MASTER

Managing supplier relationships in a NPD context

Sjoerdsmab, M.

Award date:
2013

Link to publication
MANAGING SUPPLIER RELATIONSHIPS
IN A NPD CONTEXT

by

M.D. (Maarten) Sjoerdsma

BSc Architecture, Building and Planning — TU/e 2010
Student identity number 0616232

in partial fulfilment of the requirements for the degree of

Master of Science
in Innovation Management

Supervisors:

Prof. dr. A.J. van Weele    TU/e, ITEM
Dr. A. Kastelein          TU/e, ITEM
Ir. P. Simmeren           Purive, Philips (a.i.)
Ir. F. Verheul            Philips, Global Foundries
TUE. School of Industrial Engineering.

Series Master Theses Innovation Management

**Subject headings:** supplier relationship management, new product development, procurement, early supplier involvement
ABSTRACT

Organizations can no longer rely solely on their own resources to compete and innovate in today’s competitive landscape. Rather, they look now 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. Many organizations tend to outsource non-critical activities, trim their supplier base and establish close relationships with suppliers deemed valuable for their NPD processes. Philips too realized that the resources for a competitive position do not solely reside within their own organization. Philips now aims to involve suppliers in an early stage in NPD projects in order to maximize the benefits of supplier involvement. However, it appears difficult to do so. Unlike the transactional approach, which Philips traditionally adhered to, supplier involvement does not solely rely on the exchange of a product part or material against a financial return. Instead, the transaction and interaction between suppliers and Philips in NPD must be primarily focused on the exchange of knowledge ideas, capabilities, skills and experience in order to expedite the rate and success of the innovation process. Practice and theory have shown that the right supplier relationship indeed facilitates and accommodates supplier involvement in NPD processes which subsequently results in a superior innovation performance.
MANAGEMENT SUMMARY

INTRODUCTION

Organizations can no longer rely solely on their own resources to compete and innovate in today's competitive landscape. Rather, they look now 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. This new strategic perspective is called Open Innovation, a phrase coined by Chesbrough (2003). Today it is not only universities, institutes and researchers that are potential sources for innovation: suppliers are being more and more involved in the new product development (NPD) processes as well. This shift in strategy requires a revision of the role of Purchasing and suppliers and the NPD process needs to be aligned. Many organizations tend to outsource non-critical activities, trim their supplier base and establish close relationships with suppliers deemed valuable for their NPD processes.

Philips too realized that the resources for a competitive position do not solely reside within their own organization. Therefore Philips instituted their Value Sourcing program, aimed at leveraging the knowledge and capabilities of suppliers in their NPD processes. Philips now aims to involve suppliers in an early stage in NPD projects in order to maximize the benefits of supplier involvement. However, it appears difficult to do so. Unlike the transactional approach, which Philips traditionally adhered to, supplier involvement does not solely rely on the exchange of a product part or material against a financial return. Instead, the transaction and interaction between suppliers and Philips in NPD must be primarily focused on the exchange of knowledge ideas, capabilities, skills and experience in order to expedite the rate and success of the innovation process. Practice and theory have shown that the right supplier relationship indeed facilitate and accommodate supplier involvement in NPD processes which subsequently results in a superior innovation performance.

However, this requires careful governance and relationship management from the client organization and Philips indeed has been struggling to manage supplier relationships in NPD. Here a multifactor analytical framework to manage the relationship with a supplier can help. Therefore such a framework has been used to study four actual development projects within Philips' Mother and Child Care (MCC) division. The question that is central to this study is as follows:

How can Philips MCC adapt its organization and new product development processes in order to manage supplier relationships in NPD projects in such a way that it effectively gives access to and utilization of the knowledge and capabilities of suppliers?

From a theoretical perspective this study fills a gap in the literature regarding supplier relationship management (SRM) and NPD performance. Prior research has identified a positive relationship between knowledge transfer and NPD performance; and SRM and NPD performance. This study aims to investigate the impact of SRM and knowledge transfer on NPD performance and to find the constructs that determine the quality of a relationship.

RESEARCH METHODOLOGY

Through an extensive review of literature rooted in four domains of research (SRM; NPD; early supplier involvement (ESI); and knowledge management literature), an overview of existing knowledge was obtained in terms of the determinants for a successful buyer-supplier relationship management and the NPD performance. The findings were used to construct the conceptual framework deployed in the empirical research (Exhibit 0-1).

The research design can be categorized as design-oriented and is conducted using two main theoretical perspectives being the Resource-based View and the Agency Theory. Furthermore, the study can be characterized as qualitative and explorative in nature. The empirical research is case study based: four cases
within Philips (within two different categories) were studied in retrospect. The multiple case-study design as proposed by Yin (2003) was followed. Deliberate sampling of the four cases was applied, data were collected through in-depth semi-structured interviews and a mini-questionnaire based on the conceptual framework. Every case is described using insights from approximately seven interviews. NVivo was used to analyze the qualitative data by the method described by Aken, Berend & Bij (2007).

**Research Model**

The findings of the case studies were used to transform the conceptual framework into the final research model (Exhibit 0-1). The model assumes a positive relationship between relationship quality; knowledge transfer; and NPD performance. Furthermore, it brings forward constructs that are decisive for the quality of the supplier-buyer relationship. These constructs act either on an individual or an organizational level. The greater the presence of these constructs, the higher the perceived relationship quality. A higher relationship quality has a positive effect on knowledge transfer within the buyer-seller dyad which will eventually result in a higher NPD performance. This expresses itself, for instance, in higher quality products; shorter time to market (TTM) and lower development/production costs. An elaboration of the implications of the model is given in the following sections.

**Conclusions and Findings**

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 Philips: 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.

These findings, along with the findings of the literature research have provided the input to answer our research questions. The study appears to indicate that Philips does not have sufficient capabilities to always successfully involve supplier in their NPD projects.

Philips MCC can manage supplier relationships in NPD projects more successfully and effectively by explicitly paying attention to the constructs depicted in Exhibit 5-1. To do so, Philips needs to make changes in its organization. Furthermore, Philips has to reconsider the role and responsibilities of all employees involved in the NPD process. Philips MCC needs to be flexible and transparent in their collaboration with the supplier. Furthermore, MCC needs to assess suppliers based on their performance, capabilities and competencies and not only on an initial low factory cost price.

On an organizational level, Philips need to focus on having a good formal relationship and understanding with a supplier as this improves its customer position in a number of ways. To affect this, Philips need to be willing to invest (in kind) and adapt to the needs and characteristics of the supplier.

Finally, on an individual level, Philips have to make sure that the constructs trust; communication; information and knowledge sharing; cooperation and coordination; and commitment are present within the personal Philips-supplier relationships. Philips need to have the right incentives to make sure that these constructs are in place and also need to verify the actual use of these constructs. Here it makes sense that the project leader is made explicitly responsible for managing the supplier relationship regarding the informal aspects and the purchaser is made responsible for managing the supplier relationship regarding the formal aspects.
THEORETICAL IMPLICATIONS

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 earlier. 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.

PRACTICAL IMPLICATIONS

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 buyer are crucial here. By actively managing the supplier relationship, organizations can improve the knowledge transfer and accommodate the transfer of relevant knowledge.

Summarizing, managing supplier relationships leads to a higher quality relationship which will contribute to the performance of NPD projects. Benefits include keeping the project on schedule and within budget and delivering higher quality products. Furthermore, a better quality relationship increases the problem solving capacity of the collaboration and its flexibility. 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.

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 projects 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.

Organizations should involve suppliers and members of the project even in the project definition phase. In this phase the project is scoped and the requirements are set, usually done by the marketing function in collaboration with the innovation lead. By involving not only members of the project team in this phase, but also potential suppliers, both organizations become much more aligned. The valuable input of the supplier can be directly embedded in the project scope and the quality of the supplier-buyer relationship will grow.

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. Management needs to keep this in mind when composing the project team.

By improving the (partly) outsourcing of product development, Philips MCC can focus better on the core products of their product portfolio, resulting in a more efficient innovation process. Furthermore, the input of the suppliers can be used to gain better market insights and adjust the innovation pipeline timely and accordingly.
# Table of Contents

**Abstract** ................................................................................................................................. 1

**Management summary** ............................................................................................................ 1

**Table of Contents** ................................................................................................................... v

**List of abbreviations** ............................................................................................................... vii

**Exhibits and tables** ............................................................................................................... viii

1 **Introduction** ............................................................................................................................ 1  
1.1 Research context .................................................................................................................... 1

2 **Research plan** ......................................................................................................................... 7  
2.1 Problem definition .................................................................................................................. 7
2.2 Problem statement .................................................................................................................. 7
2.3 Research objective .................................................................................................................. 9
2.4 Research questions ............................................................................................................... 10
2.5 Research methodology ....................................................................................................... 10

3 **Literature review** .................................................................................................................. 17  
3.1 Review procedure ................................................................................................................ 17
3.2 A gap in literature ................................................................................................................ 17
3.3 Theoretical perspectives ...................................................................................................... 18
3.4 Supplier relationship management ...................................................................................... 22
3.5 Knowledge transfer and knowledge sharing ....................................................................... 44
3.6 Supplier relationship quality and NPD performance ......................................................... 52
3.7 Knowledge transfer and NPD performance ....................................................................... 52
3.8 Conceptual framework ......................................................................................................... 53
3.9 Conclusion ............................................................................................................................ 55
3.10 Reflection ............................................................................................................................ 56

4 **Empirical research** ............................................................................................................... 59  
4.1 Case study 1: Nevada ............................................................................................................. 59
4.2 Case study 2: Microwave sterilizing bag ............................................................................. 68
4.3 Case study 3: Mare ................................................................................................................. 78
4.4 Case study 4: Grind and brew ............................................................................................. 88
4.5 Cross-case analysis ............................................................................................................... 101
4.6 Conclusion ............................................................................................................................ 113

5 **Final model** ........................................................................................................................... 115  
5.1 Relationship quality .......................................................................................................... 115
5.2 Knowledge transfer ............................................................................................................ 116
5.3 NPD performance ............................................................................................................... 116

6 **Conclusions** .......................................................................................................................... 119  
6.1 Conclusions ......................................................................................................................... 119
6.2 Theoretical implications ...................................................................................................... 122
6.3 Practical implications .......................................................................................................... 123
6.4 Limitations and directions for further research ................................................................. 127

7 **Bibliography** ......................................................................................................................... 129
Appendices

8.1 Organization chart Philips
8.2 Organization chart MCC
8.3 Purchasing at MCC
8.4 Sourcing models of MCC
8.5 List of interviewees
8.6 List of consulted documents of Philips
8.7 Ishikawa diagram
8.8 Cause and effect flowchart
8.9 Descriptive of the body of literature
8.10 Interview protocol
8.11 List of analyzed documents
LIST OF ABBREVIATIONS

AA Assignment Agreed
AT Agency Theory
BC Business Category
BG Business Group
BoM Bill of Material
CBV Competence-Based View
CL Consumer Lifestyle
CM Contract Manufacturer
CMM Commercial Marketing Manager
CO Commercial Organizations
CR Commercial Release
DCV Dynamic Capability View
DPT Design to Specification using Philips Technology
DTC Design to Technical Concept
DTS Design to Specification
ESI Early Supplier Involvement
H&W Health & Wellness
I&D Innovation & Development
IPD Integrated Product Development
IPL Integrated Project Leader
IPP Innovation Pipeline Planning
IR Industrial Release
ISE Innovation Site Eindhoven
KBV Knowledge-Based View
MCC Mother & Child Care
NPD New Product Development
NPI New Product Introduction
ODM Original Design Manufacturer
OEM Original Equipment Manufacturer
OHC Oral Healthcare
OTS Off the Shelf
PB Project Brief
PE Project End
PLC Product Lifecycle
PPC Project Plan Committed
PV Product Validated
R&D Research & Development
RBV Resource-Based View
Rfi Request for Information
RfQ Request for Quotation
RFV Relational Factors View
ROI Return on Investment
SRM Supplier Relationship Management
T&FC Technology & Function Creation
TCE Transaction Cost Economics
TTM Time to Market
VPD Value Proposition Development
EXHIBITS AND TABLES

LIST OF EXHIBITS

Exhibit 0-1  Research model.................................................................iv
Exhibit 1-1  Innovation pipeline as of June 2012 of Philips MCC adapted from (Philips, 2012b) .......... 2
Exhibit 1-2  Project types at Philips MCC constructed with data from project overview list (Philips, 2012e) .................................................................3
Exhibit 1-3  IPD process at Philips MCC (Philips, 2012f).................................4
Exhibit 1-4  Activities of the purchasing function during the IPD process at MCC (adapted from Philips, 2012f) .................................................................4
Exhibit 1-5  Sourcing models used for IPD projects at Philips MCC (source: Appendix 8.6 - IV)........ 6
Exhibit 2-1  Buyer/supplier behaviors negatively affecting trust within the relationship (adopted from Monczka, Carter, Scannell, & Carter, 2011) .........................................................9
Exhibit 2-2  Regulative cycle and reflective cycle adapted from Van Strien (1997) & Van Aken, 2004).... 12
Exhibit 3-1  The firm, dyadic and network level in a NPD context, constructed by author ................. 18
Exhibit 3-2  Spectrum of types of supplier-relationships, constructed by author ................................26
Exhibit 3-3  Process of Knowledge Management in organizations (Hislop, 2004).................................47
Exhibit 3-4  Conceptual framework depicting the relations between SRM, knowledge transfer and NPD performance, constructed by author ....................54
Exhibit 4-1  Ratings on the different constructs of case Nevada ........................................................ 68
Exhibit 4-2  Ratings on the different constructs of case MSB ............................................................. 78
Exhibit 4-3  Ratings on the different constructs of case Mare ............................................................ 87
Exhibit 4-4  Ratings on the different constructs of case Grind and Brew ......................................... 101
Exhibit 4-5  Frequency of mentions by the interviewees ................................................................. 104
Exhibit 4-6  Frequency of codings of the collected data ................................................................. 108
Exhibit 5-1  Final model ...........................................................................118
LIST OF TABLES

Table 2-1 Informants, selection criteria and rationale for the selection of appropriate cases and projects .............................................................. 13

Table 3-1 Outcomes of supplier-buyer relationships, compiled by author .................................................. 30

Table 3-2 Twelve constructs of supplier relationship management (adapted from Subramanian, Chandrasekaran, & Govind, 2010, compiled by author) ................................................................. 40

Table 3-3 2x2-matrix displaying the type and location of knowledge. Adapted from Hitt, Ireland & Lee (2000) ........................................................................................................................................ 47

Table 4-1 The main characteristics of case Nevada .................................................................................. 60

Table 4-2 The main findings of case Nevada .......................................................................................... 66

Table 4-3 The main characteristics of case MSB .................................................................................. 69

Table 4-4 The main findings of case MSB ........................................................................................... 76

Table 4-5 The main characteristics of case Mare ................................................................................ 79

Table 4-6 The main findings of case Mare ............................................................................................ 85

Table 4-7 The main characteristics of case Grind and Brew ............................................................... 89

Table 4-8 The main findings of case Grind and Brew .......................................................................... 98

Table 4-9 The main findings of the case studies ................................................................................... 107

Table 4-10 The main findings of the case studies – extended ............................................................ 110

Table 8-1 Number of publications per year .......................................................................................... 145

Table 8-2 Number of publications per source (top 10) ........................................................................ 145

Table 8-3 Number of publications per methodology .......................................................................... 146
1 Introduction

During the past three decades, the strategic importance of the supply side in companies has increased considerably. These changes can be interpreted as a shift from purchasing to supply management and are described in the light of many theoretical perspectives (e.g. Transaction Cost Economics (TCE); Agency Theory & Resource Based View). This shift is a manifest of the realization of organizations that sources for competitive advantage no longer solely reside within the boundaries of a firm and with an organization’s capabilities and resources. Instead, competitive advantage is more and more being sought in relationships and linkages between a firm and external organizations. This shift in strategy requires a revision of the functioning and role of purchasing and suppliers. This is confirmed by a prevailing tendency of organizations to more and more outsource non-critical activities; to reduce and trim their supplier base and establish close relationships with suppliers (and other external organizations).

