

## Managing supplier relationships in a new product development context

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# Managing supplier relationships in a new product development context

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## Abstract

Organizations can no longer rely solely on their own resources to innovate and look for strategic interactions beyond their organizational boundaries, allowing them to improve the quality of their own internal resources by investing in core competencies while contracting out other knowledge domains. From a theoretical perspective the focus of research has shifted towards supplier relationship management (SRM) and early supplier involvement in new product development (NPD). Even though much research has been done in these areas, a more comprehensive study investigating the constructs that determine the quality of a relationship still has to be done. Furthermore, the existing research has largely focused either on the role of SRM with regard to NPD performance or on knowledge transfer and its impact on NPD performance. Research encompassing these two important aspects of the NPD process is still lacking. Thirdly, our study expands the field of research beyond the automotive industry, by focusing on consumer product industry. Lastly, how SRM affects knowledge transfer and in turn NPD performance has yet not been researched. Our findings confirm the positive relationship between relationship quality, knowledge transfer and NPD performance. Managing supplier relationships leads to a higher quality relationship which contributes to the performance of NPD projects. Secondly, a total of thirteen constructs have been identified to be decisive for the quality of a relationship. These constructs act on either an individual or organizational level. Our study underlines the importance of supplier relationship management in a NPD context and the developed research model can be used to predict the performance of a NPD project by measuring the quality of the relationship between buyer and supplier on these thirteen constructs.

**Keywords:** Supplier relationship management, new product development, early supplier involvement, inter-organizational relationship

## 1 Introduction

Firms increasingly rely on resources beyond their own to innovate in today's competitive environment. They look more for strategic interactions beyond their organizational boundaries, allowing them to improve the quality of their internal resources by investing in core competencies while contracting out other knowledge domains. From a theoretical perspective and a changing competitive landscape, the focus of research and practitioners has shifted towards supplier relationship management (SRM) and early supplier involvement in new product development (NPD). Much research has been done in these areas, however, a more comprehensive study investigating the constructs that determine the quality of a relationship still has to be done. The existing research has largely focused either on the role of SRM with regard to NPD performance or on knowledge transfer and its impact on NPD performance. Research encompassing these two important aspects of the NPD process is still lacking. Furthermore, our study expands the field of research beyond the automotive industry, by focusing on consumer product industry. Thirdly, how SRM affects knowledge transfer and in turn affects NPD performance has not been researched as well.

We have addressed this gap by conducting a literature review in the following four literature domains: supplier relationship management (SRM), new product development (NPD), early supplier involvement (ESI) and knowledge management. Based on this review a conceptual framework was

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developed to guide the empirical research into which main constructs determine the quality of a relationship and in turn NPD performance. We use a multiple case study, whereby the data is collected from multiple interviews in four cases in a Dutch consumer products organization. In this research mainly resource-based view (RBV) and Agency Theory is taken into account as these are the most comprehensive and appropriate to this research on supplier relationship management in a NPD context. These theoretical perspectives allow us to capture the richness of buyer-supplier relationship and provide an excellent basis to study a dyad.

Our study contributes to the existing literature in several ways. First of all, the positive relationship between relationship quality; knowledge transfer; and NPD performance is supported. This research provides the first holistic view on the dynamics of ESI in NPD projects, including it constructs determining relationship quality; knowledge transfer and NPD performance. The study identified thirteen constructs that appear decisive for the quality of the relationship. These constructs act on an individual or an organizational level; however, the individual constructs seem to make the difference here. This study has firmly underlined the importance of supplier relationship management in a NPD context. The effect of SRM does not limit itself to the up-side of NPD performance; a poor relationship will result in a decrease in NPD performance. Our research model can be used to predict the performance of a NPD project by measuring the quality of the relationship between buyer and supplier on these thirteen constructs. Lastly, the research model provides an excellent opportunity for research to further define and crystallize the dynamics depicted in this model.

The remainder of this paper is organized as follows. First, we review the literature on supplier relationship management in new product development to develop a research framework that delineates the relationship between supplier relationship quality, knowledge transfer and new product development performance. Hereafter, a description of the research methodology will be described, followed by extensive within- and cross-case analyses. We conclude the paper with a discussion of our scientific contributions and their managerial implications, as well as the limitations of the study and promising avenues for future research.

## 2 Theoretical Background

The pursuit of innovations is a crucial strategic process central to the development of competitive advantage and the management of supplier involvement in design and development can be posited as being a major and increasingly important strategic process (Croom, 2001). Establishing a successful buyer-supplier relationship is a key strategy to attain and increase competitive advantage (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012) as it enables the buyer (and vice versa) to gain benefits that are unlikely to come from traditional transactional relationships (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). The advantage of establishing relationships with suppliers and supplier integration is the potential optimization of the supplier's and customer's core competencies in NPD, thus allowing both parties to excel in performance (Zhao & Lavin, 2012). Thus, by managing suppliers effectively, the performance of the buying firm is more likely to increase (Cusumano & Takeishi, 1991; Lawson, Petersen, Cousins, & Handfield, 2009). In order to exploit this potential and increase the NPD performance, the relationship with the supplier has to be actively managed (Walter, 2003; Gemünden, Ritter, & Heydebreck, 1996; Håkansson & Snehota, 1989; Dyer & Ouchi, 1993).

In literature the outcomes of successful, high quality buyer-supplier relationships on NPD performance have been studied by many authors (e.g. Kale, Singh, & Perlmutter, 2000; Walters & Rainbird, 2007; Zsidisin & Ellram, 2001). From our literature review we have distilled a total of seventeen different outcomes resulting from this relationship. From these seventeen outcomes, there were a total of three outcomes which were mentioned most often and were characterized as being the most significant outcomes for the NPD process. These outcomes with their respective authors are depicted in Table 1.

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Insert Table 1 Here  
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Having showed these critical outcomes, it is important to discuss what the determinant factors are for the quality of a relationship. Within the extant literature a total of twelve different constructs have been identified as having a strong impact on the relationship quality. These are discussed below in order of magnitude of effect. The first five determinants prove to be most powerful in establishing a high quality relationship.

