific investments with trust-based arguments consistent with the relational contracting and marketing channels theories. In a similar manner, we complemented these schools of thought with the information-based analysis of network theory. The complementarities of these schools with network theory were emphasized when developing our theoretical framework. While network scholars emphasize a context formed by multiple connected relationships, the scholars dedicated to the other schools emphasize primarily the dyadic relationship as the focus of analysis. The research presented in this thesis was triggered by the warning of Salancik (1995) and Nohria and Gulati (1994), who claimed that the business network is a relevant antecedent of buyer-supplier relationships and consequently deserves special attention. We then isolated information as the central positive effect of a firm's network on a focal buyer-supplier relationship.

We characterized a firm's network by its number of connected relationships with other firms in the chain (e.g., upstream and downstream), and a buyer-supplier relationship by the degree of transaction-specific investment, trust, joint action and the norm of flexibility. We argued that the valuable information a firm obtains from its network supports transaction-specific investment, trust and collaboration in a focal buyer-supplier relationship. The information is valuable because it offers benefits to the focal buyer-supplier relationship in terms of coordination of processes and activities, supporting trade conditions and monitoring actions of the counterpart.

The supportive effect of the network on the buyer-supplier relationship implies that the theoretical framework developed and tested in this research contributes to supply chain management, TCE, marketing channels and relational contracting theory. These theories can no longer consider the firm's network as a constraining context which contributes little to the buyer-supplier relationship. The idea that the network is solely a shift parameter in the model of the governance structure of a relationship, it appears, fails to cope with the new developments in the business environment. Mobile telephones, the Internet and other infrastructures allow managers to be closer to each other than ever before. 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 information that flows in a network is valuable because it permits the cross-checking of facts. Moreover, it is rather cheap to access and thus does not require large investments. In this sense, collaboration, trust and transaction-specific investment can be enhanced by the safeguarding and coordination effects of the network, as discussed in this study.

Regarding our contribution to the network school, this study proved as analytically important the distinction between the content and source dimensions of the business network. The *content* refers to the information, while the *source* refers to the subgroups. These two dimensions contributed to our analysis of the effects of the network. Our empirical evaluation of networks showed that the more information a firm obtains from the network the more a firm is encouraged to be engaged in collaborative forms of governance with investments in specific assets and trust. 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 and Johanson, 1993; Blakemburg and 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 and supports a focal buyer-supplier relationship. Moreover, Granovetter (1985) and Powell (1990) emphasized the importance of the network in increasing the level of trust and also that the information obtained from the network functions as a mechanism for safeguarding specific investments and collaboration. By examining our two samples, we found in the analysis of the individual network subgroups that buyers obtain information from their customers that fosters trust; in the supplier sample we also found a positive influence of the entire business network on trust. Thus, the results of our case studies and survey provided sufficient evidence to support the theoretical discussions at hand.

Another contribution of our study to the network school relates to the degree of actor aggregation. We followed Burt's (1980) suggestion to investigate network subgroups that were used elsewhere (Blakemburg, Eriksson and Johansson, 1999). In the case studies, some suppliers and buyers perceived the external information (i.e., from the network) as coming from several connected relationships with different actors of a supply chain. The case-study participants also referred to the importance of the agents of the auction cooperative. We then collected the data for

the quantitative analysis in order to check whether there would be a statistically significant influence of the whole business network on the conceptual elements of the buyer-supplier relationship. The results of the estimated model provide evidence that the network is crucial to promote the elements of the relationship to the extent that information is obtained from the different subgroups of connected relationships.

When studying the effect of the individual network subgroups on the elements of the buyer-supplier relationship, we found two distinct implications for theory. Firstly, there is a common pattern in the buyer and supplier samples indicating that downstream network subgroups (buyer's customers and other buyers) exert a significant positive effect on many of the elements (i.e., joint action, transaction-specific investments and flexibility). 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 relationships. Secondly, in some cases, the effects of the entire network differed from the effects of the individual subgroups. This implies that for some elements (e.g., trust) the entire network is more important than the individual subgroups. In other words, the effect of the entire network is stronger than that of the isolated individual subgroups. Firms might need to cross-check information, not only with organizations within a subgroup but also across subgroups. In the network school of thought, the aggregation level of analysis is essential for understanding the phenomenon; studies should thus carefully examine and determine when the whole network is more important than an individual subgroup and vice-versa.

10.2 Methodological Implications

In this thesis, two important methodological implications are worthy of remark. First, we opted for a two constructive step procedure to test our theoretical framework. The case study research strategy was followed by a survey, for quantitative analysis. The use of the two constructive steps allowed us to minimize the drawbacks of each research strategy. Case studies enabled us to break down the broad, vague problems of business networks and buyer-supplier relationships into smaller, more precise interrelations. These in turn helped us to formulate hypotheses that could be tested in a survey context. The case studies further assisted us in the analysis and interpretation of the statistical results of the survey data. The survey allowed us to generalize the findings because our valid and reliable survey measurement instrument can be more easily replicated than the instruments used in the case studies.

Secondly, we adapted an existing measurement instrument for the business network, and it worked well in the survey. Chapter 3 discussed the two analytical dimensions of content (i.e., information) and source (i.e., network subgroup), which helped us to capture the influence of the network on a focal buyer-supplier relationship. In the case study, managers provided us with evidence that these dimensions acceptably represented the network effect. In the questionnaire, our measurement instrument contained five different network subgroups (the downstream subgroups of other buyers and buyer's customers; the upstream subgroups of other suppliers and input suppliers; and third parties, primarily the mediation agents) and five different information benefits (defining quality, coordinating logistic processes, coordinating internal handling, monitoring actions of the counterpart and defining price and quantity). The exploratory factor analysis showed that the information benefits can be grouped by the subgroups as expected (see Appendix D).

10.3 Limitations of the Study and Suggestions for Further Research

The findings of our study should be evaluated in the light of the following limitations and suggestions for further research:

- The measurement instrument for the business network was based on an existing instrument and received some modifications. We added the agents of the cooperative as a network subgroup and explicitly considered five information benefits. The measurement instrument was tested in two samples and proved to be rather explanatory and valid (i.e., nomological validity). A suggestion for future researchers would be to further test the instrument in different theoretical and empirical contexts. Such research could certainly give rise to insights into the extent to which networks affect other concepts of supply chain management, transaction cost economics, marketing channels and relational contracting theories.
- The network effect focused on the information that firms obtain from the business network. However, some researchers on highly innovative industries (e.g., biotechnology) have focused on the network's effects on control, identifying opportunity and sharing resources (e.g., Powell, Koput and Smith-Doerr, 1996; Kogut, 2000). Under our rationale, if a firm needs a particular technology (i.e., a resource) to finalize a certain production process, the firm has to first obtain information about who has the technology and how it can be used. In this instance, the primary effect of the network is the information rather than the resource per se. We encourage future research to further explore our rationale by identifying whether or not the information is indeed used for gaining control, resources or opportunities.
- The value of the information obtained from the network might vary throughout the evolution of a buyer-supplier relationship (Ring and Van der Ven, 1994). Information from the network may influence a relationship's dynamic phases (i.e., initial, maintenance and termination) in different ways. Therefore, we suggest that the effect of the information obtained from the network be evaluated in each of the different phases of the evolution of a buyer-supplier relationship.
- We chose an organizational unit of analysis for studying the effect of the network. By investigating the information that firms obtain from the network, we assumed that respondents would consider organizational units as the source within each network subgroup. In this, we followed the literature on organizational networks as discussed in Chapter 3. However, research about social capital often focuses on the individual as unit of analysis. We suggest that future research on networks carefully consider an appropriate unit of analysis by taking into account the type of network (i.e., individual or organizational) and the managerial implications of the study.
- The case studies and the variance explained in the quantitative analysis provided significant evidence to conclude that the network influences buyer-supplier relationships and that collaboration influences performance. However, the impact of collaboration on performance remains relatively small. Apparently, firms are affected by the information from the network and collaboration, but are not totally reliant on it. This suggests that additional performance measures are needed to better explain how firms achieve overall performance.
- The issue of contracts or other formal documentation was not considered in the theoretical framework because we followed Macauly (1963) and Kali (1999). These authors claim that the social structure and the connected relationships (i.e., reputational effects) of a network are an efficient substitute for the reliable institutional environment that enforces any written contract. Moreover, we found in the case studies that in the focal industry conflicts are settled by the primary parties involved in the exchange (i.e., self-enforcement), rather than by enforcement of a contract. Nevertheless, we suggest that the

role of contracts be carefully considered at the outset of any research and when necessary, an appropriate element (in terms of contract law, letter of intent or other form of written document) should be added to the framework.

- 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. If there is very good performance, a party might become more willing to invest in joint action or make transaction-specific investments taking some risks for granted. However, proof of this causal relationship requires a longitudinal research design. Further work along this line is therefore encouraged. For instance, quantitative research could investigate the theoretical framework at different points in time. The data we collected from suppliers and buyers gave us important information about similarities and differences from the marketing and purchasing perspective. Unfortunately, we could not identify the selected counterpart in each data set because most of the companies that participated in our survey did not provide the name and address of their selected counterpart. Further research into the influence of the business network on buyer-supplier relationships should aim at analyzing both sides, in which both parties are identified. Data from both partners of a relationship could be modeled in one structural equation by taking the relationship as the unit of analysis. By examining the size of the coefficients, the results of such a model could raise points such as whether a firm has more or less trust in the relationship compared to the identified counterpart or whether a firm perceive to be more engaged in joint action that its counterpart.
- Finally, our study domain was firms in the Dutch potted plant and flower industry. This might limit the generalizability of our conclusions in either research phase (case study or survey). Further research is encouraged to replicate the research in a different setting, such as another country or product.