These changes are widely regarded (by practitioners as well as scholars) as a reflection of a growing awareness of the role supplier relationships can play in the performance and competitiveness of an organization. The emphasis on these relationships can be seen as an attempt to exploit the potential embedded in these relationships and at suppliers. The involvement of suppliers in NPD and outsourcing to suppliers stems from focusing on core competencies and making use of knowledge and resources located outside the organization. Furthermore, the fast changing technological landscape and the increased complexity and diversity increases the difficulty for organizations to excel and stay at the cutting edge in several areas of technology at the same time. Stemming from TCE, it has been recommended to maintain transactional and discrete relationships with suppliers, so that independence and cost benefits are ensured. However, this view has been largely replaced by an emphasis on the benefits and positive outcomes to which close supplier relationships can contribute. Organizations, however, should remain vigilant on when to engage in closer relationships with suppliers, as they are resource-intensive to establish and they are not always appropriate for the situation. Practice has shown that close supplier relationships can result in superior performance; it requires careful deliberation from the buying organization and a rich analytical framework to manage the relationship with a supplier; the most critical element of a successful relationship is a company’s capacity to manage the relationship. This research focusses on the questions and issues tied to supplier relationships and collaboration and this shift in supplier strategy.

This research is conducted to a large extent at Philips Mother & Child Care (MCC), a business category of Royal Philips NV. Philips originally started as a lighting factory in 1891 in Eindhoven, The Netherlands. Today, headquartered in Amsterdam, Philips is a global diversified industrial company with sales of EUR 24.8 billion in the year 2012. With a multinational workforce of around 112,000 employees and an expenditure for research & development of EUR 1.8 billion (Philips, 2012a), Philips remains an important force when it comes to innovation. The mission of Philips declares the desire to improve people’s lives through meaningful innovation. The mission is accompanied by the vision to make the world healthier and more sustainable through innovation. Philips is organized in three sectors: Healthcare; Lighting and Consumer Lifestyle (CL). The business category (BC) MCC is part of the business group (BG) Health & Wellness which in turn belongs to the sector CL. The organization chart of Philips is depicted in Appendix 8.1 and 8.2. The remaining sections will further define the context in which this research will be conducted and provides a profile of MCC and its new product development (NPD) process.

1.1 Research context

1.1.1 Philips Consumer Lifestyle

As the mission of Philips calls for improving people’s lives through meaningful innovation, this most certainly holds for Philips Consumer Lifestyle. The strategy for the sector CL is to become a profitable and
leading player in health and well-being. The products developed at CL are highly visible to consumers and intend to have direct impact on consumers’ lives. The sector CL is built on two pillars, on one hand the Commercial Organizations (CO) and on the other Business Groups (BG). These two pillars are supported by the functions present in the sector. As the BC MCC is part of the BG Health & Wellness (H&W), the following Paragraph will discuss the organization and strategy of the BG H&W.

1.1.2 Health & Wellness

The business group Health & Wellness is committed to offer products, endorsed by professionals, which are regarded by consumers as the best choice over a lifetime. The BG H&W is, as the sector CL, divided into two pillars, CO’s and BC’s, supported by different represented functions. Currently, there are two BCs, BC Oral Health Care (OHC) and BC Mother and Child Care. As result of the search for new value spaces, the BC Pain Management is likely to be added to this list in the near future. The goal for BC MCC is to reach a turnover of [Philips, 2012c] (Philips, 2012c). This goal is to be achieved via i) increased market penetration; ii) broadening the innovation portfolio and iii) by geographic expansion (Philips, 2012b)(Philips, 2012b).

1.1.3 Philips Mother & Child Care

Mother & Child Care is one of the new businesses of Philips, alongside with Pain Relief and Skin Care. With this BC, Philips is expanding into a sector new to Philips. MCC’s brand name MCC originates from the acquisition of Avent Holdings Ltd. in September of 2006, paying around EUR 650M for the organization. At that time, MCC was a leading provider of baby and infant feedings products in the United Kingdom and the United States. This acquisition was done in light of the expected synergy between MCC’s reputation and expertise on mother and baby care and Philips’ strong association with healthcare and electronics. MCC is organized as shown in Appendix 8.2. Around 2011 MCC moved to Eindhoven to form together with Pain Relief and Skin Care the Innovation Site Eindhoven (ISE). As stated earlier the ambition for MCC to achieve a turnover of [Philips, 2012b] and to become the future global leader in infant feeding and basic child care. The current product portfolio is unable to sustain this growth, therefore MCC has designed and structured an innovation strategy with an accompanying technological roadmap to further expand their product portfolio, increase market penetration and achieve geographic expansion. Key in this strategy is i) the time to market (TTM) performance of the NPD projects (or increasing the pace of innovation), ii) focusing on reinforcing the core and iii) expanding into adjacencies (Philips, 2012b)(Philips, 2012b). MCC is an innovation site with a well-filled innovation pipeline and many running projects, as shown in Exhibit 1-1.

**Exhibit 1-1 Innovation pipeline as of June 2012 of Philips MCC adapted from (Philips, 2012b) (Philips, 2012b)**

Philips MCC is specialized on products focused on new mothers and babies. Their product portfolio encompasses three focus areas: i) infant feeding; ii) toddlers & soothers; and iii) monitors, health & food preparation. The products associated with these areas are, for example: breast pumps; drinking cups and
soothers. The product portfolio can be characterized as containing few electronics and consisting of relatively few components, generally between four to nine components. The product architecture is simple, compared to other products developed by Philips, for example the Senseo Sarista. Philips MCC has a very broad and diverse product portfolio, with different types of material use. The scale of production of MCC is low, according to Philips standards (e.g. volume is regarded as high\(^1\)). The following Paragraphs discuss the new product development process of MCC as well as the role of purchasing and suppliers in this process.

1.1.4 NEW PRODUCT DEVELOPMENT PROCESS

The product development process at MCC consists of three (often independent) phases: i) Innovation Pipeline Planning (IPP), ii) Technology & Function Creation (T&FC) and iii) Integrated Product Development (IPD). The total process structure is based on the product development process at Philips Drachten, home to the BC Shavers. The IPP phase is initiated to generate ideas and to provide input for the innovation roadmap for MCC. After the IPP phase and there exists a need for more research on technology or functions, the T&FC-phase is initiated. This phase can also be started without a preceding IPP-phase. Preferably, this phase (T&FC) is omitted as it means an increase in TTM and additional development costs. Subsequently, following the IPP phase or without preceding phases, the IPD phase is started. To gain insight in the operations of MCC the following exhibit (Exhibit 1-2) is presented. This exhibit shows the project profile of MCC. It is worth noting that by far the largest share of projects is IPD-projects. This means that most projects are aimed at developing and releasing a product on the market. On site, little (fundamental) research or function creation takes place. MCC is thus stronger linked with the customer and market side of the product development.

As IPD projects are most common at MCC, this phase is discussed more elaborate in the following section. The detailed view of the IPD process is shown in Exhibit 1-3.

The IPD process is based on the CL model for product development. It is a model designed for cross-functional product development. In order to provide: a common view on project status; a shared understanding; and to timely identify risks in proceeding with the project, an IPD project is split in different
phases and milestones. These milestones are used for decisions on corrective actions, to elicit deliverables and are of a “soft” nature, gates are used for decisions to pass, kill or postpone projects.

A project is initiated with a project briefing (PB) after which the phase project initiation (IPD initiation) is started. In this phase the consumer need and proposition are refined. The phase is concluded with the gate value proposition debriefing (VPD). This gate freezes the value proposition house and an initial requirements trade-off takes place. Assignment preparation is the second phase and is started to define the technical concept and the detailed requirements, resulting in assignment agreed (AA). AA freezes product functions, architecture and requirements.

EXHIBIT 1-3 IPD PROCESS AT PHILIPS MCC (PHILIPS, 2012f)(PHILIPS, 2012f)

The third phase is project confirmation. The initial design is created and checked and the project plan is created. This phase works towards the gate project plan committed (PPC) where the baseline and details for the design are committed. Even more, the project plan is frozen, budget for the tools is agreed upon and management commits to launch. For an IPD project, the gate PPC is the most important one. It provides budget and commitment to go ahead and work towards the launch of the product. The phase where the design is refined and validated is called product validation. Also, tools are made, tested and debugged in this phase. The milestone product validated (PV) is used to check the optimized and verified detail design. Once this milestone is passed the process verification phase is started. In this phase pilot runs are made and all product and process release tests are finalized, which will result in the milestone industrial release (IR) where the product and production process are released and the mass production is started. The second to last phase is called initial production in which the initial quantities of the product are produced and checked. This phase is concluded by the most important gate in the IPD-process, namely the commercial release (CR). Passing this gate constitutes product launch; shipping and selling the first products. This gate is followed by the phase mass volume ramp-up. Production and quality issues are solved in this phase and the documentation for the product lifecycle (PLC) management is created. The handover to product lifecycle management takes place after the milestone project end (PE) where the project is closed and documentation is handed over.

In this process only three IPD milestones are mandatory, namely VPD, PPC and CR and the phases in-between can be combined if appropriate. This model provides a guideline for the IPD process and relevant deliverables (per function) must be selected by the project manager. These projects (in the IPP, T&FC and IPD phase) are initiated by the innovation lead on site. Upon initiation a project team is constituted, with an integral project leader as the lead of the project. In the core of the project team the following functions can be represented: i) commercial marketing manager (CMM); ii) design team members; iii) innovation and design (e.g. lead engineer; development support engineer and/or technical communications representative); iv) purchasing project lead; v) new product introduction lead (NPI lead); vi) quality (e.g. quality project lead) and a vii) consumer care representative.

1.1.5 PURCHASING AT MCC

In this Paragraph an overview of the purchasing functions within Philips is given. Thereafter will be discussed how these activities of purchasing relate to the IPD process at MCC. Lastly, the different sourcing
models which are used at MCC will be discussed and an overview is presented which shows the frequency of sourcing models used at MCC, to provide insight in the role of suppliers in NPD projects within MCC.

Philips distinguishes various types of purchasing, for instance; i) strategic; ii) initial; iii) operational purchasing; iv) project; v) direct & vi) indirect purchasing. At MCC, the functions present are strategic and initial purchasing. Operational purchasing takes place usually in the product lifecycle management phase. Therefore, operational purchasing will be left out of consideration. The activities and responsibilities of the purchasing functions present in MCC are depicted in Appendix 8.3.

The purchasing department plays an important role in the product development process at MCC. To illustrate the responsibilities of purchasing the activities of purchasing are presented along the timeline of an IPD project. Note however that only the function specific actions are depicted, so team wide-decision making processes are omitted. Exhibit 1-4 shows an overview of the activities of the purchasing function during the IPD process at MCC.

Exhibit 1-4 shows the activities of the purchasing function. Following this, will be zoomed in on the selection of the supplier model which takes place between VPD and AA. This is done, because at this point an initial decision is made which proves decisive for the frequency of the contact between the supplier and MCC. So, with regard to the relationship between MCC and the supplier, this is a very important decision. It also is decisive for the IPD-process and the amount of resources (of MCC) that will be called on. MCC employs six outsourcing/supplier models which each come with different responsibilities. The various models are
presented in Appendix 8.4 and rank from most responsibilities held by MCC to most responsibilities held by the supplier. The characteristics of the various models are also depicted in Appendix 8.4.

At MCC the choice is often made for contract manufacturing as can be seen in Exhibit 1-5. However, ODM and OEM sourcing models are still selected quite often. This provides an additional task for the purchasing department, regarding supplier selection and supplier relationship management. The choice for a sourcing model has an impact on the role of the different project members or involved functions.

**Exhibit 1-5  SOURCING MODELS USED FOR IPD PROJECTS AT PHILIPS MCC (SOURCE: APPENDIX 8.6-IV)**

The previous sections have described the context in which the research is conducted. Philips MCC can be characterized by a great amount of IPD projects with a broad and diverse product portfolio.
2 RESEARCH PLAN

In this section the research plan is discussed. This is done according the following set-up: first the problem within Philips MCC is defined, which in turn provides input to define the research questions. Finally, the research model and methodology is presented, derived from literature and the organization and processes within Philips MCC.

2.1 PROBLEM DEFINITION

As discussed above, in this section the research problem with regard to the (early) supplier involvement in new product development (NPD) at Philips MCC is defined. First the problem statement as defined by Philips MCC (Ir. F. Verheul) is verified, after which adjustments are made and the definitive problem statement is described. From this problem statement the research questions are derived.

2.2 PROBLEM STATEMENT

At the start of this project, Philips MCC indicated a desire to not only decrease the costs of Innovation & Development (I&D), but also reduce the throughput-time of the I&D-process, by involving suppliers earlier and to a greater extent in the product development process and also leverage of supplier’s technical capabilities and expertise. This desire originates in the strong ambition for MCC to grow and expand its product portfolio.

To get grip on the current situation at and problem of Philips MCC and their new product development process, an Ishikawa-diagram (or cause and effect diagram) is constructed; see Appendix 8.7 & 8.8. In order to construct this diagram, interviews were held with employees of MCC involved with new product development projects (an overview of the interviewees is presented in Appendix 8.5). In doing so the initial problem statement is verified (Van Aken et al., 2007) by exploring its causes and effects. The results coming from desk research have also served as input for the Ishikawa-diagram, the list of consulted documents is presented in Appendix 8.6. This problem mess collected within the Ishikawa diagram is structured in five distinct categories. All NPD projects originate from MCC’s innovation strategy and therefore this strategy should be focused on ESI-efforts and more importantly: decision making. Secondly, this innovation strategy results in the organization of actual NPD projects. On top of the strategic intent of MCC, these projects involve many tactical and organizational issues. Subsequently, the role of purchasing captured in supplier selection is found to be important in this process. Furthermore, many issues occur in the domain of supplier relationship management. These causes and effects are discussed more elaborate in the following section.

Philips MCC’s innovation strategy

A significant finding with regard to the innovation strategy of Philips MCC is the lack of recognition of the importance of supplier collaboration in product development projects. Although Philips emphasizes the importance of innovation, Philips has many procedures in place to minimize risks and avoid liabilities. Secondly, MCC’s shows little engagement and conviction when seeking and setting up a project with regard to early supplier involvement. Besides that, MCC is a relative young site and in the process of maturing. Therefore several processes and protocols relevant for early supplier involvement are not (yet) in place. Thirdly, Philips MCC has, as a consequence of their ambitious turnover goal, a strong time-to-market pressure. So any slippage of time or failure to stay on budget, leads to increased pressure on management. This pressure leads to a lack in structured decision making regarding the initiation of new projects. Underperformance of a running project is countered by the ad-hoc start of a new product development project. This leads to increased pressure on the workforce, as they are assigned to more and more projects, to illustrate: a developer is on average involved in nearly four projects at a time (Appendix 8.6 - VI). Even more, there seems to be little structure present in the decision making process regarding the choice of sourcing model at the start of a new project. As a result, there are and have been several mismatches between sourcing model and selected supplier. One of the interviewees provided the following illustrative example:
“…at the start of my project, the choice was made to go for an ODM sourcing model. The assumption was made that the supplier we were in contact with at the time had sufficient development capacity to handle the development of this specific product. This, however, proved not to be the case and they failed to meet our extensive requirements. As a result, we lost three months project time, exceeded budget and ended up developing the product in-house.”

MCC’s innovation strategy leads to a very large number of running projects, projects to be precise (Appendix 8.6 – VII). The pressure on resources is very high, with very few people per project (e.g. sometimes even two employees per project). It must be noted however, that not all projects carry the same amount of work. So it is not possible to say that two employees involved both in four projects have the same workload. It does mean however, that it is very difficult for MCC to have strong conceptual people in all projects. This situation results in “unevaluated designs”, designs on which no calculations were done and the requirements are not analyzed. These projects often blow up and require extensive management attention.