Firstly is trust: when buyers have high levels of trust in their suppliers and vice versa, they are likely to pursue more co-operative negotiation and open communication, which will benefit the NPD performance. Trust also increases the willingness to share information and knowledge (Bensaou, 1999; Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Dyer & Chu, 2011; Cantista & Tylecote, 2008; Lawson, Petersen, Cousins, & Handfield, 2009; Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003; Bunduchi, 2013). Communication is acknowledged as a determinant for the performance of buyer-supplier relationship. Without communication, there cannot be any relationship build-up. The performance of the relationships depends on the appropriateness and effectiveness of the communication (Knudsen, 2007; Kale, Singh, & Perlmutter, 2000; Sivadas & Dwyer, 2000; Walters & Rainbird, 2007; Knudsen, 2007; Sivadas & Dwyer, 2000; Lorange, Roos, & Brønn, 1992; Zhao & Lavin, 2012). Furthermore, information & knowledge sharing between the buyer and supplier and within the NPD project helps the generation and recombination of new and innovative ideas. This also improves the build-up of trust between the supplier and buyer (Bensaou & Venkatraman, 1995; Gadde & Snehota, 2000; Sivadas & Dwyer, 2000; Knudsen, 2007; Jap, 2001; Zsidisin & Ellram, 2001; Lawson, Petersen, Cousins, & Handfield, 2009). Cooperation and coordination improves the NPD performance. Furthermore, it strengthens the relationship between supplier and buyer. With help of coordination, the goals and operations of the two firms are more easily aligned (Bensaou, 1999; Gadde & Snehota, 2000; Dyer & Chu, 2011; Lawson, Petersen, Cousins, & Handfield, 2009). The last high impact construct is commitment. Commitment can be viewed as a perception or attitude towards a relationship that is expressed by certain actions, such as information sharing. Commitment improves the functioning of the relationship between the buyer and supplier. Mutual commitment creates opportunities within and outside the NPD project (Seppänen, Blomqvist, & Sundqvist, 2007; Barnes, Naude & Michell, 2005).

Besides these five constructs, there are several other which are not discussed in length but are included in the conceptual framework. These constructs are: Relationship-specific adaptations & investments (Dyer, 1997; Jap, 2001; Zhao & Lavin, 2012); satisfaction (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003); dependency & power (Gadde & Snehota, 2000; Wognum, Fisscher, & Weenink, 2002); flexibility (Zhao & Lavin, 2012); reputation (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012); loyalty (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012) and; relationship history (Handfield, Ragatz, Petersen, & Monczka, 1999; Zhao & Lavin, 2012). Strong inter-firm relationships have a positive impact on efficiency and on the effectiveness of the NPD process (Lin & Huang, 2013). It is shown, that whenever a buying firm intends to collaborate with a supplier in NPD processes, the quality of the relationship is of the utmost importance. From the studied literature can be concluded that the higher the quality of the relationship with a supplier is, the more likely positive outcomes of this relationship in the NPD process are attained (for both involved organizations).

Literature has acknowledged that knowledge transfer facilitates the generation of resources and skills essential for product innovation (Zhao & Lavin, 2012; Clark & Fujimoto, 1991; Clark, 1989). With the additional knowledge of a supplier, a buyer is more likely to generate new product ideas, develop them more quickly, resulting in higher NPD performance (Zhao & Lavin, 2012; Brown & Eisenhardt, 1995). Furthermore, the supplier can introduce ideas on how to improve product quality, improve manufacturability or ideas that contribute to the performance of the NPD process overall (Sivadas & Dwyer, 2000; Zhao & Lavin, 2012; Knudsen, 2007). Thus knowledge sharing increases the performance of the overall NPD project (Lawson, Petersen, Cousins, & Handfield, 2009).

The meta-analytic review of Van Wijk et al. (2008) shows that knowledge transfer is an enabler for organizations to generate new ideas for NPD. The combination of existing and acquired knowledge increases the organizational capacity for recombining and making new associations, which in turn has a positive influence on the NPD performance. The transfer of tacit knowledge is more important for NPD performance than the transfer of explicit knowledge (Hansen, 1999). This is to a large extent due to the fact that explicit knowledge is more imitable than tacit knowledge and therefore easier

accessible to all competitors (Croom, 2001). Based on our literature review can be concluded that an increase in inter- and intrafirm knowledge transfer is crucial to the performance on NPD processes. In high quality relationships knowledge sharing and transfer is facilitated. Whereas strong ties facilitate the acquisition of valuable knowledge, weak ties make greater amounts and diversity of information accessible to the firm. Both are necessary to increase performance of the NPD process in term of effectiveness, efficiency and innovativeness (Lin & Huang, 2013).

We have shown that the discussed concepts relationship quality, knowledge transfer and NPD performance are strongly related. The findings from the literature review are captured in the conceptual framework presented in Figure 1, which depicts the complex relations between relationship quality, knowledge transfer and NPD performance. The framework has served as a basis for the empirical research.

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Insert Figure 1 Here  
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### 3 Methods

#### 3.1 Research design

The research aims to provide knowledge that contributes to a successful intervention in order to change an existing situation. Following this aim, the research is defined as practice-oriented research (Verschuren & Doorewaard, 2010). We made use of a systematic research plan, which contributed to the quality of this research (Yin, 2003). Practice oriented research (Dul & Hak, 2008) refers to an unstructured set of problems with which the practitioner is dealing. Based on an extensive literature review and exploratory interviews a conceptual framework was constructed which provided guidance in the empirical research. The empirical research is case study based. We have employed a multi-case method and single unit of analysis, namely the dyad (the relationship between the supplying and the buying firm). This method is chosen as it is a particularly suitable research method when the research focus is i) a contemporary phenomenon and ii) where the boundaries between phenomenon and context are not clearly evident. Furthermore, a case study method can be advantageous in approaching the research questions when iii) the research is focused on “how” and “why” aspects and in the case when iv) the researcher has limited control over the phenomena. The multiple case design increases the possibility of generalizing findings in an analytical way (Yin, 2003). To assure reliability, a case study protocol was used and a case study database was developed (Yin, 2003). This is done to show that the operations of the study such as the data collection procedure can be repeated yielding similar results. Validity is ensured by establishing correct operational measures for the concepts being studied: definition of unit of analysis, operational concepts, use of multiple sources of evidence (to avoid potential sources of bias) and the establishment of a chain of evidence (Yin, 2003). Even more, different sources of information are triangulated to control for validity of the research. The external validity is assured by the replication logic in multiple case studies: the same data collection instruments and methods of analysis were used for the four cases involved and the differences between the companies are stated, providing the opportunity for researchers to establish a level of confidence in the soundness of the findings. The link that provides the basis for theory development can be found through “pattern-matching” (Yin, 2003) and “explanation building” (Yin, 2003). Pattern matching is done by comparing a pattern found through empirical research with the conceptual framework. The construction of an explanation is done by selecting relevant information, organizing it into categories and constructing an adequate explanation of the subject under study.