10.4 Managerial Implications

The Dutch potted plant and flower industry is known for its international orientation and the prominent role played by the auction cooperatives. Although the focal buyer-supplier relationships were within the national boundaries, it must be noted that both suppliers and buyers closely watch the international customers. The auction cooperatives influence the product market and offer infrastructure through which suppliers and buyers frequently meet, in the auction halls and mediation departments. Regarding the individuals, responses could have been affected by collectively acceptable behavior that is somehow the result of the way in which Dutch society is organized and the principles and values of the Netherlands. There is also the matter of the geographical distribution of buyers and suppliers, since the production and commerce points are rather close together. Finally, our respondents are used to trading under a spot-market governance structure, though most are aware of the unique benefits offered by close cooperation in fixed lines (i.e., the buyer-supplier relationship), for example, uniformity of sales/purchases, constructive problem solving and flexible order and delivery conditions. These particularities must be considered when evaluating our managerial question: How to coordinate a buyer-supplier relationship within a business network and be successful?

Achieving success in collaborative, long-term buyer-supplier relationships is essential. Understanding why and how some business relationships succeed while others fail is perhaps among the central questions facing firms. From the managerial perspective, it is then important to know how to improve overall performance. Based on our study, we point out two main implications:

- A firm's network plays an important role in the way business is done in a buyer-supplier relationship. The results of our study suggest that firms that increase their degree of collaboration (by means of joint action and flexibility) in a relationship, may substantially enhance their chances of success by establishing a network with other organizations or individuals. Managers then 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 transaction-specific investment, trust, flexibility and joint action. Information obtained from the network can reduce information asymmetry, increase coordination and offer safeguarding benefits. Furthermore, explicit attention should be given to the trade-offs, which are inherent in the establishment of any of the elements of the buyer-supplier relationship in response to the need for an efficient governance mechanism. The magnitude and acceptability of such trade-offs can be considered and safeguarded with information from the network. 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.
- Many of the extant managerial decision models evaluate governance mechanisms primarily in terms of their ability to accomplish certain joint actions. We discussed the governance of a buyer-supplier relationship from the perspective of designing inter-firm collaboration that not only economizes on certain transaction costs and minimizes waste but which also exploits complementarities in the coordination of processes and activities. Suppliers and buyers may follow the approach to performance that was identified in this study. According to that approach, suppliers focus on the business network, trust and flexibility in order to achieve performance. While we found similarities in the way that suppliers and buyers manage their relationships, buyers nonetheless followed a different approach to achieving performance. We advise managers in the purchasing position to focus on the business network, transaction-specific investments and joint action. Focusing on these elements of the buyer-supplier relationship appears to confer better performance for buyers.

While buyers can use the business network to replace the need for trust, suppliers value trust in the buyer-supplier relationship. As relationships become long-term oriented, there is an associated structural change in the form of more complex interpersonal relations that require trust. Suppliers should then increase face-to-face encounters and benevolence and show confidence in buyers' future behavior. Trust can also be promoted by the information from the network. We put forward five processes by which trust can be developed and maintained in a relationship:

- Managers calculate the costs and rewards of the counterpart cheating or cooperating in a relationship. To the extent that the benefits of cheating do not exceed the costs of being caught, the firm infers that it would be contrary to the counterpart's best interest to cheat, and so the counterpart can be trusted (Akerlof, 1970).
- A manager should be able to forecast the counterpart's behavior. Trust stems from expectations of how the counterpart may behave based on the firm's past and present implicit and explicit claims (Doney, Canon and Mullen, 1998).

- Trust is influenced by the intentions of the counterpart (Deutsh, 1969). Managers can interpret the counterpart's words and behavior and attempt to determine their intentions in the relationship.
- Trust can be built based on an assessment of the counterpart's ability to meet his or her obligations as well as the other party's expectations (Doney, Canon and Mullen, 1998). Trust as a derivative of technically competent performance ensures firms that desired outcomes can be obtained.
- Trust can be transferred in the business network from a relied-upon source of proof to another individual or group with which the focal actor has little or no direct experience. This transference process allows for trust to spread from a known entity to an unknown entity.

Managers should also be aware of the importance of the duration of the relationship, firm size and the share of business via fixed-line channels.

- Buyers should carefully consider the implications of long-term relationships with suppliers. The length of the relationship encourages inter-organizational trust, joint actions, flexibility and perceived satisfaction (the operational measure of performance).
- Buyers should consider their size when entering into a buyer-supplier relationship. The smaller buyer operations (less than €5 million annually) value higher levels of interpersonal and inter-organizational trust.
- Suppliers should also consider their size when entering into a buyer-supplier relationship. In contrast with the buyers, large suppliers (greater than €800,000 annually) tend to present the highest levels of joint action, trust and flexibility as well as the highest sales growth rates.
- Buyers and suppliers should consider increasing their share of fixed-line channels to better manage their buyer-supplier relationships. The suppliers that sell more via fixed lines are likely to trust, engage in joint problem solving and be flexible. Also, the suppliers that are more active in fixed lines achieve higher profitability and perceive better operational performance of the counterpart. A large percentage of fixed-line channels encourages joint planning.

The implications of our study are best viewed within the context of the trend toward close, long-term buyer-supplier relationships. Quite often such close relationships are considered a desirable goal. We advise managers to contrast this viewpoint with our model. The basic postulate in our work is that a firm may coordinate relationships with a counterpart by means of collaboration and, in some instances, by trust and transaction-specific investments. However, this is not always desirable. In our focal industry, buyers and suppliers have looked for channels to reduce product price and the unpredictability of volume and moreover to reduce bottlenecks in delivery. In this situation, there are enough advantages for firms to organize themselves – even making specific investments, as our research showed – and to set up close relationships with certain counterparts. In the absence of competitive advantages, building relationships or networks involves investments of time and resources that might outweigh the benefits. For instance, given the costs associated with the shift away from spot-market exchange (e.g., the auction clock), the buyer-supplier relationship and the network are likely to be detrimental to performance. At the very least, our study should serve as a cautionary example about the conditions that evoke the need to craft and manage collaborative, long-term relationships and networks.

10.5 Concluding Remarks

Part 1 of this thesis discussed the fact that information has become essential in the complex business world of today. We defined two research questions and a number of hypotheses to elucidate this need for information. Based on the analysis of the qualitative and quantitative empirical evidence, this final part conclusively addressed these research questions and hypotheses.

Regarding the first research question, our study supports the hypothesis that the information obtained from the business network affects the conceptual elements of buyer-supplier relationships. In some cases, the information from the network directly encourages certain elements (transaction-specific investments, supplier's trust and flexibility), in other cases it encourages certain elements indirectly (joint action), and for still others it replaces the need for a certain element (buyer's trust). The hypothesized relations between the conceptual elements of the buyer-supplier relationship were mostly supported. Finally, there is evidence that collaborative relationships lead to improved firm performance. Interestingly, buyers and suppliers take distinct approaches to performance. While buyers tend to focus on the business network, TSI and joint action, suppliers value the business network, trust and flexibility.

The discussion of the network aggregation level formed the core of our second research question. We found that information from the downstream network subgroups (i.e., buyer's customers and other buyers) encourages TSI, joint action and flexibility. The effects of the network on trust and joint action showed an intriguing pattern. While in fostering trust firms obtain information from the entire network, in encouraging joint actions the information from the downstream subgroups proves most essential. We speculate that the type of information required to encourage joint action is more objective and easily checked among members of the same subgroup than information that fosters trust.

Our theoretical elaboration aimed at cross-fertilization in combining the network theory and four schools of thought: supply chain management, transaction cost economics (TCE), marketing channels and relational contracting theory. We attempted to complement TCE's emphasis on TSI with trust-based arguments consistent with the relational contracting and marketing channels theory. In a similar manner, we complemented these schools with an information-based analysis of network theory. We emphasized the complementarities of these schools with network theory in developing our theoretical framework. To the network school, our study proved to be analytically important for the distinction between the dimensions of content (information) and source (subgroups) of the business network and moreover the careful delimitation of the network aggregation level.

The methodological implications of our study are twofold. Firstly, we followed a two constructive step approach to test our theoretical framework. The case study research strategy was followed by the survey with quantitative analysis. Secondly, we developed a measurement instrument for the network, and it worked well in the survey. The two analytical dimensions of content and source were helpful in capturing the influence of the network on a focal buyer-supplier relationship.

This chapter also offered suggestions for further research based on some limitations and strengths of the study. We suggest researchers might test the network measurement instrument in different theoretical and empirical contexts, and check whether other levels of analysis (i.e., organization or individual) or content (e.g., resources and opportunities) should be considered. We also suggest that the network be evaluated in each of the different phases of the evolution of a buyer-supplier relationship (initial, maintenance and termination). Data is needed that identifies the two parties in a relationship and can be modeled in a single structural equation. Moreover, the framework should be tested in different focal industries with vigilance for the effects of con-

tracts. Finally, we encourage researchers to use a longitudinal design that may provide proof of causal relationships.