The organization of NPD projects

The ad-hoc start of new NPD projects contributes to several issues with the organization of NPD projects. First of all, there is no structure or protocol at hand to guide supplier involvement. Secondly, as described in the previous section, the sourcing model is selected without clear defined criteria. The involvement of suppliers in the NPD process is often based on expected cost-savings; the goal, however, of this involvement is almost never defined. This unclear structure and decision making process leads to a lack of insight of requirements and responsibilities, for MCC as well as the involved supplier. Furthermore, MCC does not share their technological roadmap with their suppliers or even their partners. This choice, conscious or not, is not a sign of commitment of MCC towards their suppliers and partners. In this respect, MCC proves to be a conservative organization. Lastly, formal agreements between Philips and their supplier are put off till very late in the development process and volume projections fall short in nearly every project. Here again, Philips lets its conservative and risk-aversive side shine through and the trust between Philips and their supplier is negatively affected.

Supplier selection

Within the supplier selection process there are three main issues at hand. Philips is new to this market. As a result there is none to a limited supplier base present to select from for their current and future product portfolio. This, in combination with their relatively low volumes, leads to a lack of bargaining power. The third issue is a critical one. MCC has a lack of adequate selection criteria. Even though the sourcing model asks for an extensive involvement of the supplier in the NPD process, the selection of the supplier remains driven by factory cost price. There are several other selection criteria involved, however, price is a must. Philips requires development capacity from their supplier and develops the business case around this requirement. They are not willing to pay for this development capacity of their suppliers and thus still select on factory cost price. These three issues lead to a mismatch between the chosen sourcing model and the selected supplier and a low participatory rate of the supplier in the NPD process.

Supplier relationship management

First of all, MCC systematically underestimates the effort required to build and maintain a relationship with a supplier. There exists an assumption that with a good contract a good relationship is ensured. This has shown in the interviews and the lack of documents found regarding this topic. Illustrative for this attitude is Philips continuously trying to push risk onto their suppliers. While doing so, Philips still expects a fully committed and engaged supplier. As Monczka et al. (2011) state, trust is important in the relationship between supplier and buyer. Monczka et al. (2011) define several actions and aspects that undermine trust
within this relationship, as shown in Exhibit 2-1. Philips MCC does not perform well when it comes to building of trust, as MCC tries to push risk onto its suppliers, is characterized by volume forecast shortfalls, focuses on price when selecting innovative suppliers and does not have enough resources to staff all projects sufficiently. All these factors negatively influence trust and the build-up of trust within the relationship.

EXHIBIT 2-1  BUYER/SUPPLIER BEHAVIORS NEGATIVELY AFFECTING TRUST WITHIN THE RELATIONSHIP (ADOPTED FROM MONCZKA, CARTER, SCANNELL, & CARTER, 2011)

Secondly, Philips’ supplier selection criteria are driven by factory cost price, which often leads to Asian suppliers. The geographical and cultural differences between Philips and their suppliers give cause to i) a language barrier and ii) a lack of face to face meetings. This increases communication difficulties throughout the projects. Even more, Philips fails to internally agree on responsibilities regarding communication with the supplier. This causes that throughout a project varying communication channels are used. These issues with communication also give rise to a lack of trust between Philips and the suppliers. A remarkable finding from the interviews was that only one (!) Integrated Project Leader (IPL) was satisfied with his supplier relationship. It is notable that this supplier is one of the few European suppliers in MCC’s supplier base. This IPL acknowledged that the location of the supplier enabled him to actively build and maintain a relationship with this supplier through i) frequent visits (face-to-face meetings) & ii) direct communication.

The core of the issues is that Philips does not have processes in place to stimulate active supplier relationship management. Furthermore, Philips continues to nourish a culture which is risk averse, close-tongued and less committal. Because of this, their relationships with suppliers are of poor quality and lack effective knowledge transfer. Ultimately, these issues have a direct and indirect negative effect on the chance of success of the innovation process and culminate in i) project delays; ii) increased pressure on resources & iii) additional (development) costs.

What can be concluded is that

*the new product development processes suffer from inefficiency and ineffectiveness.*

This inefficiency and ineffectiveness can be translated into problems such as

*increased pressure on resources; project delay and additional (development) costs.*

The following Paragraph will use this problem statement as input to construct the research objectives and the research question.

2.3 RESEARCH OBJECTIVE

The research objective is to make recommendations to the management team of MCC and to the purchasing department within MCC. These recommendations will be regarding how to improve the organization in order to manage supplier relationships in NPD projects successfully. This objective is pursued by: i) conducting literature research; ii) case study research and; iii) designing an intervention.
2.4 Research Questions

With help of the overview of problems provided in the Ishikawa diagram and the problem statement, the research questions are defined. Following the conclusion of the preceding section, the problem within Philips MCC seems that although there is a clear desire to make better use of the knowledge and capabilities of their supplier, the enabling organizational structure, culture and procedures are not yet defined and in place. This problem statement forms the basis for the following central research question:

*How can Philips MCC adapt its organization and new product development processes in order to manage supplier relationships in NPD projects in such a way that it effectively gives access to and utilization of the knowledge and capabilities of suppliers?*

In order to provide a grounded answer to this research question, a set of more specific research questions need to be addressed first. These research questions all fulfill the requirements of efficiency or structure and a steering function (Verschuren & Doorewaard, 2010).

a. *By synthesizing the existing literature, the following questions will be answered:*

RQ1: How is supplier relationship management (SRM) in NPD defined?

RQ2: What are the key determinants regarding supplier relationship management that affect NPD performance?

RQ3: What are the goals that can be attained with SRM in a NPD context?

RQ4: What is the role of knowledge and knowledge transfer regarding NPD performance?

b. *By collecting and analyzing empirical evidence, the following questions will be answered:*

RQ5: In the current NPD-projects, how does Philips manage supplier relationships?

RQ6: What are the key determinants regarding best practices of supplier relationship management?

c. *By comparing and combining the findings from literature and from the empirical evidence, the following questions will be answered:*

RQ7: What aspects are important in managing supplier relationships in NPD projects successfully?

RQ8: In which way should these aspects be organized at Philips MCC in order to set up a best practice on managing supplier relationships in NPD projects?

2.5 Research Methodology

The research aims to provide knowledge and information that can contribute to a successful intervention in order to change an existing situation. Following this aim, the research can be defined as practice-oriented research (Verschuren & Doorewaard, 2010). Argumentation for the selected approach is provided in Paragraph 2.5.1. The paragraphs 2.5.2 till 2.5.4 describe the selection criteria for the cases, and how data is collected and analyzed.

By making use of a systematic research plan, the quality of this study will be enhanced (Yin, 2003). The term practice, as in practice-oriented research and in exploration of practice (Dul & Hak, 2008), does not refer to an already specified problem to be solved, but rather to the yet unstructured set of problems with which the practitioner is dealing. One of the aims of exploration of practice is to identify in that set one or more specific knowledge needs that need to be addressed. With an intervention cycle (Van Aken et al., 2007) the practitioner’s challenges and corresponding knowledge needs are prioritized. Practice and design oriented research begins with the general aim to provide the practitioner with some knowledge that he might need in order to act, and after successful exploration, a more specific knowledge need can be formulated. Aim of exploration for practice-oriented research:
a. To specify the problem as precisely as possible;
b. To identify its current phase in terms of the intervention cycle;
c. To identify knowledge needs;
d. To prioritize these needs according to their urgency in relation to the phase in the intervention cycle to which the problem has progressed.

As the result of the desk research and the constructed Ishikawa-diagram, the problem has been specified and the knowledge needs have been identified.

### 2.5.1 Case Study Approach

This empirical research is case study based and practice-oriented. This study uses a multi-case method and single unit of analysis, namely the dyad (the relationship between the supplying and the buying firm). A case study 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. This is clearly the case of the addressed research question. 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. Verschuren & Doorewaard (2010) and Yin (2003) describe a case study as relevant when the objective of the research is to identify underlying motivations and detailed relations, all the while taking an open and broad spectrum of potential influences into account. According to Yin (2003) several types of case studies exist: descriptive, exploratory and explanatory. Each one has its aim and its own relation to theory. A characteristic of exploratory case studies is that theory is built as the case study progresses and this contributes to the formulation of research questions and to the definition of the methods for collecting data (Yin, 2003)(Yin, 2003). In descriptive and explanatory case studies, theory is already considered before the case study is carried out. Also, theory is the object of the research influencing the definition of the methods for collecting data (Yin, 2003)(Yin, 2003).

The multiple case design increases the possibility of generalizing findings in an analytical way, as opposed to statistical generalization, where an inference is made about a population or universe on the basis of empirical data collected from a sample (Yin, 2003)(Yin, 2003). To assure reliability, a case study protocol is used and a case study database is developed (Yin, 2003)(Yin, 2003). This is done to show that the operations of the study such as the data collection procedure can be repeated with the same results.

Another critique is that case studies are more difficult or cannot be generalized. The goal of a case study, however, is to expand and generalize theories (i.e. analytical generalization) and not to contribute to a statistical generalization. Lastly, there is a critique regarding the lack of rigor, as systematic procedures have not been followed or drafted in the first place. This critique is be addressed by applying the the reflective (Van Aken et al., 2007) and regulative cycle (Van Strien, 1997) to provide the research with a systematic procedure. Also the use of interview protocols and data protocols contribute to the rigorness and reliability of the research conducted.

Furthermore, in every case study, the issues of validity and reliability are critical for evaluating the soundness of research. Validity may also be divided into two categories: internal validity, which is related to the consistency of the measures used in the study and external validity, which is related to the extent to which the research results or findings may be equally applicable to other research settings. In case study research, validity is constructed 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)(Yin, 2003). Even more, different sources of information are triangulated to control for validity of the research. In this specific research, all these aspects were taken into consideration. As is the case with explanatory case studies, internal validity implies the use of pattern-matching and explanation building (Yin, 2003)(Yin, 2003). 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, such as size or competitive environment, 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 a pattern, which is theory-based. The construction of an explanation is similar to the logical result of the analytical process. Such an analytical process implies selecting relevant information, organizing it into categories and constructing an adequate explanation of that which was under study. A design-oriented approach is chosen in this project. The design-orientation is addressed with the reflective (Van Aken et al., 2007) and regulative cycle (Van Strien, 1997) which are shown in Exhibit 2-2. This analysis is done with NVivo to assure the rigor of this approach.

**EXHIBIT 2-2  REGULATIVE CYCLE AND REFLECTIVE CYCLE ADAPTED FROM VAN STRIEN (1997) & VAN AKEN,2004**

With the selection of this approach an intervention is developed. The analysis consists of an empirical exploration and validation of: i) the problem as stated earlier and ii) the causes that have led to the occurrence of the problem. In the analysis step, the problem is further validated (Van Aken et al., 2007). In other words, technological rules are developed, based on the reflection on the results derived from the regulative cycle. With the case studies and the desk research a diagnosis and structure of the problem is drafted to lead to a plan of action to redesign the current ESI processes in NPD projects at MCC, to provide a solution to the problem. To determine the actions to be taken and estimate the impact of the change in the current organization at MCC, a change plan in created in the intervention phase. Due to time restrictions, the evaluation phase will not be considered. In short, this master thesis project consists of the three distinct phases: i) orientation (exploratory interviews; desk research; and case study selection); ii) analysis (literature review; conceptual framework development; and case studies of ESI in NPD projects); iii) design (definition of an action plan; and design of an intervention or best practice approach).

**2.5.2 CASE SELECTION**

In this research, the approach is taken to select cases on basis of the comparability with the locus of the problem (i.e. Philips MCC). To increase the measure of applicability and comparison, a set of criteria is defined
Deliberate sampling of the four cases was applied, meaning that the cases were selected based on maximal variation of the dependent variable, 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, namely Philips MCC. The selection process is guided by the following criteria (see also Table 2-1).

**Recency**

The first requirement for the case or project selection is the timing of its completion. This comes forth out of consideration for typical memory retrieval problems when analyzing past events. Also, this is done to approach the current state of affairs as close as possible to provide for an accurate and contemporary case study. Following methodological and context specific consideration, the selection criteria require the cases not to be concluded earlier than one year before this study is conducted.

**Representativeness**

The intention of the study is not to sample outliers. Even though this is a common used research strategy regarding case-design, this is done to avoid rare cases. To ensure representativeness, the selected cases should be considered typical for the organization and comparable to the type of innovation processes, products and markets at Philips MCC.

**Maturity of the Organization**

The product development process of MCC is based to a large extent of the NPD process developed in Philips Drachten. MCC is a relatively immature organization, regarding experience. Philips Drachten however, is a considerably more mature organization. In order to control for the variable maturity both cases from MCC and Philips Drachten will be selected. This helps to analyze the potential influence the maturity of a development site has on the NPD process and the collaboration with their suppliers.

**Type of Innovation**

A distinction can be made between radical and incremental innovations. This has also been done by Philips internally in their NPD projects. As radical innovations typically carry much more risk in them, their supplier collaboration and actual process might show different characteristics. In order to identify potential differences in way of working, radical and incremental innovation projects should be represented by the cases selected.

**Table 2-1  Informants, selection criteria and rationale for the selection of appropriate cases and projects**

<table>
<thead>
<tr>
<th>Informant</th>
<th>Selection criteria</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Recency</td>
<td>To take into account the dynamic nature of the industry</td>
</tr>
<tr>
<td>Project leader</td>
<td></td>
<td>To avoid memory retrieval problems</td>
</tr>
<tr>
<td>Team members</td>
<td></td>
<td>To gain insight in the most current state of affairs</td>
</tr>
<tr>
<td>Counterparts at supplier</td>
<td>Representativeness</td>
<td>To minimize between case variance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To avoid rare cases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To increase generalizability</td>
</tr>
</tbody>
</table>

2 Prof. Dr. A.J. van Weele (University of Technology Eindhoven) and Ir. F. Verheul (Philips MCC – Global Foundries)
Based on these criteria, four cases were selected for the empirical research. Two selected cases concern projects of Philips MCC; the development of the microwave sterilizing bag and the plastic cup range for toddlers. The other two cases are project of Philips Drachten, namely the development of the Grind and Brew and the milk frother.

These projects are all recent and representative for the product portfolio at the respective locations. Furthermore, both incremental as radical innovation projects are represented in the cases. Lastly, cases are selected from a mature site, Philips Drachten and an immature site, Philips MCC.

2.5.3 DATA COLLECTION

To cover the literature and derive the conceptual framework desk research is conducted. Desk research serves to explore the participating companies and industries in which the case studies are nested through non-scientific documentation. Furthermore, the case study encompasses interviewing experts and business practitioners situated within the context of the case study. These are considered the most appropriate informants because of their overall and in-depth knowledge of the project and because of their direct or indirect involvement in the projects. The case study uses informants from both actors (supplying and buying side) within a relationship. This qualitative approach is grounded on the aim unravel factors and conditions that have been put in place to enhance the performance of early supplier involvement. The research framework used is under scrutiny by the outcomes of the conducted interviews and is supplemented or adjusted if necessary. The selection of the case studies was done in consultation with Ir. F. Verheul and Prof. Dr. A.J. van Weele. 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 learn about what factors or conditions present in the case study are held accountable for successful relationship management.

To address the concerns on reliability of the data collection process, a priori developed data protocols are used, as stated earlier (Yin, 2003) (Yin, 2003). These protocols (amongst which the research framework) identified a set of items to be covered and their logical relationships. They are used to guide field research and to provide a standard format for data coding. Furthermore, the results from the field research are used to challenge the research framework; whenever new elements are included resulting from the field research, the framework is re-elaborated to review the new aspects. On this basis, the framework is adjusted. Data is collected via desk research and interviews.

DESK RESEARCH

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.

INTERVIEWS

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. 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.

Aside from insights gained through desk research, the project is described using insights from multiple interviews with project team members; project team leader; management; and preferably the counterpart at the supplier. The main objectives of the interviews are threefold. The first objective is to learn about the company’s vision and strategy towards ESI in NPD and supplier relationship management, also the general purchasing strategies and objectives are discussed. 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.

These interviews are guided by an interview protocol as described in Appendix 0. This interview protocol is subject to adjustments to the interviewee and its functions in the project when required.