In this research, the approach is taken to select cases on basis of the comparability with the locus of the problem (i.e. company Alpha). Company Alpha was selected as it has requested to have these processes studied. The company is active in the consumer product industry and has over 100.000 employees with an annual turnover of over 10 billion Euros. To increase the measure of applicability and comparison, a set of criteria is defined (Verschuren & Doorewaard, 2010). Deliberate sampling of the four cases was applied, meaning that the cases were selected based on maximal variation of the dependent variable (Verschuren & Doorewaard, 2010), namely: successful relationship management. Based on experts’ opinions, the projects are selected within different organizations to represent: i) a

comparable industry; ii) similar organizational governance and; iii) the locus of the problem defined, company Alpha. The selection process is guided by the following criteria, as shown in Table 2.

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Insert Table 2 Here  
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Based on these criteria, four cases (regarding new product development) were selected for the empirical research. Two selected cases concern projects of business unit Kappa; Case 1 Gamma and Case 2 Delta. The other two cases are project of business unit Lambda; Case 3 Zeta and Case 4 Eta. All suppliers present in the cases are located in Asia, where the supplier for Case Gamma was the only internal supplier.

### *3.2 Data Collection*

The data were collected via interviews and desk research. Desk research served to explore the participating company Alpha and industry in which the four case studies are nested through non-scientific documentation. For the case study, the research has mostly been done by conducting interviews, combined with desk research. This case study research encompassed interviewing experts, business practitioners and employees from various functional areas. All subjects were selected as most appropriate informants because of their overall and in-depth knowledge of the project under research or because of their direct or indirect involvement in one or more of these projects. We have used informants from both actors (supplying and buying side) within a relationship. This qualitative approach is grounded on the aim unravel factors and conditions that enhance the performance of early supplier involvement.

The objectives of the interviews are twofold. The first objective is to learn about the company's vision and strategy towards ESI and supplier relationship management and how this translates to their operations. The second objective is to unravel relations between supplier relationship management and the performance of NPD projects. The last objective is to learn how the researched organizations and projects manage their supplier relationships in NPD projects. The goal of the interviews is to place the projects within the proper product and market related context and to identify the environment in which the supplier relationship under research were established.

To address the concerns on reliability of the data collection process, a priori developed data protocols are used (Yin, 2003). These protocols (based on the conceptual framework) identified a set of constructs and their logical relationships. They are used to guide field research and to provide a standard format for data coding. Furthermore, the research framework serving as basis for this research may be incomplete and might require extension and additions with so far unknown variables, which have not been identified with help of the literature review. On this basis, the framework is adjusted.

Desk research covered the literature review. In conducting the case study research, desk research consists of consulting company websites, non-scientific research reports, online databases and project documentation and reports. The case studies encompass interviewing business practitioners and experts. This qualitative approach is chosen because of the fact that the research aims to unravel relations between concepts and the implications for strategies adopted by organizations. These cannot be (easily) converted into a countable phenomenon.

Aside from insights gained through desk research, the project is described using insights from multiple interviews with project members; project leader; management; and the counterpart at the supplier. These interviews are guided by an interview protocol. This interview protocol is subject to tailoring to the interviewee and its function in the project when required. Within each interview the interviewees were asked to verify the conceptual framework. In total, 36 interviews were held which lasted on average around one hour. All interviews were taped and literally transcribed to text.

### *3.3 Data Analysis*

For the analysis of the data produced by the multiple case studies, the design of Yin (2003) is followed. This implies a review of theory and the development of the conceptual framework. After which the cases are selected and the data collected. For the analysis of the data, the program NVivo is used. This program allows for large quantities of qualitative data to be analyzed and allows for extensive pattern matching. It further helps to improve the rigor of this research. Each case is analyzed and described in a dedicated report. With these reports, a cross-case comparison is made. The

conclusions from this analysis impact the conceptual framework as described earlier. Lastly, the theoretical and practical implications are derived.

Van Aken, Berend & Bij (2007) have described a method to analyze qualitative data which is adopted for this research. The conceptual framework serves as input for this method. The data was analyzed on evidence and answers for the research questions posed in this research. The analysis focusses on three main aspects: i) the presence of the researched topics; ii) the presence of the proposed relations in the constructed framework; and iii) any mentions of new variables and relations. From the transcript, any relevant sections are selected and the irrelevant data is removed. After translating the text, the text is divided into evidence for the questions posed in this research and linked to the framework. By doing so, the collected data is used to present the four case studies. This analysis of data resulted in in-depth insight into our research questions, which in turn have paved the way to arrive at an explanatory framework describing the relationship between supplier relationship quality, knowledge transfer and new product development performance. Furthermore, this analysis has enabled us to determine the key constructs that determine supplier relationship quality.

## **4 Results**

### *4.1 Within-case Analysis*

#### **Case 1 Gamma**

Firstly, the Supplier selection was based on incomplete assumptions. Furthermore, Alpha had difficulties scoping the project, which led to incomplete and insufficient knowledge sharing with Item. Lastly, the issues that arose regarding communication, the lack of transparency of the processes of Item and the lack of quality assurance led to a change in sourcing model (CM), where an internal Supplier was responsible for production and Alpha designed and developed together with the Supplier the product. The Supplier was selected based mainly on the quoted price, which was the lowest and the fact that the Supplier is part of Alpha. Both project teams are satisfied with the relationship. During the project, the benefits of working with a Supplier which was familiar with Alpha's way-of-working soon proved. A communication structure was set up to guide all communication which greatly improved the quality and quantity of information sharing between the two organizations. This, in turn, contributed to the performance of the project. This structure was set up to counter the difficulties in the project caused by working on two locations. A strong sense of goal alignment existed within the relationship. This alignment was due to the early involvement of the Supplier in the project and the communication structure.

The face-to-face visits of the Alpha team to the Supplier were an effective way to build the relationship and keep the project aligned. Without these visits, the overall view is that the project would have shown less progress. Furthermore, both organizations trusted each other. An important effect of this trust was that the problem solving capacity was enhanced. The information and knowledge sharing was guaranteed by the semi-formal communication structure. This improved the relationship between the Supplier and Alpha as well as the performance of the project. Also, the presence of trust in the relationship allowed for better information sharing, in terms of openness and honesty. The project was effectively coordinated and both parties showed their cooperation. This was further ensured by the flexibility both organizations displayed.

It is remarkable to find that both parties made comments about each other for being committed to the project. Both companies pulled away committed resources from the project. This was frustrating for both companies. The Supplier had issues with the extensive procedures and the control processes in place. The Supplier did not directly see the benefit of this and regarded it mainly as cumbersome and as a cause for delay.