By considering the overall implications of our study, managers must consider their firm's existing particularities in order to exploit the competitive advantages of managing business network and collaborative, long-term buyer-supplier relationships. In most cases, experiences gained as independent firms working in a spot-market context creates a readiness (or quite the opposite, an impediment) for accruing benefits from relationships. Firms that fail in managing the relationship may take themselves with more internal deficiencies than with the network or relationship itself. For this reason, managers that intend to obtain information from the network and engage in collaborative modes of governance with trust and transaction-specific investments being essential should first ask themselves a number of questions:

- Do we communicate well with the sources of valuable information that form our network?
- Do we know how to select sources and how to cross-check information?
- Are we capable of trusting our counterparts and of mutually setting up collaboration?
- Do we have the necessary financial conditions for specific investments?
- Do our policies encourage flexibility and joint action?
- Do our people understand collaborative relationships?
- Are our managers driven to do more with limited resources?

Certainly, some firms are at an acceptable level of development, while others are weak in some areas which will thus require special attention at the outset. The compensations of our theoretical framework for managers committed to change were discussed extensively throughout this thesis. Now it is a matter of setting up the network to coordinate and safeguard the buyer-supplier relationship and achieve success.

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Appendix A: Overview of the Network, Definitions at the Organizational Level

	Definition: Design and Implications (Theoretical Domain)
Management	
Granovetter (1985) AJS	Networks refer to the social relations influencing economic actions. This concept explicitly considers trust, ongoing process, interpersonal relations, information exchange, and reservoir of other partners. The stable (strong links with other individuals) networks are more appropriate in complex transactions. (Sociology/Embeddedness)
Thorelli (1986) SMJ	Two or more organizations involved in long-term relationships, which makes a special type of system – one whose internal interdependencies generally change over time. Due to the intensity of interaction, two or more firms constitute a subset of one market (or several markets). (Management/Strategic Networks)
Jarillo (1988) SMJ	The long-term, purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantages vis-à-vis their competitors outside the network. (Management/Strategic Networks)
Thomas and Venkatraman (1988) JMS	A group of firms within an industry that are highly symmetric with respect to cost structure, degree of product diversification, formal organization, control systems, and management rewards and punishments, and the personal views and preferences for various possible outcomes. These groups support the strategic plans of organizations. (Management/Strategic Groups)
Powell (1990) ROB	Network entails indefinite, sequential transactions within the context of a general pattern of interactions. Transactions are embedded in a particular social structure. Boundaries are expanded to encompass a larger community of actors and interests that would previously have either been fully separate entities or absorbed through merger. (Network Governance)
Larson (1991) JBV	Close collaborative alliances with a limited set of suppliers and customers that enable a firm to stabilize itself while remaining flexible and responsive to a changing market. (Management/Strategic Networks)
Saxenian (1991) RP	A network is composed of long-term, trust-based partnerships that allow for informal information flow and mobility, blurring the boundaries between interdependent but autonomous firms. (Management/Supplier Networks)
Nohria and Eccles (1992) book chapter	A new type of organization that is radically different from the Weberian bureaucracy or market transactions... (with) properties as consisting of a fluid, flexible, and dense pattern of working relationships that cut across various intra- and inter-organizational boundaries... that are made possible by advances in information technologies... network organizations are not the same as electronic networks, nor can they rebuilt based entirely on them, both face-to-face and electronic networks (Organizational Behavior/Social Networks)
Larson (1992) ASQ	A set of inter-organizational and interpersonal relationships that creates social dimensions (personal relationships, reputation, trust, reciprocity norms) to the transactions and are central to the explanation of control and coordination in the exchange structure. (Organizational Economics/Social Networks)
Powell, Koput and Smith-Doerr (1996) ASQ	Cooperation with other organizations in order to serve as a locus of innovation because it provides timely access to knowledge and resources that are otherwise unavailable, while also testing internal expertise and learning capabilities. (Organizational Learning/Social Networks)
Dyer (1996) SMJ	Individual firms engaged in a narrow range of activities which are embedded in a complex chain of input-output relations with other firms. (Management/Strategic Networks)
Williamson (1996) book	The embeddedness matters to the transaction cost model because of the information and opportunities it offers and is considered in the institutional environment as a locus of shift parameters (TCE).

Appendix A: Continued

Westphal, Gulati and Shortell (1997) ASQ	Inter-organizational and interpersonal relations that based on the content of information dissemination through the relations affect the likelihood of adopting discrete innovations base. (Organizational Behavior/Social Networks)
Peteraf and Shanley (1997) SMJ	Meaningful collections of firms or substructures within an industry, which allows for amongst other information advantages to reduce uncertainty and cope with bounded rationality. (Management/Strategic Groups)
Gulati (1998) SMJ	A set of nodes (e.g., individuals or organizations) linked by a set of social relationships (e.g. friendship, transfer of funds, overlapping membership) of a specified type. This could include horizontally and vertically connected firms. (Strategic Networks)
Madhavan, Koka and Prescott (1998) SMJ	It is considered as a strategic resource that represents multiple dyadic relationships that interconnect and bind firms into networks, which supports alliances in terms of raw materials, information, technology, markets, or other crucial performance requirements. (Management/Strategic Networks)
Kali (1999) JLEO	Informal relationships that act as a substitute for reliable institutional support that guarantees written contracts. (Organizational Economics/Embeddedness)
McEvily and Zaheer (1999) SMJ	Social relations of social, economic and professional networks influencing economic actions. This concept explicitly considers the impact of network resources (bridging ties and linkages to regional institutions) on competitive capabilities of firms. (Strategic Management/Social Networks)
Ahuja and Carley (1999) OS	The virtual organization is a geographically distributed organization whose members are bound by a long-term common interest or goal, and who communicate and coordinate their work through information technology. (Network as a Virtual Organization)
Gulati (1999) SMJ	Firms are situated in multiplex inter-firm ties that can provide them with information about new business opportunities, which can be particularly valuable in a global setting. This context provides firms with valuable resources that enable them to form effective alliances. (Management/Strategic Networks)
Kraut, Steinfield, Chan, Butler and Hoags (1999) OS	A set of connected firms creating a virtual organization in which coordination is heavily dependent on telecommunications and data networks rather than physical travel. Given the fact that (1) production processes transcend the boundaries of a single firm and, as a result, are not controlled by a single organizational hierarchy; and (2) production becomes flexible with different parties involved at different times; and (3) the parties involved in the production of a single product are often geographically disperse. (Organizational Behavior/Electronic Networks)
Gulati , Nohria and Zaheer (2000) SMJ	Strategic networks encompass a firm's set of relationships, both horizontal and vertical, with other organizations – be they suppliers, customers, competitors or other entities – including relationships across industries and countries. These strategic networks are composed of inter-organizational ties that are enduring, are of strategic significance for the firms entering them, and include strategic alliances, joint ventures, long-term buyer-supplier partnerships, and a host of similar ties. (Management/Strategic Networks)
Baum, Calabrese and Silverman (2000) SMJ	Horizontal alliances, and vertical-upstream and vertical-downstream alliances, which provide efficient access to diverse information and capabilities with minimum costs of redundancy, conflict and complexity. (Alliance Networks)
Kogut (2000) SMJ	The pattern of relationships among firms and institutions, which involve complex governing rules by which innovations are collectively produced and shared. (Organizational Learning Networks)

Appendix A: Continued

Kenis and Knoke (2002) AMR	Organizational field network is the configuration of inter-organizational relations among all the organizations that are members of an organizational field. An organizational field refers to organizations, in the aggregate, constituting a recognized area of institutional life (DiMaggio and Powell, 1983), which is more than an industry (i.e., a set of equivalent organizations that produce the same product or service; Alter and Hage, 1993). Network is emphasized in terms of the value of information transmission and communication, which supports resource exchange, boundary penetration and sentimental attachments. (Organizational Field Networks)
Marketing	
Cook and Emerson (1978) ASR	An exchange network is a set of two or more connected exchange relations. Two exchange relations are connected to the degree that exchange in one relation is contingent upon exchange (or non-exchange) in the other relation. (Exchange Networks)
Johanson and Mattsson (1985) IJRM	Exchange relationships exist between production and distribution firms. Because activities are interdependent, coordination is based on not only market forces but also on time and resources involved in the relationship. (Industrial Networks)
Hakansson and Snehota (1989) SJM	It is an organization-environment interface that stems originally from causal observations that business organizations often operate in environments which include only a limited number of identifiable organizational entities (actors). These entities are involved in continuous exchange relationships with the organization with a complex set of interdependences (resources and activities). (Industrial Networks)
Hakansson and Johanson (1993)[1] Book	A set of directly connected business relationships that creates dependencies between firms and constitutes the context of the focal business relationship which gives each firm roles and means to develop and survive within the structure. Through networks firms know how and know who. (Industrial Networks)
Anderson, Hakansson and Johanson (1994)[2]JM	A set of two or more connected relationships (see Cook and Emerson, 1978), in which each exchange relation is between business firms that are conceptualized as collective actors. Business networks are to possess advantages that go beyond the sum of the involved dyadic relations. (Business Networks)
Hakansson, Havila and Pedersen (1999) IMM	A set of directly connected business relationships that creates dependencies between firms and constitutes the context of the focal business relationship which gives each firm roles and means to develop and survive within the structure. Through networks firms know how and know who. (Industrial Networks)
Ritter (2000) IMM	A set of interconnected relationships that affects itself and the two actors as well as other relationships. There is a set of effects ranging from positive to negative. (Industrial Networks)
Antia and Frazier (2001) JM	Formal networks among agents comprise consciously planned and designed sets of relationships, while informal network ties are spontaneous and shadow formally prescribed work flow and authority relationships. This suggests that individual relationships are embedded in a context of other relationships that could have governance implications. (Information Networks)

Note: The theoretical domain is in parentheses at the end of the definition. Acronyms of journals: AJS: *American Journal of Sociology*; AMJ: *Academy of Management Journal*; AMR: *Academy of Management Review*; ASQ: *Administrative Science Quarterly*; ASR: *American Sociology Review*; IJIO: *International Journal of Industrial Organization*; JBV: *Journal of Business Venturing*; JM: *Journal of Marketing*; ROB: *Research on Organizational Behavior*; RP: *Research Policy*; SMJ: *Strategic Management Journal*; SJM: *Scandinavian Journal of Management*.