2.5.4 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) described a method to analyze qualitative data and this method is adopted for this research. The conceptual framework serves as input for this method. The results from the interview are transcribed to text and 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.
3 LITERATURE REVIEW

The literature review aims at i) providing the reader with a glimpse of the accumulated knowledge by discussing the characteristics of the research field and the quality of the selected literature and; ii) discussing various theoretical perspectives. Most importantly, the literature review is conducted in order to answer research questions one to four and the collected literature is used to construct the research framework which is the basis for the overall study (i.e. conducting the case studies). This research provides us with crucial knowledge needed to provide an appropriate answer to the main research question posited in this study. The four research questions are answered are:

RQ1: How is supplier relationship management (SRM) in NPD defined?
RQ2: What are the key determinants regarding supplier relationship management that affect NPD performance?
RQ3: What are the goals that can be attained with SRM in a NPD context?
RQ4: What is the role of knowledge and knowledge transfer regarding NPD performance?

In order to answer these research questions the following bodies of literature are under research. These are: i) innovation & NPD literature; ii) human performance management literature and iii) knowledge management literature.

This Chapter is set up as follows: in Paragraph 3.1 the review procedure is discussed. Paragraph 3.2 provides us with a characterisation of the selected literature and the identification of a possible gap in this research field. The theoretical perspectives are discussed in Paragraph 3.3. After these Paragraphs, the actual literature view is presented in Paragraphs 3.4 to 3.7, to conclude this chapter with the final research framework in Paragraph 3.8 and conclusion in Paragraph 3.9.

3.1 REVIEW PROCEDURE

The majority of the related articles were identified through structured keyword search in the systematic review. Major scholarly databases (i.e. JSTOR; Google Scholar; ScienceDirect; ABI/Inform and Wiley Online Library) were consulted in order to gather applicable research manuscripts related to the subject under study. The search covered literature from a large period of time, the focus, however, lies on recent papers from the period 1990 to 2013. The search was conducted using at least the keywords: “Supplier Relationship”; “Innovation”; “New Product Development”; “Relationship Management”; “Buyer Supplier Relationship”; “Early Supplier Involvement”; “Collaboration”; “Interfirm Cooperation”; “Knowledge Transfer”; “Relationship Performance”; “Relationship Quality”; “NPD Performance” and combinations of the keywords mentioned. Given the functionality of the database, the results were filtered on peer reviewed publications.

The mentioned criteria resulted in a selection of 133 potentially relevant papers. Using only a keyword approach leads to two main limitations: i) very narrow literature background (as a limited number of scholarly journals are covered by the consulted databases), and ii) the literature background may suffer from limited depth. In order to counter this, this set of articles is expanded i) by performing backward and forward searches (regarding references and authors); ii) with articles recommended by academics of the researcher’s faculty and iii) by snowballing to a total of 193 publications. This set of papers is reduced to 123 sources by performing a content and abstract check to the set of publications used for this literature review.

3.2 A GAP IN LITERATURE

This research concerns four fields of research, namely supplier relationship management (SRM), new product development (NPD), early supplier involvement (ESI) and knowledge management. The initial set of publications is organized around a timeline which is shown in Appendix 0 - Table 8-1. This table shows us that
these topics have been widely researched throughout the years. The first research focused on supplier relationship management and early supplier involvement first began appearing in the early 1980’s. Especially the number of publications on SRM and knowledge management has increased in recent years (e.g. Gadde & Snehota, 2000; Johnsen, 2009). This correlates with the emerging theoretical perspectives that deviate from the longstanding TCE theory (further discussed in Paragraph 3.3).

Many of the publications are in highly ranked journals (e.g. Journal of Product Innovation Management; Strategic Management Journal and R&D Management), which ensures the quality of the publications used. The top ten of journals of which publications were most frequently included in this review is depicted in Appendix 0 - Table 8-2. This shows that the fields of research have been well-established; the number of publications, however, is still rising strongly. An overview of the most widely used research methodology of the set of publications is presented in Appendix 0 - Table 8-3.

From a theoretical perspective and a changing competitive landscape the focus of research and practitioners has shifted more and more towards SRM and ESI. Even though much research has already been done in these areas, a more comprehensive study investigating the constructs that determine the quality of a relationship still has to be done. The relationship between SRM and NPD performance has been addressed by many authors. The focus lies, however, mainly on the automotive industry, where the first research on supplier involvement has been done (e.g. Bensaou & Venkatraman, 1995; Dyer & Ouchi, 1993). This research tries to expand the field of research beyond the automotive industry, by focusing on Philips NV as a developer of relatively small, low technical products for the consumer market.

Lastly, the existing research has largely focusses either on the role of SRM with regard to NPD performance or on knowledge transfer and its impact on NPD performance (e.g. Zhao & Lavin, 2012; Das & Teng, 2001; Van Wijk, Jansen, & Lyles, 2008). Research encompassing these two important aspects of the NPD process is still lacking. Furthermore, how SRM affects knowledge transfer and in turn affects NPD performance has not been researched as well.

This is a definite gap in literature on how supplier relationship quality and knowledge transfer play a role in the NPD performance. These topics is addressed in this research

3.3 Theoretical perspectives

In this Paragraph various theoretical perspectives are discussed. These theoretical perspectives are used to guide the explanation and research concerning the phenomenon (i.e. supplier relationships management) under study. The Paragraph is used to delineate the main perspective from which the further research is conducted and discussed.

Exhibit 3-1 The Firm, dyadic and network level in a NPD context, constructed by author
The antecedents of success of organizations have been widely researched. In order to provide an explanation, multiple theoretical perspectives have been adopted that each tries to identify and unravel the antecedents of organizational success. These perspectives analyze the success and performance on various levels and can be categorized as such. These levels are mainly the dyadic, firm and network level, as shown in Exhibit 3-1. The discussed theoretical perspectives each provide us with useful insights, but they also contain some drawbacks. As will show in the following sections, the emergence of a new theory can be seen as an attempt to account for these drawbacks. This is done by either i) addressing (completely) different aspects that need consideration, or ii) taking certain aspects of earlier perspectives into account and complementing them with new insights. In this report several leading theoretical perspectives are discussed that address mostly the dyadic and firm level. These perspectives and the evolution of new perspectives are discussed hereafter.

3.3.1 The dyadic level

The transaction cost theory is one of the first and most widely established theoretical perspectives. Ronald Coase (1937) is best known as the forefather of the transaction cost theory, according to Madhok (2002). According to this theory a variety of governance structures can be used to exchange goods or services. It addresses the issue of aligning the governance structures in such way that a discriminating match is established. Organizations have to make a choice between vertical integration or ‘make versus buy’ decisions (Williamson, 1987). Within the perspective of TCE, firms are recommended to choose the organizational model that minimizes the sum of fixed and contractual costs. Within the TCE perspective, organizations are assumed to have the potential for opportunistic behavior (Williamson, 1987). As a result, by making investments in relationship specific assets, commitment within the relationship is secured (Williamson, 1987). According to transaction cost economics it is more efficient to organize an activity within the institution of the firm. The focus of TCE have been mainly on the role of efficient governance in explaining firms as an institution for organizing economic activity. The primary emphasis of TCE is on cost (Madhok, 2002); the only motivation for a firm to outsource certain activities is based on a cost-perspective.

An important statement of TCE is that organizations virtually always display opportunistic behavior. This creates the premise of one of the most important critiques of TCE. Ghoshal & Moran (1996) state in their paper that despite relationship specific investments have been made, organizations and relationships still fail when they are unable to create the social context necessary to build trust and commitment that are needed for maintaining cooperation. This increases the call for a new perspective to consider these newly identified factors. Regardless of the governance structure, organizations also need other elements to establish successful relationships as well. This has led to new perspectives, like the Relational Factors View (RFV) (Hunt, Lambe, & Wittmann, 2002). The focus of this view is that many transactions in the marketplace are not merely the discrete and transactional in character, but they can be regarded as an ongoing relationship process. According to RFV the focus has shifted from transactions between two organizations that are characterized as having a short duration, are of discrete nature and as one where the parties often remain anonymous, to exchanges where parties know each other, are involved in a relationship and constitute of multiple transactions over a longer period of time.

The two previous mentioned theories deal with either the contractual or the behavioral aspects respectively. Agency Theory (AT) attempts to provide a perspective that includes both aspects. It offers unique insight into information systems, outcome uncertainty, incentives, and risk. This perspective has been proven to be empirically valid and useful in the study of many problems regarding a cooperative structure of organizations (Eisenhardt, 1989). The focus of this theory lies on determining the optimal contract, behavior versus outcome, between the principal and the agent (Eisenhardt, 1989; Sobrero & Roberts, 2002).
A principal-agent relationship can refer to the relationship between employer-employee, lawyer-client or in this study: buyer-supplier. Agency Theory tries to address two problems that can occur in agency relationships. First, the agency problem that can occur when i) the objectives and goals of the principal and agent are conflicting and ii) the principal finds it difficult or too expensive to verify what the agent is doing. The second problem concerns risk sharing and controlling behavior (Eisenhardt, 1989).

Agency Theory is concerned with determining the most efficient contract governing the principal-agent relationship given assumptions about people (e.g. self-interest; risk-aversion), organizations (e.g. goal conflict among members), and information (e.g. information is commodity which can be purchased), according to Eisenhardt (1989). The Agency Theory states that principal-agent relationships should reflect efficient organizations of information. The agency perspective is based on the assumption at the individual level self-interest is assumed and at the organizational level goal conflict occurs.

The core of the principal-agent theory is concerned with the trade-off between i) the cost of measuring behavior and ii) the cost of measuring outcomes and transferring risk to the agent (Eisenhardt, 1989).

The contract form of Agency Theory can be linked with i) information systems; ii) outcome uncertainty; iii) outcome measurability; iv) time and; v) task programmability, according to Eisenhardt (1989). Agency Theory has proven to be most relevant in situations in which contracting problems are likely to arise. Mostly, these situations occur when i) there is a goal conflict present between the principal and the agent (which can lead to opportunistic behavior of an individual); ii) there exists uncertainty regarding the outcome (e.g. new product development); and iii) evaluation of behaviors is difficult (Eisenhardt, 1989). Agency Theory can be particularly valuable when behaviors are under research. It considers contracts as a dichotomy of behavior versus outcome.

Agency Theory displays many similarities with TCE; the most important difference is that both theories include very unique and different variables. For TCE these variables are asset specificity and for Agency Theory these constitute the attitude towards risk and the characterization of the variable information (i.e. information is regarded as tradable commodity). This theory is regarded as a more rich and valuable research context (or theory) as it looks beyond the economics, without disregarding it. Agency Theory is very appropriate when the subject under study is closely linked with new product development and innovation, as it deals with behavioral issues and outcome-uncertainty. Furthermore, Agency Theory regards information and knowledge as an important tradable commodity within the relationship. This too increases the applicability of this theory for this research, as it is concerned with supplier relationships and involvement in NPD projects.

The three discussed theoretical perspectives concern factors that influence the dyadic relationship. These perspectives fail to account for firm specific factors that might influence the performance of a firm or a relationship between organizations. This has led to alternative theoretical perspectives that explicitly try and consider these firm-specific factors. The aim of the theoretical perspectives at the firm-level is to unravel how organizations can increase their performance (of the organizations and the relationship) by investing in resources, assets, or capabilities. The most common theoretical perspectives that follow this line of reasoning are the Resource-Based View, Knowledge-Based View and Competence-Based View.

3.3.2 The Firm Level

The resource-based view comes from challenging the TCE arguments (Madhok, 2002; Kogut & Zander, 1992). The resource-based view (RBV) focuses emphasizes the role of competitive advantage. As opposed to TCE, the primary emphasis of RBV lies on skills, knowledge and routines (Madhok, 2002). The rationale behind the RBV is that firms can best be described as producing heterogeneous products by combining diverse, imperfectly mobile resources (Hunt, Lambe, & Wittmann, 2002). Firms are more likely to be successful when they possess resources.
that are immobile, inimitable, and non-substitutable (Hunt, Lambe, & Wittmann, 2002). The performance is fostered by complementary and idiosyncratic resources (Jap, 2001). Complementary resources are resources brought into a relationship to extend or complete the resource base (Das & Teng, 2001). The idiosyncratic resources develop over time within the relationship and enhance the competitive position.

One crucial element of the resource-based view is that all resources of a firm are considered to be important. Overextension into diverse domains dilutes the strength of its competence and it increases the costs of organizing the activities in-house. This advocates the importance of focus on the core competences of a firm and acquiring other activities through transactions (Madhok, 2002). The resource based view proposes that in value chain management, value creation would be based on the most valuable contribution which can be made by the firms with their strategic assets. From a resource-based perspective the behavior of a firm can be interpreted as a search for competitive advantage (Uddin & Hassan, 2011). Whenever various competing organizations own the same resource or capability as the focal firm, that resource does not longer offer competitive advantage over the rivals. This refers to resource diversity. Resource immobility explains the complexity of attaining a resource by competitors because the cost of attainment, development, acquisition or use that resource is too high (Uddin & Hassan, 2011). These two assumptions explain to a large extent competitive advantage according to the resource-based view and provide a framework for determining whether a process or technology provides an advantage in the marketplace. According to the resource-based view, the creation of resource diversity (expertise and skills) and resource immobility (complexity of attainment/building) promotes the sustainable competitive advantage creation and maintenance (Uddin & Hassan, 2011). From this point of view, interorganizational relationships have been recognized by companies as a way in achieving sustainable competitive advantage (Madhok, 2002). In the competitive business environment, achieving competitive advantage is not possible by a firm without collaboration with its partners (Uddin & Hassan, 2011).

The character of the industries has changed considerably, to a point where it has given rise to the knowledge intensive firm. Due to this change, knowledge is regarded as one of the most critical resources of an organization for economic and social development (Nonaka & Takeuchi, 1995). The increased importance of knowledge as a resource has led to the emergence of another theoretical perspective, called the Knowledge-Based View (KBV). The main assumptions underlying the KBV are that knowledge is regarded as the critical input in production and is acknowledged as the main source of value (Grant, 1995). The source of competitive advantage lies in the attainment and use of this knowledge. It is the primary role of firms to integrate the knowledge residing within individuals into goods and services. Firms can distinct themselves according to KBV by heterogeneous knowledge bases and capabilities among firms and the capacity to integrate knowledge. To become and stay successful, organizations should ensure the creation and transfer of knowledge, according to Kogut & Zander (1992).

Both these views, RBV and KBV, are strongly focused on the resources of an organization. However, along with the RFV and TCE, the perspectives does not completely account for the dynamics of the environment they operate in. With regard to the change in their environment, organizations basically have three choices according to Baden-Fuller & Volberda (1997): i) organizations can reject change; ii) organizations have the option to outsource the change problem to other firms; or iii) organizations can change their organization internally as a response to the change. The development of the Dynamic Capability View (DCV) is the result of the third option (Teece, Pisano, & Shuen, 1997) (Teece, Pisano, & Shuen, 1997). The DCV describes the firm’s ability to integrate, build, and reconfigure internal and external competences to address a rapidly changing environment, according to Teece et al. (1997). For organizations to maintain or build their competitiveness,
firms should look beyond their core competences and also focus on the ability to respond to a dynamic environment.

This view and the RBV have been extended with the development of the Competence-Based View (CBV). This view more or less includes the RBV and the DCV to provide a broader perspective. The core of CBV is that firms have an ability to sustain resources and their deployment in a manner that contributes in achieving the goals of those firms (Sanchez & Heene, 1997; Sanchez, Heene, & Thomas, 1996). According to Madhok (2002) is the skillful governance of relationships a type of competence in and of itself as it directly can offer competitive advantage.

Up to now, seven main theoretical perspectives have been discussed. Each perspective carries certain implications for supplier relationship management research. According to TCE, the success of a relationship, that contains any opportunistic behavior, is determined by the contractual agreements. According to the relational factors view, the success of the relationship depends to a large extent on the elements trust, commitment, cooperation and communication. (Hunt, Lambe, & Wittmann, 2002). The Agency Theory combines these two views, where a successful relationship does not only depend on contractual agreements to limit opportunistic behavior, but should also take into account the behavioral factors that lead to the desired outcome. It regards the optimal governance structure as a balance between behavioral and outcome based governance.