The fact that the relationship was good between the two parties proved to be beneficial for the knowledge transfer within the project. The explicit knowledge transfer was ensured by the communication structure and a similar way-of-working; the tacit knowledge transfer mainly took place during the visits of the Alpha team. Both proved to be vital for the overall performance of the project along with the good relationship.

The project has slipped a bit time wise, however, this is not due to the collaboration with the Supplier, but is caused by the difficulties in scoping the project at the beginning. Furthermore, the budget of the project has remained under control as the budget has only been exceeded with less than

one per cent. Lastly, the collaboration with the Supplier is not only successfully leading to a new product range, the input of the Supplier also helped with issues Alpha had within the project.

Implications for the research model are (i) confirmation of the positive relationship between relationship quality, knowledge transfer and NPD performance; (ii) the constructs trust; communication; information and knowledge sharing; cooperation and coordination; commitment; loyalty; flexibility; and reputation have been confirmed; (iii) the constructs relationship history; satisfaction; dependency and power; and relationship-specific adaptations and investments have not been confirmed; (iv) transparency was identified as an important construct for relationship quality.

### **Case 2 Delta**

The intention of Alpha was to buy the product off-the-shelf. However, the number of adjustments Alpha proposed for this product implied an ODM project instead of an OTS project. To start, the selected supplier was wrongly assumed to have the development capabilities needed. This assumption was largely based on the reputation of supplier, as being one of the largest plastic bag manufacturers in China. Furthermore, as the project was set-up as an OTS project, no engineer was allocated to the project. This strained the communication between Alpha and Supplier, as Supplier had no technical counterpart at Alpha to discuss solutions and difficulties with the requests of Alpha. The NPI-lead added to this that Alpha had not scoped the project well enough; Alpha did not have insights in this type of industry and manufacturers. In the selection of the supplier, the soft-skills of the supplier were largely neglected.

The communication was one of the main bottlenecks during this project. Alpha found it troublesome for the project that Supplier's engineers did not speak English, and the one person to speak English did not have the technical knowledge to be of any real value. This resulted in the two parties having a lot of communication, but without effect. According to Supplier, the project was not well coordinated; to them it was not always clear who was in the lead and who to address with their questions and remarks. The involvement of the CEO is seen by Alpha as a sign of commitment, but both organizations agree that this is not the right way to do a project. His involvement meant however, that problems during the project were solved a lot quicker than before and more effort was shown by the other project members at Supplier.

For Alpha, the failure to deliver and perform had a detrimental effect on the relationship. This caused Alpha to lose trust in Supplier as a development partner. Supplier, on the other hand, did trust Alpha, mainly based on their reputation. The issues regarding communication made the sharing of information a lot more difficult. In order to speed up the process, Alpha provided training to Supplier. As a result, Supplier thought Alpha to be very committed to the project. Alpha did not perceive Supplier as committed, due to a lack of performance. Alpha strongly got the feeling that they were not a highly valued customer for Supplier; the behaviors and attitude of Supplier enforced that feeling. Furthermore, the development processes of Supplier and Alpha were very different, which caused problems in aligning these processes and finding the right counterpart. The project ran smoother after the project leader had a chance to visit the supplier, four months into the project.

As a result of this strained relationship and collaboration, there was not much knowledge transfer in the project. Alpha tried, but the exchange of tacit knowledge was nonexistent. Eventually, explicit knowledge was shared, but only after great effort by Alpha.

The project was delayed to such extent that the targeted launch-window was missed, resulting in lost sales. The final budget has not been exceeded for this project; however the initial budget was exceeded by 300 per cent. This is because Alpha had to assign extra resources to guide Supplier through the development process.

Finally, the project was performed following the CM sourcing model. Alpha ended up designing and writing the specifications for the product and Supplier produced the product. This was a large shift, compared to the initial project goal. Nonetheless, the product has been launched in the market and is currently in mass-production. Both parties are very satisfied with the produced quality of the final product, but both are frustrated with the projects itself.

Concluding, implications for the research model are (i) confirmation of the positive relationship between relationship quality, knowledge transfer and NPD performance; (ii) the constructs trust; communication; information and knowledge sharing; cooperation and coordination; commitment; and loyalty have been confirmed; (iii) the constructs reputation; relationship-specific adaptations and



investments; relationship history; satisfaction; dependency and power; and flexibility have not been confirmed; (iv) transparency; attractiveness as a customer; and performance, capabilities and individual competencies have been identified as important constructs for relationship quality.

### **Case 3 Zeta**

This is a case where both Alpha and the supplier have indicated that they have a good relationship. Within the project both organizations were very much aligned. Even though the project did not always run without issues, these did not affect the relationship. Instead, the quality of the relationship positively affected the negotiations and the overall process of the project.

The capabilities of the supplier were not as developed as Alpha had assumed. Nonetheless, the quote of Supplier was so much lower than its competitors that Alpha immediately selected Supplier as the supplier. This decision was even further supported as Supplier was already involved in a previous project with Alpha that eventually was cancelled. Supplier already knew, more or less, that they were the most likely partner for this project. This reduced the leverage of Alpha to use in the negotiations. After the start, the project had to be paused in order for Alpha to re-negotiate the increased price. Many projects would have suffered from this action; however the relationship between Supplier and Alpha was of such quality that this effect was minimized.

Both parties were committed and trusted each other. This was created and reinforced by the open and honest communication between the two project teams. Furthermore, both the purchaser and the project leader had shown a lot of commitment by delivering what was promised. According to Supplier, Alpha had a very strong and collaborative team staffed to the project. Alpha stated that despite the supplier's team not being complete capable, that is was a strong team in terms of collaboration and effort.

The transparency and honesty during the whole project was crucial to keep the project running. The product has been released to the market, to the satisfaction of both Supplier and Alpha. Even though both organizations had to increase their investments in the development, the project resulted in a quality product and within the planned timeframe.

The implications for the research model are (i) confirmation of the positive relationship between relationship quality, knowledge transfer and NPD performance; (ii) the constructs trust; communication; information and knowledge sharing; cooperation and coordination; flexibility; and commitment have been confirmed; (iii) the constructs reputation; relationship-specific adaptations and investments; relationship history; satisfaction; dependency and power; and loyalty have not been confirmed; (iv) transparency; and performance, capabilities and individual competencies have been identified as important constructs for relationship quality.