Appendix B: Case Study Interview Protocol

a. Respondent's profile

- Function of the respondent
- Main activities of the respondent
- Time spent in the company and working in the current function

b. The company

- Name and date of establishment
- Core business and products
- Total number of employees and employees specifically involved in fixed-line channels
- Affiliations with auction cooperatives and associations
- Total sales of the firm and sales growth rate
- Current percentage of fixed lines in the total trading amount
- Strategy toward fixed lines
- Percentage of sales/purchases not using the auction clock in annual turnover
- Contractual form used in the fixed-line channels

c. Business network

- Types of organizations that are sources of valuable information (associations, agents of the mediation department of the auction cooperatives, other wholesalers, other suppliers etc…)
- Number of organizations that are sources of valuable information
- Proactive or reactive behavior towards these organizations
- Benefits of the information obtained from these organizations (networks)
- Frequency of contacts with these organizations
- The impact of the information on a specific fixed-line counterpart (i.e., buyer-supplier relationship)

d. Focal buyer-supplier relationship and performance

- Number of visits to the counterpart in the focal buyer-supplier relationship
- Procedure to order/sell products to this counterpart (telephone, fax, personally, etc...)
- Need for contracts
- How a typical relationship begins, is maintained and ends

Appendix B: Continued

- Reasons to terminate a relationship
- Attractive factors of the counterpart
- Impact of previous interactions with the counterpart
- Differences of trading behavior (more or less active) in product's off-seasons
- Criteria to first select a counterpart and to maintain the relationship as it evolves
- Tolerance towards failures
- Long-term or short-term orientation
- Necessary investments to deal with the counterpart (human and physical)
- Motivational programs
- Approach to deal with opportunism
- Approach to disagreements and conflict
- Vulnerability and balance in the relationship
- Belief in the contact person and the counterpart's firm
- Approach to planning (short-term and long-term)
- Characteristics of success and failure of the firm
- Mostly used indicators of firm and relationship performance (e.g., growth rate, profitability, operational performance)

Appendix C: The Florel Questionnaires

This appendix reports the items used in the questionnaires for respondents from the supplier and buyer companies. Respondents were asked to select a regular counterpart via fixed-line channel. We report the type of scales and Cronbach's alpha.

Supplier	Buyer
Business Network *(*5 different subgroups with 5 information benefits; 7-point Likert scale, "not at all"–"very much"*)*	**Business Network** *(*5 different subgroups with 5 information benefits; 7-point Likert scale, "not at all"–"very much")
- *First-tier suppliers network subgroup* $\alpha = 0.89$ We get information from first-tier suppliers, which supports us: 1. in defining prices of products for the selected buyer. 2. in defining quantities of products to sell to the selected buyer. 3. with the logistic operations of products that we sell to the selected buyer. 4. with the production process of the products that we sell to the selected buyer. 5. to foresee future actions of the selected buyer.	- *First-tier supplier network subgroup* $\alpha = 0.97$ We get information from first-tier suppliers, which supports us: 1. in defining prices and quantities of products that we buy from the selected supplier. 2. in defining quality of products that we buy from this supplier. 3. with the logistic operations of products that we buy from this supplier. 4. with the internal handling of the selected supplier's products. 5. to foresee future actions of this supplier.
- *Other suppliers network subgroup* $\alpha = 0.81$ We get information from other suppliers, which supports us: 6. in defining prices of products for the selected buyer. 7. in defining quantities of products to sell to the selected buyer. 8. with the logistic operations of products that we sell to the selected buyer. 9. with the production process of the products that we sell to the selected buyer. 10. to foresee future actions of the selected buyer.	- *Other suppliers network subgroup* $\alpha = 0.93$ We get information from other suppliers, which supports us: 6. in defining prices and quantities of products that we buy from the selected supplier. 7. in defining quality of products that we buy from this supplier. 8. with the logistic operations of products that we buy from this supplier. 9. with the internal handling of the selected supplier's products. 10. to foresee future actions of this supplier.
- *Other buyers network subgroup* $\alpha = 0.84$ We get information from other buyers, which supports us: 11. in defining prices of products for the selected buyer. 12. in defining quantities of products to sell to the selected buyer. 13. with the logistic operations of products that we sell to the selected buyer. 14. with the production process of the products that we sell to the selected buyer. 15. to foresee future actions of the selected buyer.	- *Other buyers network subgroup* $\alpha = 0.93$ We get information from other buyers, which supports us: 11. in defining prices and quantities of products that we buy from the selected supplier. 12. in defining quality of products that we buy from this supplier. 13. with the logistic operations of products that we buy from this supplier. 14. with the internal handling of the selected supplier's products. 15. to foresee future actions of this supplier.
- *Buyer's customers network subgroup* $\alpha = 0.95$ We get information from buyer's customers, which supports us: 16. in defining prices of products for the se-	- *Customers network subgroup* $\alpha = 0.92$ We get information from our customers, which supports us: 16. in defining prices and quantities of prod-

lected buyer.
17. in defining quantities of products to sell to the selected buyer.
18. with the logistic operations of products that we sell to the selected buyer.
19. with the production process of the products that we sell to the selected buyer.
20. to foresee future actions of the selected buyer.

- *Agents of the cooperative network subgroup* α = 0.91

We get information from agents of the cooperative, which supports us:
21. in defining prices of products for the selected buyer.
22. in defining quantities of products to sell to the selected buyer.
23. with the logistic operations of products that we sell to the selected buyer.
24. with the production process of the products that we sell to the selected buyer.
25. to foresee future actions of the selected buyer.

Physical transaction specificity α= 0.79 (7-point Likert scale, "not true at all"–"totally true")
1. In our company, we have made significant investments to deliver products to the selected buyer.
2. We have made significant investments to handle internally the products that are ordered by the selected buyer

Human transaction specificity α = 0.68 (3 items, 7- point Likert scale, "not true at all"–"totally true")
1. We have invested time and efforts to learn about the business practices of the selected buyer.
2. If we switch to another buyer we would lose a lot of investments that we have made to sell to the selected buyer.
3. If we decided to stop working with this buyer, we would be wasting a lot of knowledge regarding the buyer's method of operation.

Interpersonal trust α = 0.75 (7-point Likert scale, "not true at all"–"totally true")
1. Our company's contact person (purchasing agent) has always been evenhanded in negotiations with us.
2. In our company, we have faith in the contact person to look out for our interests even when it is costly to do so.
3. Our company's contact person is trustworthy.
4. In our company, we have faith in the contact person to look out for our interests even when it is costly to do so.
5. In our company, we would feel a sense of betrayal if the contact person's performance would be below my expectations. *(dropped after vali-*

ucts that we buy from the selected supplier.
17. in defining quality of products that we buy from this supplier.
18. with the logistic operations of products that we buy from this supplier.
19. with the internal handling of the selected supplier's products.
20. to foresee future actions of this supplier.

- *Agents of the cooperative network subgroup* α = 0.92

We get information from agents of the cooperatives, which supports us:
21. in defining prices and quantities of products that we buy from the selected supplier.
22. in defining quality of products that we buy from this supplier.
23. with the logistic operations of products that we buy from this supplier.
24. with the internal handling of the selected supplier's products.
25. to foresee future actions of this supplier.

Physical transaction specificity α= 0.80 (7- point Likert scale, "not true at all"–"totally true")
1. In our company, we have made significant investments to purchase products from the selected supplier.
2. We have made significant investments to handle internally the products that are purchased from this supplier.

Human transaction specificity α = 0.83 (3 items, 7- point Likert scale, "not true at all"–"totally true")
1. We have invested time and efforts to learn about the business practices of the selected supplier.
2. If we switch to another supplier we would lose a lot of investments that we have made to buy from this supplier.
3. If we decide to stop working with this supplier, we would be wasting a lot of knowledge regarding the supplier's method of operation.