On the firm-level, the resource-based view contributes to research related to supplier relationship in two distinct ways. First, RBV regards relationships with suppliers as a means to get access to certain assets or resources, otherwise unavailable to the organization. Secondly, RBV argues that the success of the relationship can be enhanced by dedicating resources to the relationship. The knowledge-based view regards the transfer, creation, and integration of knowledge as crucial to enhance the success of the relationship. By engaging in a relationship with a supplier, the knowledge base can be expanded, which in turn can result in greater success. The dynamic capability view provides the following addition to supplier relationship management research. Relationship management is regarded as a specific capability, having more experience enables the organization to be more successful in relationship management. Merely the fact that an organization is experienced in supplier relationship management does not explain the processes and mechanisms that are needed for successful relationship management. The competence-based view tries to offer this explanation and shows the interaction and interrelatedness between a firm’s resources and the development of relationship capability.

These theoretical perspectives have now been discussed separately. New perspectives continue to be developed in order to fill gaps or as a response of drawbacks of prior perspectives. In this research mainly RBV and Agency Theory is taken into account as these are comprehensive and appropriate to this research on supplier relationship management in a NPD context.

### 3.4 Supplier relationship management

Individual organizations can no longer rely on their own resources to compete and innovate in today’s world. Rather, they should look for strategic interactions allowing them effectively to leverage internal resources by investing in some core competencies and contracting out other knowledge domains. The speed of technological progress, the increasing amount of resources needed to fully control the process and the pressure on profitability increase the pressure on firms (Sobrero & Roberts, 2002). This requires firms to innovate better and faster with equal or less resources. The NPD process has always, now even more, been characterized by complexity and unpredictability (Wynstra, Von Corswant, & Wetzels, 2010).

‘Open Innovation’ is a phrase coined by Chesbrough (2003). Chesbrough (2003) defined open innovation as: “...the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.” He described the innovation policy of two competing
companies (Chesbrough, 2003) (Chesbrough, 2003). As one company (Lucent) decided to maintain a large budget for R&D, the other company (Cisco) did not have the resources to compete on a budgetary scale with this company and chose not to set up an extensive R&D organization. Therefore Cisco decided to insource technological development and innovations. The general consensus at that time was that Cisco was likely to succumb to the competitive power and innovativeness of Lucent. However, the chosen strategy of Cisco proved successful and although there was a huge difference in R&D spending, their market shares remained more or less similar to one another.

Following this train of thought and acknowledging the success of this strategy, companies soon followed and sought innovations in various areas outside the company’s boundaries. One particular interesting source for innovations is suppliers. Firms have been seeing more and more value (e.g. knowledge; cost savings; innovation potential) present in the supply chain and at the suppliers. Buying firms have been increasingly busy in freeing up this value. By involving suppliers in the innovation processes, like NPD, buying firms are enabled to reduce their R&D spending; strengthen the ties with their suppliers and increase their innovative capacity (Croom, 2001). As a result, these buying firms become more and more competitive and supply chains (where discrete transactions are most common) transform into a value chains (where relationships play a large role).

The following Paragraphs provide us with insight in the mechanisms through which companies improve their innovative capacity and how they effectively can build relationship with suppliers and involve them in the NPD process.

With any strategy or change in strategy, a critical outcome is the attainment of competitive advantage (Jap, 2001). Establishing a long-term 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 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). Nowadays, competitive advantage is the result of the way in which firms allocate their resources and develop new products by organizing innovation processes. Alongside, relationships have been moving away from ‘power-based’- and traditional-relationships (in which there is a strong hierarchical dependence present) towards a more network model in which there is a sense of mutual development within a partnership or relationship (which can result in a value chain) (Croom, 2001). In the latter type of relationship, suppliers and buyers are able to gain equal (not necessarily similar) benefits, instead of positive outcomes mainly for the more powerful company (e.g. supply chain owner or buying firm).

In the NPD process operational and relational competencies are critical factors. Operational competences refer to technical and economic capabilities of the firm such as the manufacturing process design or rapid delivery systems. Relational competencies relate to institutional and social dimensions that constitute as an organization’s architecture, like the formal and informal ties within and between individuals, groups and functions. As organizations look for competitive advantage, operational competencies may not prove sufficient, as they are more imitable and thus might not provide competitive advantage in the long-term (Croom, 2001). Relational competencies however, can offer this competitive advantage as they are more difficult to imitate and develop, as advocated by the RFV and AT. Although these relational competencies gain in importance, they cannot deliver results without operational competencies (Croom, 2001). These relational competencies enable organizations to build and maintain relationships with suppliers, as put forward by AT. These relational competencies are the main subject under study.
Supplier relationships are costly to develop, nurture, and maintain (Bensaou & Venkatraman, 1995; Gadde & Snehota, 2000), but they also carry risk, because (special) investments are needed (Bensaou, 1999). What is then the rationale for investing in supplier relationships (with regard to NPD processes)? 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). Supplier-buyer relationships are important NPD, as is shown by Zhao & Lavin (2012). For any firm that decides to subcontract (portions of) design/production, it shows that supplier relationships and management of these relationships are crucial (Cusumano & Takeishi, 1991). This lies in the created dependence on the skills and competences of organizations lying outside the buying firm’s boundaries and thus outside the firm’s direct influence. Behavior of another firm cannot be controlled by an outcome-based contract alone; there should be mechanisms present in the relationship to account for behavioral issues, as is in line with the AT. By managing suppliers effectively, the performance of the buying firm is more likely to increase (Cusumano & Takeishi, 1991; Lawson, Petersen, Cousins, & Handfield, 2009). However, managing relationships with supplier is difficult and requires investments and competences of both the buying and the supplying company. These investments entail monetary as well as non-monetary investments. For example, organizations need to adjust towards a supplier and to do so, assets have to become more specified towards a supplier (i.e. asset specificity) (Gadde & Snehota, 2000), which can cause the assets to lose value to other functions of the organization (Dyer, 1997). Transaction costs increase with more asset specificity (Dyer, 1997). This transaction economics perspective focuses on the costs and risk-side of engaging in a relationship with a supplier. As discussed earlier, this perspective, even though it still provides a valid contribution to this field of research, is somewhat outdated by the development of new theoretical perspectives that are able to take a broader perspective into account.

When managed successfully, supplier relationships can be noted as one of the most valuable assets of a company. This does not have to be in terms of absolute value, but in terms of context specific value (Gadde & Snehota, 2000). A clear association between innovativeness of an organization and the closeness of relationships with supplier was identified by Cantista & Tylecote (2008). To exploit some of the potential of a supplier, it is required that the operations of the two companies become more closely integrated in various facets of the relationship (Gadde & Snehota, 2000). Some examples of these facets are: extensive and intense interpersonal interaction; coordination of various activities; and mutual adaptations of resources. All these facets entail costs (e.g. monetary) for both companies. Furthermore, 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).

Relationships in business are all maintained for economic reasons or, i.e. to fulfill a function (Walter, Müller, Helfert, & Ritter, 2003). These functions can be direct and indirect. First, the direct functions of the relationships are discussed. Thereafter, the indirect functions of relationship are under consideration.

A relationship can have a cost reduction function. By working together price reductions can be achieved and a platform for low purchasing prices can be established. A cost reduction function is opposed to the profit function for suppliers. Being more successful in the cost reduction function for the buyer often leads to a more negative outcome for the supplier. Furthermore, a relationship can have a quality function. By collaborating, both supplier and buyer can be enabled to produce products of higher quality. In addition to these two direct functions, a relationship may also have a volume function. By reducing the number of suppliers of a commodity, the exchanged volume per supplier increases. This in turn leads to cost reduction (Walter, Müller, Helfert, & Ritter, 2003). Lastly, a relationship may also exist in order to
safeguard against uncertainties in the market. By having an extended relationship with a supplier, it may provide a fallback if another supplier of the same commodity fails to deliver. The indirect relationship functions of a supplier relationship only are of value in other relationships or in the future. No direct benefit or outcome was distinguished. First of all, a relationship can fulfill a market function. The relationship with a supplier leads to the establishments of contracts with new exchange partners (Walter, Müller, Helfert, & Ritter, 2003). The supplier is able to play an active role in assisting the buyer with contracting of new partners. Suppliers, however, play more often a more passive role, as buyers use reputed suppliers as reference. In line with this market function is the scout function of the supplier. The supplier contributes to the buyer’s performance by transferring technical and market-related information to the buyer. This way, buyers benefit from the market insights of their suppliers and profit from experience and expertise complementary to the buyers’ insights. The third function, and a particular relevant one for this research, is the innovation development function. This function can manifest itself in the form of: i) sharing innovative ideas; ii) supplying innovative components, products and facilities; and iii) engaging in collaborative NPD projects. Lastly, relationships can have a social support function. Social aspects are important in any relationship as they help align the two organizations in the relationship (Walter, Müller, Helfert, & Ritter, 2003). The ‘function’ or purpose of a relationship with a supplier is further discussed in Paragraph 3.4.2.

Relationships can tie up resources (Walter, Müller, Helfert, & Ritter, 2003; Goffin, Lemke, & Szwejczewski, 2006 invalid source specified). as it is resource intensive to create and maintain such a relationship. Managing supplier relationships systematically is therefore advised by Walter et al. (2003) as it forces the buyer to (re)evaluate every relationship and consciously and deliberately make decisions and investments to manage the relationship.

From the suppliers’ perspective, Lin & Huang (2013) have provided results that suggest that firms should build strong relationships with customers to foster knowledge-sharing, cooperation and problem solving. So, not only is it advocated for buying firm to build relationships with their suppliers and benefit from them, also for suppliers it is strongly advised to build relationships with their customers.

According to Lawson et al. (2009) socialization mechanisms are crucial in managing relationships across firm boundaries. Socialization can be defined as the level of interaction between, and communication within and between the firms, which leads to personal familiarity, improved communication, and problem solving. Socialization mechanisms encourage two-way information exchange, help build and establish relationship trust, and enable transparency of information. These results are further discussed in Paragraph 3.4.2. Cooperative problem solving is a dominant logic of buyer-supplier relationships in NPD projects, as opposed to hard-bargaining according to a more transactional approach, stated by Bidault, Despres & Butler (1998).

The discussion so far has been about relationships as a uniform entity. This, however, does not do justice to this diverse concept. Therefore, the different types and the determinants of the different types of relationships are discussed in the Paragraph 3.4.1.

### 3.4.1 Types of relationships

In the previous section some of the benefits of engaging in a relationship with a supplier have been discussed. However, before deciding to engage in (different) relationship with a supplier, the buying firm must realize that various types of relationships exist. By making use of various types of relationships, a variety of goals can be attained. For instance, differences in innovation performance have been explained with different types of relationships (Knudsen, 2007)(Knudsen, 2007). The focus of this research lies on a dyad-level and the firm-level in a NPD context. The network level will be discussed on several occasions, as it is important to keep in mind that most firms are part of larger network.
According to Bensaou (1999) there exist several types of relationship between suppliers and buyers and not each relationship should be of the same type as relationships can fulfill various functions. It is in interest of the organization to manage the supplier relationships with help of a portfolio of relationships. This is because not all suppliers are the same and not all relationships have the same goal (Gadde & Snehota, 2000). In making a choice which type of relationship to establish, purchasers could consider at least the following three aspects: i) the product exchanged; ii) the competitive conditions of the upstream market; and iii) the capabilities of the suppliers available. With each of these aspects extended tasks lie ahead for the buying firm in clearly defining these aspects.

Knudsen (2007) stated that relationships with suppliers can differ in (with regard to type and extent of interaction): i) form; ii) content; and iii) intensity. These are similar to the three aspects mentioned by Gadde & Snehota (2000). Somewhat similar is the view from Goffin, Lemke & Szwejczewski (2006), which describes relationships as a variance in three distinguishing factors: i) the number of transactions; ii) the longevity of the relationship; and iii) the closeness of the relationship. The relationship between a buyer and supplier can manifest itself in many forms. Combining the previous mentioned views leads to the following four factors in which relationships can differ: i) form/closeness (Knudsen, 2007; Goffin, Lemke, & Szwejczewski, 2006); ii) intensity/number of transactions (Knudsen, 2007; Goffin, Lemke, & Szwejczewski, 2006); iii) content (Knudsen, 2007); and iv) longevity/duration (Goffin, Lemke, & Szwejczewski, 2006).

These factors are translated by Cantista & Tylecote (2008) in two types of relationships, namely an arm’s length and a collaborative relationship. An arm’s length relationship constitutes of a succession of specific, discrete economic transactions, where the buying organization secures its independence, a transactional approach. This type of relationship is by far the most common one. Collaborative relationships entail multiple economic transactions embedded in social relations between the two trading partners. This type of relationship is characterized by the closeness of the relationship (i.e. trust; exchange of information; and development of conjoint actions) (Sobrero & Roberts, 2002) and a certain level of interdependence. This type of relationship cannot be attained overnight (Cantista & Tylecote, 2008). First the buyer and supplier should engage in a trial period at arm’s length. After that, the two organizations can develop norms and rules of how to work together and then, a higher level of closeness can be reached by integrating strategies and parts of the organization (Cantista & Tylecote, 2008). At any time within a relationship it is possible to (given the right or wrong circumstances) to upgrade or downgrade the relationship in terms of closeness (Cantista & Tylecote, 2008), thus it is crucial for any organization to manage its relationships in order to maintain the appropriate type of relationship. This spectrum of types of relationship is depicted in Exhibit 3-2 which also shows the determinants for the types of relationships and the characteristics in which they can differ.

In Exhibit 3-2 the two ends of the spectrum in supplier relationships are depicted. On the one end there is short-term contracting or an arm’s length relationship and other the end of the spectrum there is a single sourcing, long-term relationship (e.g. partnership), which displays greater commitment from both parties (Subramanian, Chandrasekaran, & Govind, 2010). The view from Subramanian, Chandrasekaran & Govind (2010) overlaps to a great extent with the view of Cantista & Tylecote (2008).

The different characteristics of the NPD process and the characteristics of the suppliers’ resources also prove to be guiding in the choice of the buying firm among alternative relationship forms. Sobrero & Roberts (2002) have identified a number of relationships: i) transactional relationship; ii) long term contracts; iii) strategic alliances; and iv) R&D consortia (Sobrero & Roberts, 2002). These four types of relationships can be placed on the spectrum depicted in Exhibit 3-2, where the first type can be placed at the left end of the spectrum and the last type at the right end of the spectrum. Tangpong et al. (2008) have attempted in their
paper to define a typology of buyer-supplier relationships. These authors divide the extant literature into two main approaches: relational content based types (i.e., differences based on relational norms, trust and commitment) and dependence based types (i.e., differences based on dependence and power related variables).

Exhibit 3-2 Spectrum of Types of Supplier-Relationships, Constructed by Author

By integrating the two approaches, they too describe the typology of relationships as a continuum or spectrum. This spectrum has on one end a relationship that is low on relationalism and dependence and on the other end a relationship that is high on relationalism and dependence. However, Tangpong et al. (2008) also introduce the typology of an autonomous-link relationship which is high on relationalism and low on dependence. This type shows similarities with a collaborative or cooperative relationship (Autry & Golcic, 2010) (Autry & Golcic, 2010) and with the proposed typology of Cantista & Tylecote (2008). The cooperative relationship defined by Autry & Golcic (2010) and Tangpong et al. (2008) can be placed on the right side of the spectrum in Exhibit 3-2. Along with the proposed typology and its distinguishing factors, it is possible to classify many of the existing buyer-supplier relationships.

As said earlier, not every relationship should be managed in the same way and not every relationship should be the same. A variety of relationships can provide different benefits. On deciding which relationship to build and what extent of supplier involvement is required, a buying firm should take the economic importance of the supplier in to consideration, as well as the continuity of the relationship and its sourcing strategy (Gadde & Snehota, 2000) (Gadde & Snehota, 2000). Product and capability characteristics and requirements shape and define the type of relationship. For Bensaou (1999) in order to manage supplier relationships successfully, it is important to match the optimal type relationship to the various products, markets and supplier conditions. Even more, it is important to adopt the appropriate management approach for each type of relationship. Building and establishing relationships requires two firms involved to bridge the “distance” that exists between the two firms. According to Ford (1984) there are five elements of this distance: i) social distance, which describes the extent to which both the organizations and the individuals involved in the relationship are not familiar with each other’s way of working; ii) cultural distance, which describes the extent to which the norms and values of the two organizations differ because of their national or geographical characteristics; iii) technological distance, the differences in process and product technologies of the two companies; iv) time distance, the time between the contract and the transfer of the product or service agreed upon; and lastly v) the geographical distance, this refers to the physical distance between the two organizations’ locations. Concluding, it is crucial before establishing a relationship to decide to what extent and at what moment to engage a relationship with a supplier (Wynstra & ten Pierick, 2000).