### **Case 4 Eta**

The choice for the supplier was largely based on the fact that Supplier was also the supplier for the first generation product. Supplier currently holds the IP for the complete platform. Alpha did perform a market scouting for other suppliers, which resulted in a short-list of suppliers that were deemed more capable than Supplier. However, three major factors proved to be decisive in the supplier selection: firstly, the project was under a lot of time pressure, so preferably the supplier would already be included in the Alpha supplier base. Secondly, Alpha had experience in working with Supplier and lastly, Supplier provided the lowest quote on price. Even though there are still many quality issues, the assumption of Alpha was that they could train the supplier to achieve the desired level of quality.

Alpha experienced the relationship with Supplier as troublesome; as opposed to Supplier who found that they had a good relationship with Alpha. The interviewees on the Alpha team found that there was not much of a relationship with Supplier. The biggest challenge for Alpha was communicating. Without the presence of Alpha Asia the project would be impossible as the supplier could not understand or write English, or at most very limited. Furthermore, the supplier was not very responsive. To counter this, Alpha has set up a communication structure halfway in the project. Also the project leader at Alpha Europa was replaced by someone located in Asia. Being able to speak Chinese, this project leader helped improve the communication. It is remarkable that the supplier differs to a large extent from the view of Alpha. Supplier perceived Alpha as trustworthy and found that the communication did not was a problem at all. The fact that Alpha sent over engineers to train them is recognized by Supplier as a sign of commitment and did build trust. However, Supplier found

that Alpha did not communicate their quality standards well enough. The resulting delay decreased the satisfaction of Supplier with the relationship. Also, the suppliers thought that Alpha was unresponsive.

For Alpha the only way to have trust in this relationship is to have a written agreement. This is the start of the trustful relationship. No interviewee from the Alpha team mentioned that they trusted the supplier. Especially the project leader does not trust the supplier at all; he demands for all propositions and solutions of the supplier evidence and evidence of evidence. For him, the only way to gain his trust is to work exactly according to Alpha's way-of-working and to perform according to Alpha's standards. This is more or less in line with the view of the supplier. The project is a collaboration between two organizations and an agreement has to be in place. Other than Alpha, the supplier did mention that a good personal relationship between the two project teams could increase the performance of the project.

Both parties stated that the visits of Alpha to the supplier helped the progress of the project. The supplier found it especially valuable that Alpha paid them several visits, before and during the project. Furthermore, the relationship and collaboration was not very coordinated, causing misalignment between the two organizations. For instance, instead of having one action list visible to all project team, there were four different ones; one per location.

The issues regarding trust and communication have caused the information and knowledge sharing to become an issue as well, according to Alpha. The supplier does not share or have ideas about the product. The lead engineer, however, thought that the supplier showed willingness to learn and was committed to the project. The supplier had some concerns about the inflexibility Alpha showed regarding their procedures. They felt that Alpha expected them to adapt to the needs and demands of Alpha and to be flexible in allocating resources to the project and reacting to the changes in the project description. The supplier thought that if Alpha had shown the same flexibility and adaptations that the project would have run a lot smoother and the relationship between Supplier and Alpha would be better. It is remarkable to find that Alpha also found Supplier to be inflexible. It is even more remarkable to find that both organizations found that they both were very flexible themselves.

Both parties found that Alpha had assumed a very directive and demanding position in the project. This harmed the relationship and reduced the willingness of the supplier to cooperate. In turn, Alpha only assumed this position as their effort to train the supplier did not result in improvement and success, which increased the frustration at Alpha. Also the commitment suffered from this. Furthermore, Alpha feels that Supplier fails to deliver: on quality, but also regarding delivery and allocating resources to the project. Both organizations were unsure or negative about the reputation of the other. Supplier found that the reputation of Alpha consisted of demanding and rigid customer, with a lot of procedures and protocols; whereas Alpha found that the reputation of Supplier, which was not so good to start with after the development of the first generation, getting worse as they failed to deliver and meet the (quality) standards set by Alpha. Supplier, however, stated that it required a lot of effort and commitment to get familiar with Alpha's way-of-working.

Within the project team at Alpha there were very contradictory views on performance of the supplier and the relationship with the supplier. The purchaser and the lead engineer both found that the relationship with the supplier is important for the success of the NPD project and tried to establish some sort of relationship. The project leader, however, found that the supplier was hired to perform, which they failed to do. His attitude in the project influenced the relationship and the whole collaboration within the project. This resulted in a lot of interference of the purchaser to control the damages and de-escalate the issues at hand.

This troublesome relationship between Supplier and Alpha resulted in very limited knowledge transfer. Alpha tried to train the supplier in their way-of-working; however the communication issues decreased the effectiveness of these attempts. Even the sharing of explicit knowledge proved to be difficult, mainly due to the language barrier. The only instances where both parties felt that they were aligned and working together were during the visits of the Alpha team to the supplier. Both parties found that during these visits they were able to discuss the technical solutions and propositions and also share their thoughts on the project and collaboration. Even though Supplier owned the IP, Alpha thought that Supplier did not show any ownership during the project. Alpha would have trusted Supplier better if they had shown ownership.

The project itself performed very poorly. Both parties have agreed on that. There were a lot of quality issues and the project overall was delayed. Alpha has strong doubts about the development

capability of the supplier, which were already present at the beginning of the project, but now have only been increased. Also, the ineffectiveness of the communication has proved to have a negative effect on the project performance. Both organizations find that the result and performance of the project did not reflect the effort and time they invested in the project. Furthermore, the interviewees on the Alpha team agreed that if Alpha had scoped the project better, that a lot of difficulties could have been avoided. They also shared the same opinion when it comes to supplier scouting and selection. Alpha believes that it was wrong to let the selection be driven by the lowest quote and assume that they could educate the supplier to perform according their quality standard. The lack of transparency at the supplier side frustrated Alpha as they could not provide advice and evaluate the process of the supplier.

Overall, both parties are not satisfied with the final result. The project took too long to complete and even though the product has been released in the market there are still a lot of quality-issues to be resolved.

To conclude, implications for the research model are (i) confirmation of the positive relationship between relationship quality, knowledge transfer and NPD performance; (ii) the constructs trust; communication; information and knowledge sharing; cooperation and coordination; relationship-specific adaptations and investments; commitment; satisfaction; dependency and power; flexibility; and reputation have been confirmed; (iii) the constructs loyalty; and relationship history have not been confirmed; (iv) performance, capabilities and individual competencies has been identified as an important construct for relationship quality.

The results of the four cases are depicted in Table 3.

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Insert Table 3 Here  
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4.2 Cross-Case Analysis

Following the discussion and analysis of the individual cases, we present the cross-case analysis. Before doing so, we first summarize the case study results in Table 4.