Interpersonal trust α = 0.79 (7-point Likert scale, "not true at all"–"totally true")
1. Our company's contact person (purchasing agent) has always been evenhanded in negotiations with us.
2. In our company, we have faith in the contact person to look out for our interests even when it is costly to do so.
3. Our company's contact person is trustworthy.
4. In our company, we have faith in the contact person to look out for our interests even when it is costly to do so.
5. In our company, we would feel a sense of betrayal if the contact person's performance would be below my expectations. *(dropped after valida-*

dation procedure)	*tion procedure)*
Inter-organizational trust $\alpha = 0.83$ (7-point Likert scale, "not true at all"–"totally true") 1. We expect this buyer to be working with us for a long time. 2. The selected buyer has always been evenhanded in his negotiations with us. 3. The selected buyer may use opportunities that arise to profit at our expense. (Reversed scale) (*item dropped)* 4. Based on experience, we can with complete confidence rely on the selected buyer to keep promises made to us. 5. We are hesitant to transact with the selected buyer when the order specifications are vague. (Reversed scale) (*item dropped)* 6. The selected buyer is trustworthy.	**Inter-organizational trust** $\alpha = 0.78$ (7-point Likert scale, "not true at all"–"totally true") 1. We expect this supplier to be working with us for a long time. 2. The selected supplier has always been even-handed in his negotiations with us. 3. The selected supplier may use opportunities that arise to profit at our expense. (Reversed scale) (*item dropped)* 4. Based on experience, we can with complete confidence rely on the selected supplier to keep promises made to us. 5. We are hesitant to transact with the selected supplier when the order specifications are vague. (Reversed scale) (*item dropped)* 6. The selected supplier is trustworthy.
Joint action (7-point Likert scale, "not at all"–"very much") - *Joint planning* $\alpha = 0.70$ 1. Our company plans volume demands for the next seasons together with this buyer. 2. Our company plans the new products and varieties demands for the next seasons together with this buyer. 3. This buyer provides us with sale forecasts for the products our company sells to them. 4. Our company shares long-term plans of our products with this buyer. - *Joint problem solving* $\alpha = 0.87$ 1. This buyer and our company deal with problems that arise in the course of the relationship together. 2. This buyer and our company do not mind owing each other favors. 3. In most aspects of the relationship with this buyer, the responsibility for getting things done is shared. 4. This buyer and our company are committed to improvements that may benefit the relationship as a whole.	**Joint action** (7-point Likert scale, "not at all"–"very much") - *Joint planning* $\alpha = 0.85$ 1. Our company plans volume demands for the next seasons together with this supplier. 2. Our company plans the new products and varieties demands for the next seasons together with this supplier. 3. This supplier provides us with sale forecasts for the products our company sells to them. 4. Our company shares long-term plans of our products with this supplier. - *Joint problem solving* $\alpha = 0.89$ 1. This supplier and our company deal with problems that arise in the course of the relationship together. 2. This supplier and our company do not mind owing each other favors. 3. In most aspects of the relationship with this supplier, the responsibility for getting things done is shared. 4. This supplier and our company are committed to improvements that may benefit the relationship as a whole.
Flexibility to make adjustments $\alpha = 0.60$ (7-point Likert scale, "not at all"–"very much") 1. Our company is flexible in response to changes in the relationship with this buyer. 2. This buyer makes adjustments to maintain the relationship with our company. 3. When some unexpected situation arises, this buyer and our company work out a new deal.	**Flexibility to make adjustments** $\alpha = 0.70$ (7-point Likert scale, "not at all"–"very much") 1. Our company is flexible in response to changes in the relationship with this supplier. 2. This supplier makes adjustments to maintain the relationship with our company. 3. When some unexpected situation arises, this supplier and our company work out a new deal.
Performance - *Perceived satisfaction* $\alpha = 0.86$ (7-point Likert scale, "very unsatisfied"–"very satisfied") Indicate how satisfied you are with the following	**Performance** - *Perceived satisfaction* $\alpha = 0.91$ (7-point Likert scale, "very unsatisfied"–"very satisfied") Indicate how satisfied you are with the following

aspects of the relationship with the selected buyer over the last 12 months:
1. The order frequency over the year.
2. Quantities of products per order.
3. Communication quality with people of the selected buyer.
4. Prices paid by the selected buyer for our products.
5. Quality of their purchasing department.
6. The way in which problems are solved

- *Growth rate* (single item)

1. What was the development of your total sales volume over the last three years?

- *Profitability* (single item; 7-point Likert scale, "not at all achieved"–"totally achieved")

1. To what extent did you achieve the expected profitability with your pot plant business?

Control Variables

- *Length of business interaction* (single item)
1. How long have you been doing business with the selected buyer? (years)

- *Environment volatility and diversity* $\alpha = 0.58$ (7-point Likert scale, "not true at all"–"totally true")

1. We are often surprised by the sales forecasts of the Auction Coop.
2. We are often surprised by the instability of volume purchased by "all" of our buyers.
3. We are often surprised by the high volatility of prices of our products in the market.
4. There are many buyers for our products in the market. (Reversed scale) (*item dropped)*
5. There are many pot plant growers for similar products in the market.
6. Our buyers say that there are few immediate customers in the market for our products. (Reversed scale)

- *Firm size* (single item)
1. Could you select the range of your total sales? (five intervals: < 200 thousand euro; 200 – 400; 400 – 600; 600 – 800; > 800 thousand)

- *Counterpart size* (single item)
1. Could you choose the range of the selected buyer's total sales? (three intervals: < 500 thousand euro; 500 – 1 million; > 1 million)

- *Fixed lines* (single item)
1. Considering the total amount of product sales (in euro) over the year, please write down the percentage traded via fixed lines. (%)

aspects of the relationship with the selected supplier over the last 12 months:
1. Continuous supply over the year.
2. Offered assortment of products.
3. Communication quality with people of the selected supplier.
4. Prices of this supplier's products.
5. Quality of this supplier's products.
6. The way in which problems are solved.

- *Growth rate* (single item)

1. What was the development of your total sales volume over the last three years?

- *Profitability* (single item; 7-point Likert scale, "not at all achieved"–"totally achieved")

1. To what extent did you achieve the expected profitability with your pot plant business?

Control Variables

- *Length of business interaction* (single item)
1. How long have you been doing business with the selected supplier? (years)

- *Environment volatility and diversity* $\alpha = 0.68$ (7-point Likert scale, "not true at all"–"totally true")

1. We are often surprised by the sales forecasts. (*item dropped)*
2. We are often surprised by the instability of volume offered by "all" of our flower suppliers.
3. We are often surprised by the high volatility of prices of flower products in the market.
4. There are many suppliers for our products in the market. (Reversed scale)
5. There are many companies buying similar products that we need in the market.
6. There are many customers in the market for our flower products. (Reversed scale) (*item dropped)*

- *Firm size* (single item)
1. Could you select the range of your total sales? (seven intervals: < 25 thousand euro; 25 – 100; 100 – 200; 200 – 500; 500 – 1 million; 1 million – 5 million; > 5 million)

- *Counterpart size* (single item)
1. Could you choose the range of the selected supplier's total sales? (three intervals: < 1 million; 1 million – 5 million; > 5 million)

- *Fixed lines* (single item)
1. Considering the total amount of product sales (in euro) over the year, please write down the percentage traded via fixed lines. (%)

Appendix D: Baseline Statistics and Exploratory Factor Analysis of the Network Subgroups

Results of the exploratory factor analysis of the supplier sample.

	Components				
Network subgroups	1	2	3	4	5
Buyer's customers					
Monitor the buyer's actions	**0.901**			0.167	0.121
Coordinate production processes	**0.881**		0.185		0.189
Coordinate logistic processes	**0.878**		0.213	0.108	0.144
Define quantity	**0.874**		0.174	0.140	0.150
Set up price	**0.855**		0.169	0.109	0.176
Agents of the cooperative					
Monitor the buyer's actions		**0.882**			
Define quantity		**0.875**		0.106	
Coordinate production processes		**0.834**			
Set up price	–0.198	**0.832**			
Coordinate logistic processes		**0.816**			
First-tier suppliers					
Coordinate logistic processes			**0.855**		0.135
Define quantity	0.137		**0.853**		0.203
Set up price	0.164		**0.773**		
Monitor the buyer's actions	0.209		**0.765**	0.140	0.211
Coordinate production processes	0.173		**0.763**	0.141	0.215
Other suppliers (growers)					
Monitor the buyer's actions				**0.849**	0.136
Define quantity	0.168	0.180	0.151	**0.814**	0.178
Coordinate production processes	0.137		0.102	**0.808**	0.212
Set up price		0.109		**0.747**	0.106
Coordinate logistic processes	0.133	0.200	0.209	**0.730**	0.187
Other buyers					
Define quantity	0.163		0.123		**0.777**
Monitor the buyer's actions	0.213		0.102	0.139	**0.770**
Coordinate production processes	0.123		0.201	0.259	**0.751**
Set up price	0.159			0.172	**0.690**
Coordinate logistic processes			0.359	0.213	**0.636**

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations; b. For clarity, coefficient value smaller than 0.1 was suppressed; c. The total explained variance of the five factors was 73%.

Appendix D: Continued

Results of the exploratory factor analysis of the buyer sample.

	Components				
Network subgroups	1	2	3	4	5
First-tier suppliers					
Coordination of internal handling	**0.934**	0.162		0.128	0.157
Definition of price and quantity	**0.918**	0.175		0.158	
Coordinate logistic processes	**0.916**	0.189		0.161	0.148
Monitor the buyer's actions	**0.906**	0.204			0.188
Define quality	**0.887**	0.231		0.181	0.147
Other suppliers (growers)					
Coordination of internal handling	0.157	**0.853**	–0.105	0.161	
Define quality	0.213	**0.836**	0.140	0.144	0.266
Monitor the buyer's actions	0.288	**0.822**	0.109	0.123	0.155
Coordinate logistic processes	0.267	**0.814**	0.212	0.250	0.140
Definition of price and quantity	0.105	**0.812**		0.247	0.180
Agents of the cooperative					
Coordination of internal handling			**0.918**		0.116
Define quality			**0.916**	0.182	
Coordinate logistic processes			**0.890**		0.151
Definition of price and quantity		0.109	**0.831**		–0.132
Monitor the buyer's actions	0.136	0.146	**0.813**	0.147	
Other buyers					
Coordination of internal handling	0.133	0.149	0.160	**0.879**	0.204
Define quality	0.142		0.188	**0.860**	0.158
Coordinate logistic processes	0.216	0.240		**0.857**	0.160
Definition of price and quantity		0.154		**0.851**	
Monitor the buyer's actions	0.145	0.329	0.117	**0.724**	0.130
Buyer's customers					
Define quality				0.151	**0.900**
Coordinate logistic processes			0.111	0.222	**0.894**
Coordination of internal handling		0.107		0.192	**0.881**
Monitor the buyer's actions	0.275	0.308			**0.764**
Definition of price and quantity	0.239	0.296			**0.737**

Extraction method: Principal component Analysis. Rotation method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations; b. For clarity, coefficient value smaller than 0.1 was suppressed; c. The total explained variance of the five factors was 83%.