The relationships under study are positioned on the right side of the spectrum, or at least that is the goal of the respective relationships. Relationships that go beyond the mere transactional approach, show cooperative and collaborative traits and involve relational factors. In the following Paragraphs is discussed
which factors are the most crucial for establishing long-term buyer-supplier relationships and making these relationships successful i.e. managing these relationships. The study of David Ford (1984) highlights the importance of managing the relationship with a supplier. Furthermore, the results of successful relationships will also be discussed.

3.4.2 Outcomes of Supplier-Buyer Relationships

Before discussing the factors leading to successful relationship management, let us first discuss when a relationship is rightfully called successful. In essence, the relationship is successful if the buying firm and the supplying firm both achieve the goal (or part of the goal) with which they engaged in the relationship. For a buying firm, this constitutes when the internal needs have been satisfied and/or the external challenges have been overcome (Knudsen, 2007) (Knudsen, 2007). Another aspect of a successful supplier relationship is that both parties involved gain something, ideally in a win-win situation. Although the focal firm of this research is the buying organization, the perspective of the supplier will be discussed as well.

Many authors have discussed buyer-supplier relationships and their outcomes (e.g. Kale, Singh, & Perlmutter, 2000; Walters & Rainbird, 2007; Zsidisin & Ellram, 2001). As there exists a great variance of outcomes of buyer-supplier relationships, it is impossible to cover all extant literature and discussed outcomes. Therefore, on basis of the importance (of an outcome) to a firm and the frequency of the outcome mentioned by various scholars a selection is made. This selection is not exhaustive, it depict, however, the most crucial outcomes regarding supplier-buyer relationships. Some outcomes have already been mentioned in Chapter 3.4, these are not mentioned again, they are however included in the overview presented in Table 3-1.

Buyers and suppliers are able to gain advantages and reap benefits that may not (or to a lesser extent) be realized under a traditional (and transactional) relationship, by establishing a long-term relationship. There are three results of supplier involvement in product development that are regarded as most valuable and prominent as it contributes to the competitiveness of the organization: lower development cost; improved quality; and reduced cycle time or time to market (as mentioned, amongst others, by: Petersen, Handfield, & Ragatz, 2005; Zsidisin & Ellram, 2001; Cusumano & Takeishi, 1991; Zhao & Lavin, 2012). When a relationship is managed successfully, it may offer competitive advantage and have one or more of the following results: decreasing prices (Cusumano & Takeishi, 1991) (Cusumano & Takeishi, 1991); higher quality products (Cusumano & Takeishi, 1991; Walter, 2003; Goffin, Lemke, & Szwiezewski, 2006); greater access to resources and knowledge (Walters & Rainbird, 2007); increased value through synergies (Walters & Rainbird, 2007; Zsidisin & Ellram, 2001) Invalid source specified.; shared risks (Walters & Rainbird, 2007; Kale, Singh, & Perlmutter, 2000); shorter time to market (Zsidisin & Ellram, 2001; Knudsen, 2007; Kale, Singh, & Perlmutter, 2000); reduced development costs (Zsidisin & Ellram, 2001 Knudsen, 2007; Kale, Singh, & Perlmutter, 2000; Goffin, Lemke, & Szweczewski, 2006); efficiency and effectiveness of the NPD process (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012; Goffin, Lemke, & Szweczewski, 2006); lower transaction costs (Zsidisin & Ellram, 2001; Knudsen, 2007; Kale, Singh, & Perlmutter, 2000); and higher profit margins (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012).

Furthermore, through collaboration a supplier is more likely to contribute new ideas and new technologies (Kale, Singh, & Perlmutter, 2000; Zsidisin & Ellram, 2001). Increased information exchange; identification of potential problems in the early state of NPD; joint problem-solving activities; elimination of redesign and rework; decrease of internal complexity of NPD; and, as mentioned earlier, reduction of development cycle and costs are more examples of the benefits associated with supplier integration in NPD project (Wynstra, Von Corswant, & Wetzel, 2010; Wynstra, van Weele, & Weggeman, 2001; Petersen, Handfield, & Ragatz, 2005). Moreover, firms engage in collaboration with suppliers to profit from risk-sharing and reducing uncertainty of NPD (Kale, Singh, & Perlmutter, 2000). Organizations start collaborations in NPD to take advantage of partners’ knowledge & expertise (Knudsen, 2007; Kale, Singh, & Perlmutter, 2000; Zsidisin &
These learning effects and knowledge are crucial to any NPD process. The knowledge-component is required to innovate and by learning, firms are able to develop innovations more effective and efficient. An innovation process generally can have two results: the innovation itself (e.g. product innovation) and learning (Sobrero & Roberts, 2002). Innovation is often the short term result of an innovation process, whereas learning provides value for an organization in the long term. Learning entails acquisition of knowledge and in addition use of that knowledge. Two types of learning can be distinguished: i) acquisitive learning takes place as the firm acquires and internalizes knowledge; ii) experimental learning occurs largely inside the firm and generates new knowledge that is distinctive to the organization. With either of these two or both results, an organization can attain competitive advantage and this newly acquired knowledge (by learning) can be used in other NPD projects. Supplier integration in NPD requires and facilitates the combination of internal knowledge of the customer firm with the knowledge of selected suppliers (Zhao & Lavin, 2012; Petersen, Handfield, & Ragatz, 2005; Ragatz, Handfield, & Scannell, 1997). Supplier collaboration enables a buying firm to use and benefit from the knowledge of the supplier.

Primo & Amundson (2002) have analyzed extant literature and offered a concise overview of the outcomes of supplier involvement in NPD projects and relationships with supplier. They state that supplier collaboration leads to: reduced project development times; reduced project costs; improved project lead time and cost; better perceived quality; positive effect on access to and application of technology; and better manufacturability of the developed product. These outcomes are all positively associated with successful supplier relationships and supplier involvement in NPD projects. This view is also held by Wagner & Hoegl (2006), Mohr & Spekman (2006) and Bunduchi (2013), who state that collaborative NPD brings significant benefits to NPD including lower costs and risks, faster development, better product and better access to new resources and knowledge. When a relationship between supplier and buyer is successful, it becomes stronger. When a relationship between a supplier and buyer grows stronger, it can become more successful (Autry & Golicic, 2010). This reciprocal relation is common for many aspects of the relationship with the supplier. For buyers it is important to know that the effort to build and maintain strong relationship results in higher levels of NPD performance and supplier performance (Autry & Golicic, 2010).

Developing a relationship is justified when the costs of extended involvement are exceeded by the benefits associated with the relationship, in line with the view of TCE, and should be carefully considered in this perspective (Gadde & Snehota, 2000; Dyer & Chu, 2011). Effectively, this means that direct procurement, direct transaction, relationship handling and supply handling costs have to be outweighed by cost benefits (e.g. R&D spending benefits) and revenue benefits (e.g. increased sales). This view only takes into account the (direct) economic consequences of supplier relationships, and often the direct costs obscure the future benefits, since these benefits are often delayed (Knudsen, 2007; Gadde & Snehota, 2000) invalid source specified. An organization which aspires to establish a more extensive supplier relationship needs to consider this aspect. Non-monetary investments, mostly neglected in TCE, too play a role in establishing the relationship. These investments should be taken into consideration as well, before engaging in supplier relationships. These types of investments or behavior will be discussed in Paragraph 3.4.3.

Furthermore, relationships are not riskless and therefore it should be taken into account that firms also need to protect themselves from the risks and opportunistic behavior of their partner to secure their own proprietary assets (Kale, Singh, & Perlmutter, 2000). Opportunism (or suspicions of opportunism) of one or more actors, can easily erode the relationship (Jap, 2001) (Jap, 2001). According to TCE, opportunistic behavior
is inevitable in any relationship; other views (e.g. RFV, RBV, AT) have posited that opportunistic behaviors can be mitigated. The achievement of these objectives (i.e. positive results and protection against the risks) have been widely regarded as mutually exclusive, but Kale, Singh & Perlmutter (2000) provide empirical evidence that when ‘relational capital’ is built in conjunction with an integrative approach to managing conflict, it can result in the achievement of both objectives. Relational capital refers to the competencies and capabilities that are required to maintain and build a relationship and will be further discussed in Paragraph 3.4.3. Thus, making good use of suppliers is difficult and complex for two reasons. One, the economic consequences can be difficult to assess and two, companies are dependent on the supplier as they cannot fully control the actions of a supplier. Theoretical perspectives as RFV and AT have offered insight, as discussed in Paragraph 3.3, on how to manage suppliers’ behavior and the relationship.

A relationship can become successful through the following mechanisms, according to Dyer (1997) i) via repeated transactions with a small set of supplier; ii) economies of scale with a smaller supplier group; iii) extensive interfirm information sharing which reduces asymmetric information; iv) using non-contractual mechanisms (i.e. trust) which prove effective over longer periods of time than contractual mechanisms (Sobrero & Roberts, 2002) and v) investments in co-specialized assets. These mechanisms are based on aspects from TCE as well as RFV and AT.

The previous sections show that the potential value of supplier-buyer relationships and its outcomes have been acknowledged by many scholars. These results have been collected and depicted in Table 3-1, alongside with the scholars who mentioned these results.

<table>
<thead>
<tr>
<th>No.</th>
<th>Outcome</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increased product quality</td>
<td>Cusumano &amp; Takeishi, 1991; Zhao &amp; Lavin, 2012; Petersen, Handfield, &amp; Ragatz, 2005; Bunduchi, 2013; Wagner &amp; Hoegl, 2006; Goffin, Lemke, &amp; Szwejczewski, 2006; Walter, 2003; Primo &amp; Amundson, 2002; Madhok, 2002</td>
</tr>
<tr>
<td>2</td>
<td>Reduced cycle time or time to market</td>
<td>Zsidisin &amp; Ellram, 2001; Zhao &amp; Lavin, 2012; Petersen, Handfield, &amp; Ragatz, 2005; Wynstra, Von Corswant, &amp; Wetzels, 2010; Primo &amp; Amundson, 2002; Bunduchi, 2013; Wagner &amp; Hoegl, 2006; Madhok, 2002; Walter, 2003</td>
</tr>
<tr>
<td>3</td>
<td>Reduced costs (e.g. development or transactional costs)</td>
<td>Zsidisin &amp; Ellram, 2001; Zhao &amp; Lavin, 2012; Petersen, Handfield, &amp; Ragatz, 2005; Rajendran, Kamarulzaman, Nawi, &amp; Mohamed, 2012; Wynstra, Von Corswant, &amp; Wetzels, 2010; Primo &amp; Amundson, 2002; Goffin, Lemke, &amp; Szwejczewski, 2006; Madhok, 2002; Dyer, 1997; Walter, 2003; Walter, Müller, Helfert, &amp; Ritter, 2003</td>
</tr>
<tr>
<td>4</td>
<td>Greater access to resources, knowledge and expertise and learning effects</td>
<td>Walters &amp; Rainbird, 2007; Primo &amp; Amundson, 2002; Mohr &amp; Spekman, 2006; Knudsen, 2007; Kale, Singh, &amp; Perlmutter, 2000; Zsidisin &amp; Ellram, 2001; Sivadas &amp; Dwyer, 2000; Walter, 2003; Zhao &amp; Lavin, 2012; Sobrero &amp; Roberts, 2002; Madhok, 2002</td>
</tr>
<tr>
<td>5</td>
<td>Increased information exchange</td>
<td>Wynstra, Von Corswant, &amp; Wetzels, 2010; Petersen, Handfield, &amp; Ragatz, 2005; Mohr &amp; Spekman, 2006</td>
</tr>
<tr>
<td>6</td>
<td>Efficiency and effectiveness in the NPD process and/or operations</td>
<td>Rajendran, Kamarulzaman, Nawi, &amp; Mohamed, 2012; Goffin, Lemke, &amp; Szwejczewski, 2006; Sobrero &amp; Roberts, 2002; Zsidisin &amp; Ellram, 2001</td>
</tr>
<tr>
<td>7</td>
<td>Increased firm performance</td>
<td>Dyer, 1997; Jap, 2001</td>
</tr>
<tr>
<td>8</td>
<td>Increased value through</td>
<td>Walters &amp; Rainbird, 2007; Zsidisin &amp; Ellram, 2001</td>
</tr>
</tbody>
</table>
synergy

<table>
<thead>
<tr>
<th></th>
<th>Increased innovativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Kale, Singh, &amp; Perlmutter, 2000; Zsidisin &amp; Ellram, 2001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Decrease of NPD complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Wynstra, Von Corswant, &amp; Wetzels, 2010; Petersen, Handfield, &amp; Ragatz, 2005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Increased customer satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Zsidisin &amp; Ellram, 2001; Sobrero &amp; Roberts, 2002</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Decrease of NPD complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Petersen, Handfield, &amp; Ragatz, 2005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Increased customer satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Zsidisin &amp; Ellram, 2001; Sobrero &amp; Roberts, 2002</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Increased profit margins</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Rajendran, Kamarulzaman, Nawi, &amp; Mohamed, 2012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Supplier's contribution to new ideas and technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Wynstra, Von Corswant, &amp; Wetzels, 2010; Petersen, Handfield, &amp; Ragatz, 2005; Primo &amp; Amundson, 2002; Madhok, 2002</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Stronger relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Autry &amp; Golicic, 2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Joint problem-solving activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Wynstra, Von Corswant, &amp; Wetzels, 2010; Petersen, Handfield, &amp; Ragatz, 2005; Lawson, Petersen, Cousins, &amp; Handfield, 2009; Bidault, Despres, &amp; Butler, 1998</td>
</tr>
</tbody>
</table>

To conclude, especially higher quality products, a shorter TTM and reduced development costs are highly sought after and only achieved in successful relationships. In all cases, the results of successful supplier relationships contribute to competitive advantage. Having provided the results of successful relationship management, it is important to discuss what the determinant factors are for the effectiveness of relationship management. This is done by drawing a comparison between successful and unsuccessful relationship and by discussing the separate and individual antecedents that should be in place to increase the effectiveness of supplier management and the quality of the relationship.

3.4.3 Antecedents of Successful Relationship Management

The success of a relationship can be measured in various ways. One thing that holds is that a relationship is successful when the buyer attains the goal or objective with which the firm engaged in the relationship. The same holds for the supplier. A successful buyer-supplier relationship is one where both participants reach their goal of the relationship. Because the buying firm is the focus of this study, the perspective of the buyer will be central to this discussion.

Buyer-supplier relationships have been widely researched and the origin of this stream of research lies in the automotive industry. The automotive industry was one of the first industries in which there has been extensive research on buyer-supplier relationships. As research on supplier relationships originated from within the automotive industry, the discussion on what a successful relationship is starts with the results of a study conducted in the automotive industry by Bensaou & Venkatraman (1995). According to these authors success can be measured with three dimensions:

1) Supplier rating index (e.g. development time; quality performance);
2) Perceived satisfaction with the relationship (e.g. quality, amount and accuracy of the information exchanged);
3) Level of buffers between two firms (e.g. average level of inventory kept by assembler).

These dimensions are not absolute and are not the only measure for buying firms to assess the quality of their relationships. It is clear that this type of measurement has limitations and is specified towards aspects of the automotive industry. This is only one of many suggestions by scholars on how to measure the success of a

Page 31
relationship. For this research, whenever one or more actors in the relationship attain their goal(s), the relationship can be called successful.