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Insert Table 4 Here  
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The findings of the case studies show that the constructs that determine the quality of the relationship either act on an individual or organizational level. The results of the case studies imply that the effect of the constructs on the individual level can have greater impact on the quality of the relationship than the constructs on the organizational level. The constructs satisfaction; relationship-specific adaptations; reputation; and loyalty are identified to act on the organizational level. These constructs mainly play a role during supplier selection and contract negotiations. The constructs relationship history and dependency and power should be omitted in the final model. These constructs proved to be of very little value to the quality of the relationship and the success of the collaboration. The constructs trust; communication, information and knowledge sharing; cooperation and coordination; commitment and flexibility have all been confirmed as being decisive for the quality of the relationship between two organizations, these constructs act on the individual level.

As a result of the four case studies there are several constructs that can be added to the conceptual model. The first is transparency; in three of the four case studies transparency was identified as a contributor to the constructs trust and communication and thus the quality of the relationship. The construct transparency acts on an individual level, according to the interviewees. Secondly, the attractiveness as a customer is the other construct that can be added to the conceptual model. The findings of the case studies show that the attractiveness as a customer determines to a large extent the commitment shown in a relationship. This construct proves to be a determinant on the organizational level. The last construct that proves to be important to the quality of the relationship is the performance, capability and competencies of the counterpart and will be added to the organizational level.

In the Case 1 Gamma and Case 3 Zeta with a better quality relationship, the knowledge transfer was strongly present, for tacit and explicit knowledge. Case 2 Delta and Case 4 Eta with a lack of

knowledge transfer also appear to have a poor quality relationship present. This appears to confirm the relationship between the quality of the relationship and knowledge transfer.

The empirical research offers support for the positive relation between the quality of the relationship, knowledge transfer and the performance of the NPD project. Based on the quality of the relationship and knowledge transfer, the expectation would be that Case 1 & 3 would perform well and Case 2 & 4 would be underperforming. This expectation is met by the findings of the empirical research.

The cases appear to be confirming the relation proposed in the conceptual framework. The findings show that Case 1 & 3 both have a better quality relationship between Alpha and the supplier. Especially the constructs trust; communication; information and knowledge sharing; and cooperation and coordination are strongly present. This allowed for better quality and quantity knowledge transfer between the two parties. Eventually this resulted in both parties being satisfied with the result of the NPD project. Even though these two cases are not unanimously positive about the results, the overall result of these two NPD projects is positive. Based on these findings, it appears that the performance of these two cases can be explained by the quality of the relationship. It must be said, that the project Nevada has used an internal supplier, which partly explains the quality of the relationship.

To explain the (poor) performance of Case 2 & 4, it appears that a similar dynamic as in the positive cases is at work, yet with a negative connotation. Within Case 2 the relationship quality was poor, according to Alpha and the supplier. With nearly every construct Alpha and the supplier had a negative experience. For this project, the construct communication was identified as having a very negative effect on the relationship and the performance of the project. This also contributed to a strong underperformance regarding knowledge transfer within the collaboration, which resulted in a poor performance of the NPD project itself. The positive score on quality relates to the product in mass-production and is due to the experience of the supplier in manufacturing.

For Case 4, Alpha is of the opinion that the relationship with the supplier was of poor quality. Remarkably, this is contradictory with the findings of the supplier. The supplier feels that they have a good relationship with Alpha, mainly because of the commitment Alpha showed. Similar to Case 2, there was not much knowledge transfer during the project. Largely as a result of the quality of the relationship, the project did not perform well, exceeding both the schedule as the budget and eventually resulting in a poor quality product with which neither organization was satisfied.

These findings are used to construct the final research model, which is presented in Figure 2. Concluding, the four case studies have provided enough evidence to confirm the proposed positive relation between relationship quality, knowledge transfer and NPD performance.

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Insert Figure 2 Here  
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## 5 Conclusion

Within the current theoretical knowledge domains, much research has been done on the relationship between supplier relationship quality and NPD performance. Furthermore, many scholars have focused their research on the role of knowledge transfer and its impact on NDP performance. Research encompassing these two important aspects of the NPD process is still lacking. Besides this, even though much research has been down in these areas, a more comprehensive study investigating the constructs that determine the quality of a relationship between a buying and supplying organizations has not been carried out.

Furthermore, the focus lies mainly on the automotive industry, where the first research on supplier involvement has been done. Thirdly, how supplier relationship quality affects knowledge transfer and in turn affects NPD performance has not been researched as of this date.

To address this gap, we have empirically investigated which main constructs determine the quality of a buyer-supplier relationship. Moreover, this research has studied the dynamic relationship between supplier relationship quality, knowledge transfer and NPD performance. As a result, we have advanced the literature by confirming a positive relationship between supplier relationship quality,

knowledge transfer and NPD performance, besides determining the key constructs that determine the relationship quality between a buyer and supplier.

The findings of the four case studies were in line with our hypothesized conceptual framework. In two of the four cases the relationship between supplier and buyer was not optimal. The results of the NPD projects were sub-optimal as well; supporting poor quality of these relationships did affect the course of the project negatively. In the third case the relationship was of better quality and the NPD process yielded better quality products within the planned timeframe. This outcome again provides support for our hypothesized conceptual framework. The fourth case study also showed a better quality relationship. However the actual outcome of the project was disappointing. The findings show that this was not due to the collaboration with the supplier, but was rooted in the capabilities and culture at Alpha: during the project the requirements continuously shifted as a result of a lack of scoping and changing demands. This caused the project to be severely delayed and a strong rise in factory cost price.

The findings of the research have several theoretical implications. First of all, the positive relationship between relationship quality; knowledge transfer; and NPD performance is supported. This holistic view on the dynamics of ESI in NPD projects has not been provided in earlier research. The study identified thirteen constructs that appear decisive for the quality of the relationship between buyer and supplier. These constructs act on an individual or an organizational level. The constructs that mainly act on an individual level have proven to have the greatest impact on the relationship quality.

The first and foremost practical implication is that organizations with an ambition for ESI should actively manage supplier relationships in order to increase the performance of the NPD project. Organizations need not only focus on formal agreements (e.g. contracts), but also focus on managing the informal relationship with the supplier to maximally leverage the knowledge and capabilities of suppliers in their NPD projects. The personal capabilities in this respect of both the project manager and the purchaser are crucial here. By actively managing the supplier relationship, organizations can improve the knowledge transfer and accommodate the transfer of relevant functions.

The research framework can be used to determine the most effective way of managing supplier relationships in a NPD context. In heavyweight innovation projects with many involved suppliers, the buying firm should make use of the full research model in their approach, with a special focus on the constructs that are manifest on an individual level. For lighter weight NPD projects or project with fewer responsibilities for the supplier, the buying firm may opt for adapted simplified version of the research model where emphasis is put on the organizational constructs as this is the least extensive approach to successful supplier relationship management.