Appendix D: Continued

Correlation matrix of the BUYER SAMPLE (includes standard deviations and means)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1) Profitability	5.03	1.75	1.00																		
2) Perceived satisfaction	5.53	.94	–.11	1.00																	
3) Growth rate	13.86	18.80	.07	.12	1.00																
4) Joint planning	3.39	1.77	**.27**	.06	.05	1.00															
5) Flexibility	4.90	1.47	.04	.26	.12	**.57**	1.00														
6) Joint problem solving	5.66	1.40	.05	**.52**	.13	**.41**	**.63**	1.00													
7) Interpersonal trust	3.13	1.77	.02	.06	.10	**.50**	**.44**	.18	1.00												
8) Inter-organizational trust	3.32	1.69	–.03	.15	.11	**.62**	**.60**	**.31**	**.74**	1.00											
9) TSI, physical	5.36	1.05	–.12	**.78**	.08	.02	**.35**	**.57**	–.01	.05	1.00										
10) TSI, human	5.09	1.07	.14	**.40**	–.05	.17	**.26**	**.39**	.20	.20	**.51**	1.00									
11) Network subgroup of suppliers	1.94	1.41	.10	–.12	–.14	.17	.13	–.11	**.37**	.12	**–.26**	–.16	1.00								
12) Network subgroup of other suppliers	3.05	1.63	.08	–.21	.04	.22	**.31**	.01	.23	.23	–.14	–.15	**.47**	1.00							
13) Network subgroup of other buyers	3.12	1.64	.09	–.18	.07	**.28**	**.29**	.06	**.24**	**.26**	**–.24**	–.05	**.37**	**.47**	1.00						
14) Network subgroup of buyers' customers	3.72	1.96	.17	–.10	.02	**.39**	.35	.23	.22	**.37**	–.05	.14	**.36**	**.39**	**.38**	1.00					
15) Network subgroup of brokers	3.36	1.80	–.15	**–.26**	.01	.06	.07	–.04	.05	.18	–.20	–.15	.13	.19	**.27**	.08	1.00				
16) Length of business interaction	7.68	4.73	.01	.11	–.01	**.26**	**.29**	.16	.11	.05	.19	–.05	.17	**.34**	–.12	–.10	–.02	1.00			
17) Environmental volatility and diversity	4.06	1.08	**.25**	–.10	.22	.07	–.01	–.04	.02	–.12	–.18	–.05	.02	.06	.34	.01	.23	–.10	1.00		
18) Supplier size	6.13	1.40	–.08	**–.25**	.12	.03	–.12	–.15	–.14	–.15	**–.31**	–.23	.06	.02	.22	.09	**.26**	–.06	**.37**	1.00	
19) Buyer size	1.33	.54	.09	**–.26**	–.16	.08	.10	–.08	.11	–.07	–.11	–.05	.05	–.05	–.19	.03	.00	.16	–.16	–.02	1.0
20) % of fixed lines	58.2	31.8	–15	.08	–.16	.19	.09	**.26**	.06	.08	.17	–.02	–.17	–.03	**–.31**	–.16	–.12	**.33**	**–.36**	**–.25**	**.34**

Appendix D: Continued

Correlation matrix of the SUPPLIER SAMPLE (includes standard deviations and means)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1) Profitability	4.45	1.90	1.0																		
2) Perceived satisfaction	5.28	.99	**.36**	1.0																	
3) Growth rate	9.14	15.15	.18	.14	1.0																
4) Joint planning	2.88	1.38	–.04	**.23**	**.15**	1.0															
5) Flexibility	4.49	1.41	**.20**	**.45**	**.19**	**.45**	1.0														
6) Joint problem solving	5.63	1.37	**.16**	**.47**	**.19**	**.29**	**.58**	1.0													
7) Interpersonal trust	4.81	1.18	.14	**.46**	.07	**.29**	**.42**	**.52**	1.0												
8) Inter-organizational trust	5.31	1.16	**.29**	**.68**	**.18**	**.34**	**.57**	**.57**	**.63**	1.0											
9) TSI, physical	3.48	1.85	.04	**.16**	–.01	**.32**	.13	**.19**	**.18**	**.18**	1.0										
10) TSI, human	3.32	1.36	–.50	**.23**	–.05	**.40**	**.29**	**.26**	**.15**	**.36**	**.53**	1.0									
11) Network subgroup of suppliers	2.46	1.38	–.08	.01	–.09	**.28**	.08	.05	.11	.03	**.25**	**.26**	1.0								
12) Network subgroup of other suppliers	2.62	1.40	–.05	–.05	–.05	**.27**	.03	.09	.02	.02	**.18**	**.16**	**.29**	1.0							
13) Network subgroup of other buyers	2.91	1.40	.12	**.15**	–.10	**.34**	**.26**	**.18**	.11	**.17**	**.17**	**.25**	**.43**	**.44**	1.0						
14) Network subgroup of buyers' customers	2.70	1.73	.12	**.15**	.00	**.33**	**.22**	**.19**	**.15**	.130	**.38**	**.34**	**.39**	**.30**	**.40**	1.0					
15) Network subgroup of brokers	3.10	1.57	–.07	**–.23**	.06	–.00	–.05	–.10	–.13	–.12	**–.17**	–.06	.03	**.20**	.10	–.05	1.0				
16) Length of business interaction	8.41	5.61	.12	.12	**–.17**	–.06	.10	.13	.07	.14	.10	.04	–.04	–.09	.02	–.07	–.02	1.0			
17) Environmental volatility and diversity	3.56	1.10	**–.32**	–.13	.02	.04	**–.18**	–.11	–.08	–.12	.09	.02	.11	.14	–.01	–.03	.07	–.**19**	1.0		
18) Supplier size	4.11	1.20	.04	**.17**	.08	**.23**	**.26**	**.28**	.11	**.21**	**.23**	**.27**	.12	–.07	.13	**.16**	–.05	.12	–.12	1.0	
19) Buyer size	1.31	.70	–.04	.10	.05	–.02	.02	–.03	–.10	.02	.07	.12	.08	.09	.01	**.15**	**–.18**	–.01	.02	–.02	1.0
20) % of fixed lines	65.84	22.15	**.26**	**.36**	–.04	**.15**	**.29**	**.29**	**.26**	**.27**	.09	.12	.11	–.05	**.22**	**.27**	–.12	**.19**	**–.18**	**.15**	.13

Summary

No firm works in a vacuum. In the complex business world of today, information has become essential. Managers continually look for opportunities or challenges, using their relationships with other firms in their supply chains to obtain valuable information for their decision-making. We asked ourselves at the start of this research project: What impact does the information that flows in the business network have on a focal buyer-supplier relationship? Do managers in a long-term buyer-supplier relationship profit from the information that flows in the network? In other words, is there a positive relation between information from the business network and the performance of a firm involved in a long-term buyer-supplier relationship? Understanding how some buyer-supplier relationships are coordinated and succeed while others fail is perhaps among the essential questions for firms. To this end, we analyze the business network in terms of the information that firms can obtain from the total set of connected relationships (e.g., with first-tier suppliers and buyers' customers). This analytical perspective was triggered by Salancik (1995) and Nohria and Gulati (1994), who claimed that the network is a relevant factor influencing the coordination of a focal buyer-supplier relationship and consequently deserves special attention. The central research question of this study thus refers to the effect of a firm's network on a buyer-supplier relationship.

Central Research Question:

How does a firm's business network affect a focal buyer-supplier relationship?

The literature on long-term, close buyer-supplier relationship emphasize three conceptual elements: trust (Anderson and Narus, 1991), transaction-specific investments (Williamson, 1985) and the dimensions of collaboration (Morgan and Hunt, 1994), namely joint action (Zaheer and Venkatraman, 1995) and flexibility (Noordewier, John and Nevin, 1990). The specific question that this study tries to answer is whether the information that firms obtain from the business network supports these conceptual elements of buyer-supplier relationships. Moreover, the decomposition of the business network into subgroups of connected relationships (e.g., colleagues, first-tier suppliers) can allow firms to reduce redundancy and increase efficiency. These thoughts can be converted into two specific research questions:

1. How does the information from the business network affect trust, transaction-specific investments and collaboration in a buyer-supplier relationship and how does collaboration affect performance?

2. What is the impact of individual network subgroups on a buyer-supplier relationship?

By answering these questions, we can isolate information as the central benefit of a firm's network and consider this information as supportive in terms of safeguarding and coordinating the buyer-supplier relationship. A theoretical framework is developed on the basis of the schools of the business network, supply chain management, transaction cost economics, marketing channels and relational contracting theory. The complementarities of the schools are explored in order to develop the research hypotheses.

H1-H4: The more information a firm obtains from the network, the more the network will encourage transaction-specific investments, trust, joint action and flexibility to make adjustments in a buyer-supplier relationship.

H5-H6: The more the partners trust each other, the higher the degree of flexibility and joint action in a buyer-supplier relationship.

H7: The higher the degree of transaction-specific investments, the higher the degree of joint action in a buyer-supplier relationship.

H8: The higher the degree of flexibility, the higher the degree of joint action in a buyer-supplier relationship.

H9: The more joint action in a buyer-supplier relationship, the better the performance.