Within a relationship, interactions define the value of assets and resources. The ability of customers and supplier to develop both structured and ad hoc processes of interaction (a dyadic interaction) is important in the development process (Croom, 2001). New product development success and relationship quality is to a large extent based on and rooted in the effectiveness of the interaction process. Croom (2001) underlines the importance of the interaction process within the relationship by defining SRM as management of customer-supplier interaction.

The relationship between a buyer and supplier is more likely to become successful when certain behaviors or antecedents are present, either at the actors or between the actors. According to Mohr & Spekman (2006), successful partnerships are characterized by greater levels of trust; greater communication quality and information sharing. Trust is also described as an important antecedent to inter-organizational cooperation (Cantista & Tylecote, 2008). Sivadas & Dwyer (2000) stated that inter-functional cooperation (intra- and interfirm) is critical for NPD success. In turn, trust and communication are critical for cooperation and coordination (Gadde & Snehota, 2000; Cooper & Ellram, 1993).

Without cooperation and coordination, efficiency suffers and goal attainment is delayed or hindered (Sivadas & Dwyer, 2000). Sivadas & Dwyer (2000) go one step further and combine trust, communication and coordination in one variable, ‘cooperative competency’. The need for cooperative competency in a relationship arises from reciprocal dependency in the NPD process and the constraints imposed by the need for mutual adjustments. These constraints impel information sharing as well as trusting and trustworthy behaviors in the relationships. Cooperative competency is a similar construct as ‘relational capacity’ as defined by Dyer & Singh (1998). These concepts show quite some similarities with the term ‘relational capital’ coined by Kale, Singh & Perlmutter (2000). According to these authors relational capital is based on mutual trust and interactions at the individual level (characterized by respect and friendship), which creates a basis for learning and know-how transfer between two organizations. Learning and knowledge are inseparable competitive dimensions (Hitt, Ireland, & Lee, 2000; Jap, 2001).

In supplier-buyer relationships, (tacit) knowledge is more often transferred and more likely to occur when intense and frequent communication behaviors exist between different functions and different organizational levels of the supplier and buyer (Hansen, 1999). The importance of knowledge transfer will be further elaborated on in Paragraph 3.5. Lawson et al. (2009) characterize the transfer relationship or collaboration between supplier and buyer as a friendship among engineers of both organizations and frequent informal & formal interactions.

Building relational capital and managing conflict are important to the success of supplier-buyer relationships. Relational capital encourages firms to set up knowledge sharing routines, essential to facilitate the learning of information and know-how (Kale, Singh, & Perlmutter, 2000). Managing conflict cannot be done by mere contractual agreements; a richer, contextual framework is needed and is provided by RFV and AT. Another significant factor in the performance of supplier-buyer collaborations is the effectiveness of supplier and customer interaction (Gadde & Snehota, 2000). The nature of the interaction can both be ad-hoc and formal (Croom, 2001). To engage in a relationship there has to be some sort of dyadic or relationship capability present, which consists of: i) product-based dimensions (e.g. technical function); ii) structure-based dimensions (e.g. structures that facilitate control, communication and coordination); and iii) interaction-based capabilities (e.g. trust) (Croom, 2001). It shows that
again, although under a different name, this concept shows a lot of similarities with ‘cooperative competency’; ‘relational capacity’; and ‘relational capital’.

By complementing supplier involvement in the NPD process with intense communication and strong interaction, the release of new products and the responses to competitor moves and market changes will be faster (Knudsen, 2007; Zsidisin & Ellram, 2001). Also, the ability to transfer the style of management and operations onto the suppliers in question, contributes to the quality of the relationship (Cusumano & Takeishi, 1991).

Generally, there are four main determinants of successful relationships to distinguish, briefly touched upon in the previous sections. Those are: i) trust; ii) communication; iii) information/knowledge sharing; and iv) cooperation and coordination. These determinants prove to be most powerful in establishing a relationship. Furthermore, there are several other determinants that play a role in establishing a relationship with a supplier. Although they are less powerful, they are worth considering and often contribute to one or several of the four main determinants. Even though these antecedents and factors are discussed separately, they all interact and influence each other. These antecedents determine to a great extent the performance of a relationship between buyer and supplier. Many of the antecedents are clearly behavioral and non-contractual of nature, which is be rooted in AT and RFV and can be considered as a move away from TCE.

To provide the following Paragraphs with structure every Paragraph consists of a definition of the concept, alongside with its antecedent, elements and effect on the NPD process and relationship. It must be noted, that some factors that have been discussed by scholars as an antecedent are discussed by others as an outcome. This indicates that the line between antecedent and outcome is not always clearly definable.

**Trust**

Trust is acknowledged by many scholars as an integral feature and critical dimension of supplier-buyer relationship performance (e.g. Dyer & Chu (2011); Seppännen, Blomqvist, & Sundqvist (2007)). Trust is perceived as a multilevel construct that can exist as at personal, organizational, institutional and international level (Das & Teng, 2001). Inter-organizational trust is based on experience, interaction and common history with an exchange partner (Bunduchi, 2013). Trust within a relationship between organizations is conceived as the agglomeration of trust between individuals. Organizations cannot trust one another, employees within these organizations can. Therefore, most trustful relationships are often reducible to the relationship between two individuals. The scholars Seppännen, Blomqvist, & Sundqvist (2007) have provided an literature overview, which is used as a basis for this Paragraph.

Next to the manifestation of the concept trust on different levels, trust can also differ in typology. Varying between the different types of relationship, from arm’s length to a collaborative relationship, Sako (1991) introduces the distinction between three types of trust: contractual trust (e.g. delivering the promised good or service); competence trust (e.g. the ability of the actor to fulfill the expectations); and goodwill trust (the commitment to do more than formally expected (e.g. contributing with improvement ideas). Whereas contractual trust is the most basic form of trust and can be found in transactional relationships, goodwill trust usually only manifests itself in long-term collaborative relationships. According to Sako (1991) trust is a precondition for the disclosure of information; which forms the basis for the generation of innovations. Goodwill trust is the most powerful form of trust and may directly translate into supplier’s proactive behaviors (e.g. presenting innovative ideas).

Trust is a complex construct that has been defined by many scholars and consists of many different components. Trust is the confidence a customer has that the supplier will behave cooperatively and honestly (Zhao & Lavin, 2012). Trust is defined as a positive belief, attitude, or expectation of one party concerning the likelihood that the actions or outcomes of another party will be satisfactory and the
extent that the supplier believes his customer is honest (or credible), benevolent and competent and vice versa (Dyer & Chu, 2011; Walter, 2003; Kale, Singh, & Perlmutter, 2000; Seppännen, Blomqvist, & Sundqvist, 2007). Morgan & Hunt (1994) view trust as the confidence one party has in an exchange partner’s reliability and integrity. Sako (1991) adds another important component of trust; predictability. Concluding, the construct trust consists of i) fairness; ii) reliability and iii) goodwill (Walter, Müller, Helfert, & Ritter, 2003; Morgan & Hunt, 1994; Dyer & Chu, 2011; Walter, 2003; Kale, Singh, & Perlmutter, 2000).

What are the antecedents of trust in a relationship? Trust is expected to emerge and grow, when a party; is known to reliably make good faith efforts to behave in accordance with prior commitments; makes adjustments in ways perceived as “fair” by the exchange partner; and does not take excessive advantage of an exchange partner (Dyer & Chu, 2011; Zsidisin & Ellram, 2001). It is always based on non-contractual mechanisms and in individuals (Dyer & Chu, 2011; Sobrero & Roberts, 2002).

Furthermore, trust is likely to be produced through social relationships; institutionalized processes; and alignment of economic incentives (Dyer & Chu, 2011). According to Granovetter (1985) and Kale, Singh & Perlmutter (2000), trust comes from social interactions between exchange partners. Social relationships and social interactions are also very important. Without social interactions between individuals, no trust will grow and any relationship is bound to fail.

The papers of Bunduchi (2013) and Seppännen, Blomqvist, & Sundqvist (2007) bring even more antecedents of trust forward. These authors suggest that two-way information sharing and the reputation of the exchange partner are crucial for the build-up of trust. Seppännen, Blomqvist, & Sundqvist (2007) indicate that an existing relationship; timely and accurate communication; and face-to-face communication acts as an antecedent to trust.

Dyer & Chu (2011) find that supplier trust is highly correlated with stable and consistent buyer processes that represent commitment toward long-term interactions. Also, a high degree of stability of organizational personnel at both organizations is necessary to produce trust. Lastly, a long term orientation in the form of longer contracts and commitment of both supplier and buyer contribute to the development of a trustful relationship (Cusumano & Takeishi, 1991; Bensaou & Venkatraman, 1995; Walter, 2003; Cantista & Tylecote, 2008; Dyer & Chu, 2011). Commitment can be shown through exhibiting loyalty, a willingness to make short term sacrifices and willingness to invest in the relationship. Trust take a significant period of time to build and strengthens over time (Zsidisin & Ellram, 2001; Sako, 1991).

Trust has been identified as an important factor in relationship management and as key feature of collaboration (Bensaou, 1999; Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Dyer & Chu, 2011; Cantista & Tylecote, 2008; Lawson, Petersen, Cousins, & Handfield, 2009; Rajendran, Kamaruzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003; Bunduchi, 2013). Trust has been acknowledged as a source of competitive advantage (Dyer & Chu 2011; Bunduchi, 2013); as facilitator for investments in relation specific assets (Dyer & Chu, 2011; Asanuma, 1989) and trust leads to superior information sharing routines (Dyer & Chu, 2011). Furthermore, trust reduces risk of the exchange (Bunduchi, 2013; Seppännen, Blomqvist, & Sundqvist, 2007).

Trust is recognized as an important construct for sourcing in an innovation context, because NPD processes are characterized by high uncertainty and tacit knowledge (Bunduchi, 2013). To overcome this, trust plays a crucial role (Zhao & Lavin, 2012) (Zhao & Lavin, 2012). Furthermore, (mutual) trust is dubbed as a precondition for starting a long term (successful) collaboration (Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Cantista & Tylecote, 2008; Bunduchi, 2013). Trust has been identified as an important factor in relationship management and as key feature of collaboration (Bensaou, 1999; Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Dyer & Chu, 2011; Cantista & Tylecote, 2008; Lawson, Petersen, Cousins, & Handfield, 2009; Rajendran, Kamaruzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003; Bunduchi, 2013). Trust has been acknowledged as a source of competitive advantage (Dyer & Chu 2011; Bunduchi, 2013); as facilitator for investments in relation specific assets (Dyer & Chu, 2011; Asanuma, 1989) and trust leads to superior information sharing routines (Dyer & Chu, 2011). Furthermore, trust reduces risk of the exchange (Bunduchi, 2013; Seppännen, Blomqvist, & Sundqvist, 2007); reduces the transaction costs (Dyer & Chu, 2011; Bunduchi, 2013; Seppännen, Blomqvist, & Sundqvist, 2007); and increases the performance of the exchange and the business (Bunduchi, 2013) (Bunduchi, 2013) and trust is an essential factor of relationship quality and performance (Seppännen, Blomqvist, & Sundqvist, 2007) (Seppännen, Blomqvist, & Sundqvist, 2007).

Trust is recognized as an important construct for sourcing in an innovation context, because NPD processes are characterized by high uncertainty and tacit knowledge (Bunduchi, 2013). To overcome this, trust plays a crucial role (Zhao & Lavin, 2012) (Zhao & Lavin, 2012). Furthermore, (mutual) trust is dubbed as a precondition for starting a long term (successful) collaboration (Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Cantista & Tylecote, 2008; Bunduchi, 2013). Trust has been identified as an important factor in relationship management and as key feature of collaboration (Bensaou, 1999; Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Dyer & Chu, 2011; Cantista & Tylecote, 2008; Lawson, Petersen, Cousins, & Handfield, 2009; Rajendran, Kamaruzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003; Bunduchi, 2013). Trust has been acknowledged as a source of competitive advantage (Dyer & Chu 2011; Bunduchi, 2013); as facilitator for investments in relation specific assets (Dyer & Chu, 2011; Asanuma, 1989) and trust leads to superior information sharing routines (Dyer & Chu, 2011). Furthermore, trust reduces risk of the exchange (Bunduchi, 2013; Seppännen, Blomqvist, & Sundqvist, 2007); reduces the transaction costs (Dyer & Chu, 2011; Bunduchi, 2013; Seppännen, Blomqvist, & Sundqvist, 2007); and increases the performance of the exchange and the business (Bunduchi, 2013) (Bunduchi, 2013) and trust is an essential factor of relationship quality and performance (Seppännen, Blomqvist, & Sundqvist, 2007) (Seppännen, Blomqvist, & Sundqvist, 2007).
2002; Kale, Singh, & Perlmutter, 2000; Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). Trust is the basis for constructive dialogue and cooperative problem solving.

The construct trust reduces the fear of exploitation, reduces negotiation costs and minimizes feelings of vulnerability (Walter, 2003; Kale, Singh, & Perlmutter, 2000). Controlling exploitation is critical for any relationship (Dyer & Chu, 2011; Cantista & Tylecote, 2008). In a relationship that exhibits mutual trust, suppliers are more likely to believe that, when sharing their knowledge, they could gain from their partners (Morgan & Hunt, 1994). In a trust-based relationship between supplier and customer, the customer will not harm the supplier by misusing his information and knowledge (He, Gallear, & Ghobadian, 2011; Zhao & Lavin, 2012). Not only does trust positively affect inter-firm knowledge transfer, it also reduces the cost and time of knowledge transfer and leads to a high level of knowledge transfer. It requires great trust for the buyer to access supplier’s knowledge (Petersen, Handfield, & Ragatz, 2003) and trust becomes even more important when the knowledge to be transferred between actors is tacit (Zhao & Lavin, 2012). Trust facilitates more open communication, information sharing and conflict management (Seppännen, Blomqvist, & Sundqvist, 2007). Learning is also supported through the presence of trust (Sako, 1991). Therefore, trust has been identified as a crucial antecedent of relationship management and knowledge transfer (Zhao & Lavin, 2012; Morgan & Hunt, 1994). Establishing a successful relationship requires trust between the partners (Morgan & Hunt, 1994).

According to Seppännen, Blomqvist & Sundqvist (2007), trust is critical for establishing relationships as it helps to increase predictability, adaptability, and strategic flexibility. Relationships that exhibit trust display greater levels of commitment and involvement in NPD (Walter, 2003). This, in turn, increases the NPD performance.

Seppännen, Blomqvist, & Sundqvist (2007) have described the gray area between antecedents and outcomes of trust in the relationship. As is shown in the previous section, some antecedents have been mentioned as outcome as well as vice versa. Increased information sharing; cooperation; longevity of the relationship; reputation; mutual satisfaction; reduction of control; long-term goals; similar values; extent of communication and displayed commitment have been identified as both antecedent and outcome of trust in a buyer-supplier relationship (Seppännen, Blomqvist, & Sundqvist, 2007). This has also been documented earlier by Goffin, Lemke, & Szwejczewski (2006).

Concluding, trust is acknowledged by many scholars as an integral feature and critical dimension of successful relationships (Walter, 2003; Zsidisin & Ellram, 2001).

Communication

Communication is important for any relationship. To illustrate: try and imagine to solve (complex) problems with your neighbor without so much as even giving him a thumbs up. This is a somewhat black and white representation, but it does indicate the importance of communication. Communication can be defined as formal and informal sharing of information between firms and fulfills a coordination and alignment function (Nonaka & Takeuchi, 1995).

Within a relationship, for effective communication, regular personal visits and inter-personal relationships are crucial (Knudsen, 2007; Kale, Singh, & Perlmutter, 2000). Meeting face-to-face, not only enables trust-building, but is by far the most effective way of communicating (Wognum, Fisscher, & Weenink, 2002). Even though many organizations nowadays rely more and more on communication via ICT-solutions, in no way can it replace personal visits in terms of information richness. For effective communication, openness in the relationship is regarded as very important (Sivadas & Dwyer,
Openness in the relationship comes forth from trust within the relationship and also helps build trust. Also it allows for information and knowledge sharing, without feelings of ambiguity.