The study has shown that the capabilities of a project leader are decisive for the success of the supplier involvement. The behaviors of the project team proved to have a strong impact on the quality of the relationship with the supplier and the collaboration as a whole.

This study has firmly underlined the importance of supplier relationship management in a NPD context. The effect of SRM does not limit itself to the up-side of NPD performance; a poor relationship will result in a decrease in NPD performance. Our research model can be used to predict the performance of a NPD project by measuring the quality of the relationship between buyer and supplier on these thirteen constructs.

To conclude, our findings confirm that a positive relationship between relationship quality, knowledge transfer and NPD performance exists. Managing supplier relationships leads to a higher quality relationship which will contribute to the performance of NPD projects. Secondly, a total of thirteen constructs have been identified to be decisive for the quality of a relationship. These constructs act on either an individual or organizational level. Furthermore, a better quality relationship increases the problem capacity and flexibility of the collaboration. It allows for more knowledge transfer which results not only in more (innovative) ideas and solutions but also in the transfer of relevant knowledge, e.g. the understanding of certain tests or the interpretation of market developments. Our study has underlined the importance of supplier relationship management in a NPD context and the developed research model can be used to predict the performance of a NPD project by measuring the quality of the relationship between buyer and supplier on these thirteen constructs. These findings advance our understanding of the importance of supplier relationship management in new product development and its impact on NPD performance.

### 5.1 Limitations and future research

This research carries several limitations. Firstly, the case studies selected for this research are all within the context of one company and thus in a very limited context of industries. This introduces the possibility of context-specific findings. Our research should be replicated in other industries and organizations.

Second, the collected data was coded by one researcher. This researcher also conducted the interviews to collect the data. The fact that the interviewer is aware of the connotations of the interviews allows him to interpret the data more accurately. Nonetheless, this introduces the risk of biased coding. It would improve the reliability of the research to have two or more researchers to code the collected data. The concepts under study are complex phenomena and strongly linked to perception and interpretation. To eliminate bias possibly introduces at interpreting the findings, this research benefits from conducting it with more than one researcher.

Third, it would be interesting to develop the results of this research into testable hypotheses, which could be investigated by means of large-scale follow-up studies in the forms of a survey. This would provide the results of this research with statistical support. This would improve the validity and reliability of the results. Additionally, it would allow for additional analysis, such as investigating the differences across industries.

The relational set in the observation for this research is limited to one type of interaction (i.e. buyer-supplier relationships) and the firm level. Yet, as discussed in this research, dyadic relationships do not occur in a vacuum; they are part of network and context. The actors in a relationship interact simultaneously with more than one partner. This research has paid little attention to managing and balancing multiple network relationships. We recommend expanding the scope of the research beyond the dyad, to gain insight on SRM in a larger NPD context.

In order to gain more insights in the dynamics of a buyer-supplier relationship within a NPD project, conducting a longitudinal study would prove very valuable. This type of study allows for identification of key moments and events that prove to be determinant for the quality of the relationship, knowledge transfer and NPD performance.

The additional constructs that have been identified in this research, require verification and validation with regard to their role in buyer-supplier relationships. Especially the construct attractiveness as a customer/supplier is an interesting field of study, as this study shows preliminary results that it is a very powerful construct for the quality of a relationship.

Lastly, the research was conducted within the context of one organization. To increase the generalizability and value for the theoretical domain, this research could be conducted across several organizations, representing varying industries.

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## 7 Tables

**Table 1:** Main outcomes of buyer-supplier relationships

Outcome	Authors
<b>Increased product quality</b>	Cusumano & Takeishi, 1991; Zhao & Lavin, 2012; Petersen, Handfield, & Ragatz, 2005; Bunduchi, 2013; Wagner & Hoegl, 2006; Goffin, Lemke, & Szejczewski, 2006; Walter, 2003; Primo & Amundson, 2002; Madhok, 2002
<b>Reduced cycle time or time to market</b>	Zsidisin & Ellram, 2001; Zhao & Lavin, 2012; Petersen, Handfield, & Ragatz, 2005; Wynstra, Von Corswant, & Wetzels, 2010; Primo & Amundson, 2002; Bunduchi, 2013; Wagner & Hoegl, 2006; Madhok, 2002; Walter, 2003
<b>Reduced NPD costs</b>	Zsidisin & Ellram, 2001; Zhao & Lavin, 2012; Petersen, Handfield, & Ragatz, 2005; Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012; Wynstra, Von Corswant, & Wetzels, 2010; Primo & Amundson, 2002; Goffin, Lemke, & Szejczewski, 2006; Madhok, 2002; Dyer, 1997; Walter, 2003; Walter, Müller, Helfert, & Ritter, 2003

**Table 2:** Selection criteria for the case study

Selection criteria	Rationale
<b>Recency</b>	To take into account the dynamic nature of the industry To avoid memory retrieval problems
<b>Representativeness</b>	To gain insight in the most current state of affairs To minimize between case variance To avoid rare cases
<b>Maturity</b>	To increase generalizability To identify any influence of maturity on the NPD process and the collaboration with suppliers
<b>Type of innovation</b>	To identify any differences between radical and incremental innovation projects with regard to way of working and supplier relationship management