H10: The more flexible the partners are to make adjustments, the better their performance.

The theoretical framework was tested on the basis of empirical evidence from the two sides of the buyer-supplier relationship in the Dutch potted plant and flower industry. This industry is one of the most important Dutch agribusiness industries, generating half of the total production value of Dutch horticulture (over €3 billion) and accounting for more than 65% of world trade in flowers and plants (Ministry of Agriculture, 2001). Despite the fact that the Dutch auction clock system is world renowned, in recent years an increasing number of firms have shifted their trade from the auction clock, where buyers and suppliers have virtually no contact, to fixed lines, in which long-term and close buyer-supplier relationships are established. These changing relationships require merchant distributors and growers to change their spot-market mindset. Firms must now look for collaboration, in terms of creative problem solving, integration of activities and resources, and close contact with the counterpart. The shift away from spot-market exchange also entails a shift in approach to obtaining valuable information. In fact, there has been a change in structure and procedures for collecting information and dealing with the counterpart. There has also been an associated structural change in the form of more layers in the organizational structure and more complex interpersonal relations, not only with the counterpart's personnel but also with other organizations (Deneux and Luten, 2001). These changes have stimulated firms to replace short-term transactions by long-term, close buyer-supplier relationships.

The methodology for collecting data followed two constructive steps, where a combination of survey (quantitative) and case study (qualitative) was performed. Combining research strategies within a single project opens up opportunities for mutual advantages in each step of the design, data collection and analysis (Sieber, 1973). While the case study is "an empirical inquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used" (Yin, 1994: 13), the survey is generally characterized by large numbers of research units, labor extensive data generation, breadth rather than depth and quantitative data and analysis (Verschuren and Doorewaard, 1999).

Regarding the first research question, our study supports the hypothesis that the information obtained from the business network affects the conceptual elements of buyer-supplier relationships. In some cases, the information from the network directly encourages certain elements (transaction-specific investments, supplier's trust and flexibility), in other cases it encourages certain elements indirectly (joint action), and for still others it replaces the need for a certain element (buyer's trust). The hypothesized relations between the conceptual elements of the buyer-supplier relationship were mostly supported. Finally, there is evidence that collaborative relationships lead to improved firm performance. Interestingly, buyers and suppliers take distinct approaches to performance. While buyers tend to focus on the business network, TSI and joint action, suppliers value the business network, trust and flexibility.

The discussion of the network aggregation level formed the core of our second research question. We found that information from the downstream network subgroups (i.e., buyer's customers and

other buyers) encourages TSI, joint action and flexibility. The effects of the network on trust and joint action showed an intriguing pattern. While in fostering trust firms obtain information from the entire network, in encouraging joint actions the information from the downstream subgroups proves most essential. We speculate that the type of information required to encourage joint action is more objective and easily checked among members of the same subgroup than information that fosters trust.

Our theoretical elaboration aimed at cross-fertilization in combining the network theory and four schools of thought: supply chain management, transaction cost economics (TCE), marketing channels and relational contracting theory. We attempted to complement TCE's emphasis on TSI with trust-based arguments consistent with the relational contracting and marketing channels theory. In a similar manner, we complemented these schools with an information-based analysis of network theory. We emphasized the complementarities of these schools with network theory in developing our theoretical framework. To the network school, our study proved to be analytically important for the distinction between the dimensions of content (information) and source (subgroups) of the business network and moreover the careful delimitation of the network aggregation level.

The implications of our study are best viewed within the context of the current trend toward close, long-term buyer-supplier relationships. Quite often such close relationships are considered a desirable goal. We advise managers to contrast this viewpoint with our model. The basic postulate in our work is that a firm may coordinate relationships with a counterpart by means of collaboration and, in some instances, by trust and transaction-specific investments. However, this is not always desirable. In studied industry, buyers and suppliers have looked for channels to reduce product price and the unpredictability of volume and moreover to reduce bottlenecks in delivery. In this situation, there are enough advantages for firms to organize themselves – even making specific investments, as our research showed – and to set up collaborative relationships with certain counterparts. In the absence of competitive advantages, building relationships or networks involves investments of time and resources that might outweigh the benefits. For instance, given the costs associated with the shift away from spot-market exchange (e.g., the auction clock), the buyer-supplier relationship and the network are likely to be detrimental to performance. Our study should serve managers as a cautionary example about the conditions that evoke the need to craft and manage collaborative, long-term relationships and networks.

Samenvatting

In het hedendaags complexe bedrijfsleven wordt informatie steeds belangrijker. Managers zijn continu bezig met het zoeken naar nieuwe mogelijkheden en uitdagingen. Voor het nemen van beslissingen wordt zoveel mogelijk informatie verzameld van de ketenpartners. Inzicht in gebruik van deze informatie vanuit de bedrijfsnetwerkomgeving voor coördinatie van de koper-verkoper relatie is van wezenlijk belang. Bij de start van dit onderzoeksproject hebben we onszelf de vraag gesteld: Welke invloed heeft de informatie vanuit de omgeving op de koper-verkoper relatie? Halen managers die een lange termijn hebben voordeel uit de informatie die uit het netwerk komt? Naar het bedrijf toe vertaald wordt de volgende vraag gesteld: In het geval van een lange termijn verkoop-inkoop relatie, is er een positieve relatie tussen de informatie van het netwerk en de prestatie van bedrijf in een lange termijn relatie?

In dit onderzoek is gekeken naar informatie die bedrijven uit hun gehele netwerk kunnen halen (e.g., toeleveranciers van de verkoper en klanten van de kopers). Deze analytische benadering was gekozen naar aanleiding van onderzoek gedaan door Salancik (1995) and Nohria an Gulati (1994) die beweren dat het netwerk invloed heeft op de coördinatie van koper-verkoper relaties en derhalve in onderzoek meer aandacht verdient. De centrale vraag van dit onderzoek richt zich derhalve op aspect.

Centrale Onderzoeksvraag:

Hoe beïnvloedt het netwerk van een bedrijf een koper-verkoper relatie?

De literatuur op het gebied van lange termijn koper-verkoper relaties benadrukt in dit verband hiermee drie concepten: vertrouwen (Anderson and Narus, 1991), transactie-specifieke investeringen (Williamson, 1995) en de dimensies van samenwerking, flexibiliteit (Noorderwier, John and Nevin 1990) en gezamenlijke acties (Zaheer and Venkatraman, 1995). De meer specifieke vraag die dit onderzoek tracht te beantwoorden is, of de informatie die bedrijven halen uit hun netwerk deze drie concepten ondersteunen. Daarbij wordt door middel van decompositie van het bedrijfsnetwerk in subgroepen (e.g., collega's, toeleveranciers), ook gekeken of redundantie kan worden teruggebracht en de efficiëntie kan worden verhoogd. Daarom wordt in dit onderzoek naar de volgende twee onderzoeksvragen gekeken.

1. Hoe beïnvloedt de informatie vanuit het bedrijfsnetwerk vertrouwen, transactie-specifieke investeringen en samenwerking in een koper-verkoper relatie en hoe beïnvloedt de samenwerking de prestatie?

2. Wat is de invloed van de afzonderlijke subgroepen op een koper-verloper relatie?

Door het beantwoorden van deze vragen, zijn we in staat die informatie vanuit het netwerk te isoleren die ondersteunend is in de vorm van waarborging van de relatie en die de coördinatie ondersteund. Voor het beantwoorden van deze vragen is een theoretisch raamwerk is ontwikkeld. Bij de opbouw van het raamwerk is gebruik gemaakt van de volgende theoretische stromingen: bedrijfsnetwerk, ketenmanagement, transactiekosten, marketing kanalen, en relationele contracten theorie. Door het identificeren van complementariteiten tussen de stromingen zijn de volgende hypothesen opgesteld.

H1-H4: Des te meer informatie een bedrijf kan halen uit het netwerk, des te meer het netwerk de ontwikkeling stimuleert van transactie-specifieke investeringen, vertrouwen, gezamenlijke acties en flexibiliteit in een koper-verkoper relatie.

H5-H6: Des te meer partners elkaar vertrouwen, des te meer flexibiliteit er is en gezamenlijk acties er worden ondernomen in een koper-verkoper relatie.

H7: Des te hoger het niveau van transactie-specifieke investeringen, des te meer gezamenlijke acties er worden ondernomen in de koper-verkoper relatie.

H8: Des te hoger het niveau van flexibiliteit in de relatie, des te meer gezamenlijke acties er worden ondernomen in de koper-verkoper relatie.

H9: Des te meer gezamenlijke acties worden ondernomen in een koper-verkoper relatie, des te beter de prestatie.

H10: Des te flexibililer partners zijn in het maken van aanpassingen, des te beter de prestatie.

Het theoretische model is getest op data verkregen van zowel de koper als de verkoper zijde, in de Nederlandse potplanten- en bloemensector. De productiewaarde van deze sector is €3 miljard en vertegenwoordigd daarmee meer dan de helft van de productiewaarde van de Nederlandse plantensector, en vertegenwoordigt meer dan 65 % van de wereldhandel in bloemen en potplanten (Ministerie van Landbouw, Natuurbeheer en Voedselveiligheid, 2001). Ondanks het feit dat Nederlandse veilingklok wereldwijd vermaard is, hebben veel bedrijven hun handel verschoven van de klok, waar kopers en verkopers zo goed als geen contact hebben, naar vaste, lange termijn koop-verkoop relaties.