**Table 3:** Findings from the case study, based on conceptual framework

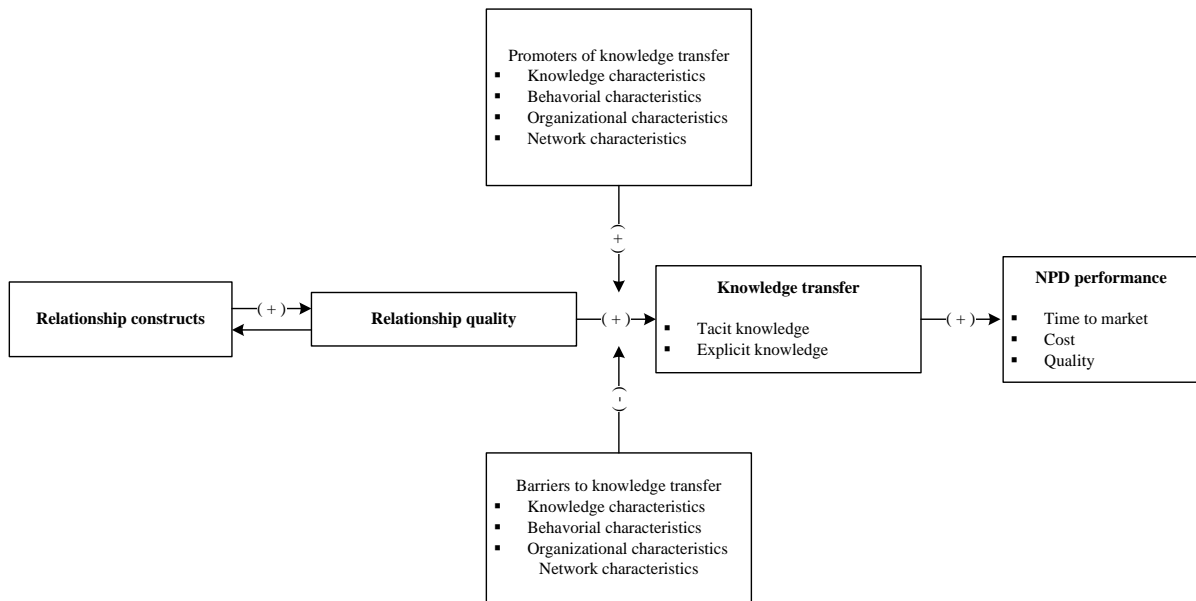
Construct	Experience			
	CASE 1 Gamma	CASE 2 Delta	CASE 3 Zeta	CASE 4 Eta
<b>Relationship Quality</b>	(o)/(+)	(-)	(+)	(-)/(+)
Trust	(+)	(-)	(+)	(-)
Communication	(+)	(-)	(+)	(-)
Information sharing & knowledge transfer	(-)/(+)	(-)	(+)	(-)

Cooperation coordination	&	(+)	(-)	(+)	(o)/(+)
Adaptations investments	&	(-)	(-)	(o)/(+)	(+)
Commitment		(-)	(-)/(+)	(+)	(-)/(+)
Satisfaction		(+)	(o)	(o)/(+)	(-)
Dependency power	&	(o)	(-)	(+)	(-)
Flexibility		(-)/(+)	(o)	(-)	(-)
Reputation		(o)	(-)	(o)	(-)
Loyalty		(+)	(o)	(o)	(o)
Relationship history		(o)	(-)/(o)	(o)	(o)
Additional findings	Supplier is part of Alpha and familiar with the way-of-working Transparency increased the quality of the relationship	Transparency would have contributed to trust and information and knowledge sharing Alpha felt unvalued as a customer	Both organization were very much aligned Ability to deliver was high	A large discrepancy between the perceptions of Alpha and the supplier on the relationship	
<b>Knowledge transfer</b>		(+)	(-)	(+)	(-)
Explicit knowledge		(+)	(-)	(+)	(-)
Tacit knowledge		(+)	(-)	(+)	(-)
<b>NPD performance</b>		(+)	(-)	(+)	(-)
Timing		(-)	(-)	(+)	(-)
Budget		(+)/(+)	(-)	(+)	(-)
Quality		(+)	(-)	(-)	(-)

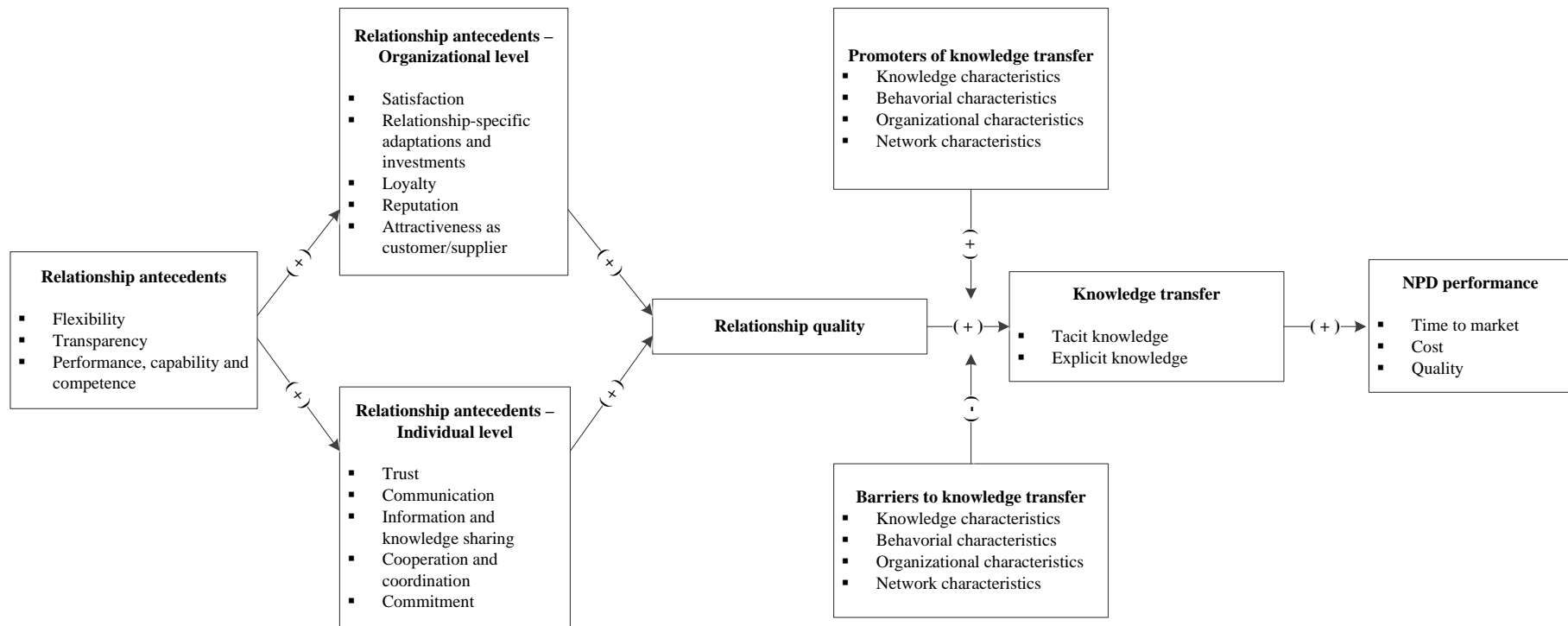
**Table 4:** Summary of the case study results

Elements	CASE 1 Gamma	CASE 2 Delta	CASE 3 Zeta	CASE 4 Eta
Relationship quality	(o)/(+)	(-)	(+)	(-)/(+)
Knowledge transfer	(+)	(-)	(+)	(-)
Performance of the NPD project	(+)	(-)	(+)	(-)

## Figures



**Figure 1: Conceptual framework**



**Figure 2:** Research model