Dit vereist van de distributeurs en de tuinders dat zij hun instelling moeten veranderen. De bedrijven moeten ingesteld zijn op meer samenwerking met hun partner bij het vinden van oplossingen voor problemen, integratie van activiteiten en productiemiddelen en meer persoonlijke contacten. Deze verschuiving houdt ook in dat op een andere wijze waardevolle informatie moet worden verkregen. Deze verandering vindt plaats in de structuur en de procedures waarmee informatie wordt verzameld en hoe partners met elkaar omgaan. In samenhang hiermee is er ook een verandering geweest in de vorm het ontstaan van meerdere lagen in de organisatiestructuur, en meer complexiteit in interpersoonlijke relaties, met het personeel van de partner, maar ook met het personeel van andere organisaties (Deneux and Luten, 2001). Deze veranderingen hebben bedrijven gestimuleerd om korte termijn transacties te vervangen door ‘close’ koop-verkoop relaties.

De datacollectie werd op tweeërlei wijze gedaan, een enquête (quantitatief) werd gecombineerd met gevalsstudies (kwalitatief). Het combineren van twee strategieën in een project geeft de mogelijkheid de strategieën wederzijds te versterken bij zowel de collectie van data alsmede de analyse (Sieber, 1973). Waar de gevalsstudie “een empirisch onderzoek is waarin een hedendaags fenomeen in haar context wordt bestudeerd, waarbij de grenzen tussen het fenomeen en de context niet helder aan te geven zijn en meerdere bronnen worden gebruikt voor het verzamelen van bewijsmateriaal” (Yin, 1994: 13) en de enquête een methode is, gekarakteriseerd door grote aantallen onderzoeksobjecten, arbeidsintensieve data generatie en generaliseerbaarheid (Verschuren en Doorewaard, 1999).

Met betrekking tot de eerste onderzoeksvraag, de hypothese dat de informatie verkregen uit het netwerk de concepten van de koper-verkoper relatie beïnvloedt, wordt ondersteund door de empirische data. Uit de analyse blijkt dat deze beïvloeding zowel direct als indirect gebeurt. Toename van transactie-specifieke investeringen, vertrouwen van de toeleverancier en flexibiliteit wordt rechtsreeks gestimuleerd door informatie uit het netwerk. In het geval van het opzetten van gezamenlijke acties is de stimulatie indirect. Verder blijkt dat voor de koper informatie uit het netwerk het element van vertrouwen in de relatie vervangt. De relaties tussen

de concepten, beschreven in de hypothesen worden in de meeste gevallen ondersteund door de empirische gegevens. Met betrekking tot de prestatie van bedrijven, blijkt dat deze beter is voor bedrijven in collaboratieve relatie. Opvallend hierbij is dat prestatie door koper en verkoper anders wordt gezien. Kopers waarderen veelal op het bedrijfsnetwerk, transactie-specifieke investeringen en gezamenlijke acties. Toeleveranciers hechten veel waarde aan het bedrijfsnetwerk, vertrouwen en flexibiliteit.

Het aggregatie niveau van het netwerk vormde het tweede onderwerp van onderzoek. Uit het onderzoek bleek dat informatie van stroomafwaartse groepen van bedrijven in het netwerk (i.e., klanten van kopers en andere kopers) transactie specifieke investeringen, gezamenlijke acties en flexibiliteit stimuleren. De invloed van vertrouwen op gezamenlijke acties vertoonde een interessant patroon. Om vertrouwen te krijgen in de partner, zoeken bedrijven naar informatie. Uit het onderzoek blijkt dat hiervoor informatie vanuit hele bedrijfsnetwerk van belang is. In het geval van gezamenlijke acties blijkt dat met name informatie komende van subgroepen stroomafwaarts in het netwerk, dit soort acties stimuleert. Ons vermoeden is, dat informatie die stimuleert tot het ondernemen van gezamenlijke acties objectiever is, en dat deze informatie gemakkelijker gecheckt kan worden bij leden van dezelfde subgroep, dan informatie die stimuleert tot het opbouwen van vertrouwen.

Onze theoretische uiteenzetting beoogde kruisbestuiving door het combineren van netwerk theoretische stroming met vier andere theoretische stromingen: ketenmanagement, transactiekosten, marketing kanalen en relationele contracten theorie. We hebben getracht de invloed van transactie-specifieke investeringen op de relatie, welke sterk wordt benadrukt in de transactiekosten theorie, aan te vullen met de invloed van vertrouwen op de relatie, dit op basis van argumenten vanuit relationele contract en marketing kanalen theorieën. Op eenzelfde wijze, zijn deze stromingen gecombineerd met de netwerk theoretische stroming bij analyse van de invloed van de informatie vanuit het bedrijfsnetwerk. Bij het ontwikkelen van het theoretisch raamwerk is de nadruk gelegd op de complementariteit van de theorieën. Voor de netwerk theoretische benadering heeft ons onderzoek een bijdrage geleverd in de vorm van het aanbrengen van een onderscheid ten aanzien van de inhoud van de informatie en de bron (subgroepen) in het bedrijfsnetwerk, en de zorgvuldige afbakening van het netwerk aggregatie niveau.

De conclusies van ons onderzoek kunnen het beste worden gezien in het licht van de huidige verschuiving naar meer ‘close’ vaste koper-verkoper relaties. Door velen worden dergelijke relaties gezien als een soort van ideaal. Echter, wij adviseren managers om deze gedachte te spiegelen aan model getest in dit onderzoek. De hoofdstelling in van dit onderzoek is dat voor een bedrijf in koper-verkoper relatie, de coördinatie het beste gebaseerd kan zijn op samenwerking en, in sommige gevallen op basis van vertrouwen en transactie-specifieke investeringen. Dit is echter niet altijd het geval. In de sector waar het onderzoek werd uitgevoerd, keken kopers en verkopers naar kanalen om de productprijs en de onzekerheid in volume te reduceren, en het aantal knelpunten in de aanvoer te verminderen. In een dergelijke situatie zijn er genoeg redenen te vinden voor bedrijven om zich beter te organiseren – waarbij zelfs investeringen werden gedaan - en samenwerkingsverbanden aan te gaan met handelspartners. Echter, indien geen concurrentie voordelen zijn te behalen, is in zo’n situatie de investering in de relatie in termen van geld en tijd al snel groter dan het voordeel. Bijvoorbeeld, gegeven de kosten die de verschuiving van veiling klok naar vaste koper-verkoper relaties met zich meebrengt, zijn koper-verkoper relaties en het netwerk nadelig voor de prestatie van het bedrijf. Ons onderzoek zou managers alert moeten maken op condities die aanzetten tot het vormgeven en managen van lange termijn samenwerkingsrelaties en netwerken.

About the author

Danny Pimentel Claro was born June 21, 1972 in Santos, São Paulo State, Brazil. He graduated as agricultural engineer from Federal University of Lavras (UFLA), Brazil in 1995. While an undergraduate student at UFLA, he followed several management courses and experienced training programs in four large Brazilian agribusiness companies: Usina Santa Elisa (2nd largest Brazilian sugarcane processor of alcohol fuel and sugar in São Paulo), Fazenda Mitacoré/Bamerindus (large production unit of cereals: corn and soybean in Paraná), Viva Agro-Industrial Ltda (exporting production unit of melon in Rio Grande do Norte) and Cooperativa Agrícola Alto Rio Grande (large dairy cooperative in Minas Gerais). In the final three years of his undergraduate period, he was responsible for a research project that provided annual statistical reports about students' performance in secondary school and their performance at UFLA, as well as factor analysis with data of students' social and economic characteristics. CNPq awarded Claro a scholarship during these three years. Claro has presented the results of the research within the CNPq project at three conferences in Brazil, and two articles were published in Brazilian scientific journals (*Revista Ciência e Prática* and *Caderno de Administração Rural*).

In 1995, Danny worked as production manager at a Brazilian flower company located in Bragança Paulista, São Paulo. The company was an important player in Brazil's flower industry, producing roses and gypsophila. This experience enabled him to gain first-hand knowledge of the bottlenecks of the Brazilian flower industry, especially in terms of commercialization and marketing channels. Consequently, he carried out a study of coordination among companies in the flower industry. That study began in 1996, when he enrolled in the masters of science program – *strictu sensu program* – in the Business Administration Department at UFLA. His studies were partially financed by FAPEMIG and CNPq. Claro's MSc dissertation was successfully defended and accepted in October 1998.

In mid 1997, Claro and other colleagues founded AGE Consultants, Ltda. For AGE, he assisted and implemented management projects in several different agribusiness and non-agribusiness companies for some three years. His consultancies focused on management and information systems that offered detailed financial reports with valuable information for decision-making processes.

As lecturer, he was in charge of the basic course on accounting management at UFLA in the second half of 1996. The course was a requirement for the UFLA business administration undergraduate program. From 1997 to 1999, he taught basic statistics and accounting management at CNEC College in evening classes.

In November 1999, Claro decided to pursue his PhD degree at Wageningen University. He was granted a full scholarship from CAPES (Coordenação de Aperfeiçoament de Pessoal de Nível Superior, Brasil) under project number BEX 1257-98/6. Since then, he has been an assistant researcher supporting teaching and research projects in the Management Studies Group at Wageningen University. His project in Wageningen was developed in collaboration with Pensa (Programa de estudos dos negócios do sistema agroindustrial) at the University of São Paulo (USP). In 2001, he was involved in the Quality of Life research project coordinated by the Dutch Agricultural Economics Research Institute (LEI). This project dealt with business relationships in the organic coffee industry, and aimed at development of sustainable cross-border relationships between smallholders in Brazil and buyers in the Northwestern Europe.

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