Often, in supplier relationships in NPD, the demands for communication and information richness of are very high. In order to meet those demands, organizations need to make sure they facilitate and stimulate efficient and effective communication flows. Communication is facilitated by and needed for clearly defining the goals and responsibilities within the relationship (Sivadas & Dwyer, 2000; Walters & Rainbird, 2007; Knudsen, 2007; Sivadas & Dwyer, 2000; Lorange, Roos, & Brønn, 1992). Furthermore, to establish a successful relationship and to ensure that the communication flows are in order, it is important to select suppliers on basis of complementarities to the buyer’s business (Sivadas & Dwyer, 2000; Knudsen, 2007; Jap, 2001). To help build effective communication routines in a relationship, the aforementioned antecedents should be in place. Having these in place will increase (the chance of) success of the relationship and the success of the NPD process.

Effective communication influences the degree to which each partner understands the other firm’s goals. Good communication can result in sharing assumptions and thinking together to solve problems in NPD (He, Gallear, & Ghobadian, 2011). Furthermore, it plays a crucial role in knowledge sharing between organizations (Zhao & Lavin, 2012). A central condition for successful knowledge transfer is the presence of constructive communication channels between the two actors (Zhao & Lavin, 2012). Communication is used as a mechanism to connect and integrate various sources of knowledge (Zhao & Lavin, 2012). Communication has a significant positive effect on both tacit and explicit knowledge transfer (Zhao & Lavin, 2012). The transfer and recombination of knowledge between and within two companies is crucial for NPD (Sivadas & Dwyer, 2000; Wognum, Fisscher, & Weenink, 2002; Knudsen, 2007).

Wognum, Fisscher & Weenink (2002) have described a paradox regarding the importance of communication for relationship management: communication is essential to achieve and maintain a balanced relationship and share information and on the other hand communication depends on a well-balanced relationship.

Concluding, communication is 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 communication.

**Information and Knowledge Sharing**

Gadde & Snehota (2000) described a paradox, that information sharing can only take place in a successful relationship and information sharing is required to create a successful relationship. This paradox (and the previous one) comes to a large extent forth from the difficulty in making the distinction between antecedent and outcome. In line with the mechanism of effective communication and building trust within the relationship, it is important for any relationship to facilitate information and knowledge sharing.

Formalizing parts of the relationship increases information and knowledge sharing because the goals of and the responsibilities within the collaboration are clearly defined (Sivadas & Dwyer, 2000). A relationship can become successful if a free flow of information and knowledge is guaranteed (Bensaou & Venkatraman, 1995; Gadde & Snehota, 2000; Sivadas & Dwyer, 2000; Knudsen, 2007; Jap, 2001; Zsidisin & Ellram, 2001; Lawson, Petersen, Cousins, & Handfield, 2009). The internal information flows can
extend outside the corporate walls to align the interests of buying firms with supplying firms. Moreover, successful relationships and effective supply chains display information flows going both directions, instead of unidirectional information flows (Zsidisin & Ellram, 2001). To access the knowledge present at the partner within the relationship, a firm must be able to learn from its partner. For that to take place there has to be knowledge transfer between the two partners. Three types of learning are to be distinguished. A buyer can learn to access or internalize critical information, capabilities or skills from a supplier. Furthermore, the buying firm can learn how to manage collaboration processes and to work better together. Lastly, a buying firm may learn and develop alliance capability or relationship capability (Kale, Singh, & Perlmutter, 2000). These three types of learning are all of importance for successful relationship management.

Information sharing improves the build-up of trust; it strengthens supplier relationships and can lead to overall improvements in the supply chain (Zsidisin & Ellram, 2001). Furthermore, information and knowledge sharing allows for the recombination and generation of new and innovative ideas, which will benefit the performance of the NPD process. The concept of knowledge sharing is discussed more elaborate in Paragraph 3.5.

**COOPERATION AND COORDINATION**

Supplier-buyer relationships within NPD processes can only be successful if the two parties work together; therefore cooperation and coordination are two crucial determinants for supplier-buyer relationships. Without effective and efficient cooperation and coordination within the relationship, it loses effectiveness or even fails (Bensaou, 1999; Gadde & Snehota, 2000; Dyer & Chu, 2011; Lawson, Petersen, Cousins, & Handfield, 2009). Communication and trust form, with coordination and cooperation the basis for a successful relationship.

What factors contribute to successful cooperation and coordination in a relationship? Bensaou (1999), Gadde & Snehota (2000) and Dyer & Chu (2011) all state in their papers that a good social climate is the key enabler for effective cooperation and coordination. There needs to be personal contact, effective communication and trust in order to create a good social climate. Also, there remains a need for monitoring, control, governance and administrative mechanisms to assist and guide the actors in a relationship (Gadde & Snehota, 2000; Sivadas & Dwyer, 2000; Wognum, Fisscher, & Weenink, 2002; Dyer & Chu, 2011; Jap, 2001). By open-ended future interaction with suppliers and frequent contact the chances increase that a pattern of cooperative behavior occurs (Heide & Miner, 1992). Cooperation and coordination consists of mutual adjustment and alignment: of expectations; organization; goals; and responsibilities (Gadde & Snehota, 2000; Wognum, Fisscher, & Weenink, 2002; Walter, 2003; Knudsen, 2007; Bensaou & Venkatraman, 1995). For successful relationships the buyer needs to support the supplier during the NPD process and vice versa (Cusumano & Takeishi, 1991; Walter, 2003; Dyer & Chu, 2011). According to Sobrero & Roberts (2002), inter-organizational structuring decisions and mechanisms are significant explanatory factors for relational success. These mechanisms help in coordinating the activities within a relationship.

Effective coordination and cooperation will improve the NPD process 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, which significantly increases the performance of the two firms.

**RELATIONSHIP-SPECIFIC ADAPTATIONS AND INVESTMENTS**

As mentioned earlier and stemming from transaction cost theory, relationship-specific investments refer to the non-transferable investment that are made in organizational relationships (Zhao & Lavin, 2012). Whenever an organization makes these specific investments, assets are adjusted towards a supplier and these assets lose value to other purposes or suppliers. With this asset specificity or relationship-specific adaptations, suppliers and buyers are locked-in. Not only is additional value created, but also are the
switching costs increased, which makes it difficult to replace a partner involved in the exchange relationship (Morgan & Hunt, 1994)(Morgan & Hunt, 1994). Because of these increase switching costs, expectations of continued future exchanges are established. Furthermore, these adaptations are regarded as a representation of relationship commitment (Zhao & Lavin, 2012)(Zhao & Lavin, 2012). With help of these adaptations inter-firm knowledge transfer is enhanced and opportunistic behavior is minimized (Zhao & Lavin, 2012) (Zhao & Lavin, 2012). Both supplier and buyer should make relationship-specific adaptations. An investment in a relationship reduces the motivation to act opportunistically (Morgan & Hunt, 1994)(Morgan & Hunt, 1994).

According to Van Echtelt et al. (2008) and Zhao & Lavin (2012) supplier relationship-specific adaptations can constitute of supplier’s changes in processes, product technologies, or procedures to the specific needs and/or capabilities of the customer. Relationship-specific adaptations increase the possibility of knowledge transfer between the two actors in the relationship (Zhao & Lavin, 2012)(Zhao & Lavin, 2012). The effects of these adaptations contribute to the performance of both the buyer and supplier (Dyer, 1997; Jap, 2001).

**COMMITMENT**

Commitment is important for all of the relational exchanges between the buyer and supplier. Morgan & Hunt (1994) stated that commitment in a relationship exists when each partner believes that an ongoing relationship is important to successful business. Their study showed that commitment has a positive impact on the performance of the relationship. High levels of commitment lead to cooperation among each partner (e.g. joint action; high levels of flexibility). Commitment can be expressed by a firm by sharing confidential information and by performing actions that contribute to trust and the longevity of the relationship. Commitment leads to a stable relationship, reduces uncertainty (concerning the relationship and the NPD process) and reduces the cost of searching for new exchange partners.

The paper of Barnes, Naude & Michell (2005) suggests that commitment is crucial for the build-up of an inter-firm relationship. These authors have distinguished several factors, which have been mostly mentioned earlier in this study, that contribute to supplier commitment. These factors are intangible, meaning they mostly relate to interpersonal and social attributes that are difficult to quantify. The most important factors prove to be: i) trust; ii) reliability; iii) friendship; iv) communication; and v) predictability or closeness (Barnes, Naudé, & Michell, 2005)(Barnes, Naudé, & Michell, 2005). An increase in any of these factors is correlated with an increase of supplier or buyer commitment. Furthermore, some of these factors prove also to be an important construct in relationship management. Walter et al. (2003) divide commitment in three different dimensions. Affective commitment is about a positive attitude towards the future existence of the relationship. The second dimension is instrumental commitment, which constitutes of some sort of relationship investment (e.g. resources). The last dimension described by Walter et al. (2003) is the temporal dimension of commitment, which is an indicator that the relationship exists over time.

To conclude, the construct commitment can be viewed as a perception or attitude towards a relationship expressed by certain actions, such as information sharing. Commitment improves the functioning of the relationship between the buyer and supplier.

**SATISFACTION**

A relationship can only be successful if all actors are satisfied with the conditions of the relationship and the performance of the other (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012; Walter, Müller, Helfert, & Ritter, 2003)Invalid source specified.. Satisfaction can be described as a feeling of happiness or fulfillment that arises when expected or desired result is attained (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012)(Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). As the satisfaction of both actors increases, they remain committed to (continue) the relationship. Thus, satisfaction with the relationship and/or the exchange partner is an antecedent for successful relationship management.
DEPENDENCY AND POWER

A relationship will suffer if one actor gets more powerful than the other. Power is the ability to take advantage over the less powerful partner. This will inherently lead to a more favorable condition for the powerful actor and a less favorable one for the dominated actor (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). A power difference is able to grow, whenever one partner becomes (too) dependent on the other and the dependency is not reciprocal.

Relationship build-up is hindered by the existence of unbalanced power distribution and an asymmetry of dependence within the relationship. Unbalanced power and dependency will make a relationship less successful (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). For a relationship to become successful the distribution of power and dependency should be perceived as fair. Gadde & Snehota (2000) discuss the mechanisms of a buyer-supplier relationship: “A supplier and customer try to control and manage the relationship to achieve their own aims. But as one of two grows more successful (than the other) in this attempt, the relationship will lose effectiveness and innovativeness.” (Gadde & Snehota, 2000). Managing a relationship, therefore, is coping with interdependencies (Wognum, Fisscher, & Weenink, 2002).

FLEXIBILITY

Another important construct regarding supplier relationship management is flexibility. Both supplier and buyer should exhibit flexibility towards another. Flexibility can be defined as the willingness and the ability to make changes to accommodate the relationship-counterpart’s (changing) needs (Zhao & Lavin, 2012). Also, flexibility can be seen as a form of accommodation to reconfigure and re-assign resources to make use of opportunities and/or avoid or solve problems. As NPD processes are characterized by a large degree of complexity and uncertainty, flexibility from both actors is required to anticipate changes and act accordingly (e.g. by providing solutions to arisen problems) (Knudsen, 2007). Being flexible allows for more knowledge transfer between the actors. Flexibility only has an impact on the transfer of tacit knowledge, not on the transfer of explicit knowledge (Zhao & Lavin, 2012). For a relationship to become and stay successful, a certain degree of flexibility is required from the supplier and the buyer.

REPUTATION

Reputation is an intangible asset and it describes a perception about fairness, honesty and concern of a firm. Reputation also covers the perception of past performance, experience and competencies of a firm (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). Expectations of certain behaviors and performance are rooted in expectation. Building relationships with suppliers with a good reputation decreases uncertainty. Both supplier and buyer benefit from this reduction (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012). A positive reputation also has positive effect on the performance of the relationship.

LOYALTY

Loyalty represents an important basis for developing a sustainable relationship and competitive advantage, according to Rajendran et al. (2012). Furthermore, there is a positive relationship between loyalty and the performance of a relationship and performance of organizations (Rajendran et al., 2012). Loyalty is influenced by trust, satisfaction, commitment and dependence in a supplier-buyer relationship. Relationships in which loyalty is present amongst the actors are more often long-term or more likely to become long-term relationships (Rajendran, Kamarulzaman, Nawi, & Mohamed, 2012).

RELATIONSHIP HISTORY
An extended history between a supplier and buyer acts as a facilitator for knowledge transfer. The longer a relationship is, the more likely the supplier and buyer develop a collaborative relationship (Handfield, Ragatz, Petersen, & Monczka, 1999). A history of close relationships increases the expectation for the current relationship and increases the perceived commitment to the relationship. As Wasti & Liker (1997) report in their paper, in long relationships it has become more easily for the buyer to access the suppliers’ technical capabilities and expertise. The level of (tacit) knowledge transfer will increase when a relationship has sufficient time to establish and develop (Zhao & Lavin, 2012). This increased knowledge transfer helps to increase and improve NPD efficiency and effectiveness. In a longer relationship a supplier has enough time to provide a solution for a buyer’s problem, which enables the buyer to avoid the search for external knowledge. A longer relationship also enables a supplier to be involved in the NPD process in an earlier stage, which helps to avoid redesign and other costs that come from changes later in the NPD process (Zhao & Lavin, 2012).

**Conclusion**

One last factor that plays a role in establishing a successful relationship with a supplier is finding and selecting the right supplier. According to Croom (2001) the main criteria for selecting the right supplier for the NPD process to build a relationship with is whether this supplier has relational capability. These are the key mechanisms for trust building. Wagner & Hoegl (2006) define three main criteria for selecting the right supplier. To select a supplier for NPD the supplier must demonstrate i) competencies and qualification (strongly related to competence trust); ii) trust and reliability; and iii) openness and support (strongly related to goodwill trust). In the selection of suppliers it is of the highest importance to check if a targeted supplier makes all requirements (Croom, 2001). Good knowledge of suppliers is essential for selecting the right supplier.

Furthermore, another important point put forward by Lemke, Goffin & Szwejczweski (2005) is that before establishing a close relationship with a supplier, it is necessary for the buyer to assess the appropriateness of a close relationship in that instance. Purchasing commodity items does not necessarily require or benefit from a close relationship. By choosing the right type of relationship fitting to its purpose, the chances on building a successful relationship increase. This has also been mentioned in Paragraph 3.4.1, where different types of relationship were discussed.

To conclude, the performance of supplier relationship management depends on twelve important constructs, which have been collected in Table 3-2, along with their main effects. This Table acts as a summary of the discussion above concerning the twelve antecedents. If the objective of the organizations involved in an interorganizational relationship is the attainment of goals that are unachievable or more difficult to achieve by organizations independently and this objective is reached, then a relationship is successful (Morgan & Hunt, 1994). For Walter et al. (2003), a relationship successful if the relationship quality is high and satisfactory; the higher the quality of the relationship, the greater the NPD performance. Relationship quality is made up out of i) trust; ii) communication; iii) information & knowledge sharing; and iv) cooperation & coordination. By measuring these variables, a reliable estimation can be made about the quality of the relationship and the performance of the relationship. This estimation can be used to predict the likely result on the NPD performance.

**Table 3-2** Twelve constructs of supplier relationship management (adapted from Subramanian, Chandrasekaran, & Govind, 2010, compiled by author)

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>When buyers have high levels of trust in their suppliers, 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</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Communication</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Knowledge</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 3.4.4 Characterization of Successful Relationships

Twelve antecedents for successful supplier relationships have been identified in the previous Paragraph and it is important to note that successful supplier relationship can be characterized by certain traits, which are closely linked to the success of the relationship. This characterization can be done on basis of the type of results and/or the distinct properties of the relationship.

A supplier and buyer both have information processing needs and information processing capabilities. If these fit, the performance of the collaboration increases (Bensaou & Venkatraman, 1995). Information processing needs arise from uncertainty (within the inter- and intra-firm relationship). NPD processes are uncertain in nature; they involve a large amount of risk (Walter, 2003). Greater uncertainty implies greater needs for information processing within the inter-organizational relationship. In 1995, Bensaou & Venkatraman identified three major types of uncertainty: i) environmental uncertainty; ii) partnership uncertainty; and iii) strategic uncertainty.
uncertainty and iii) task uncertainty. These uncertainties and their underlying aspects increase the information procession needs within a relationship. This strains the information processing capabilities.

The information processing capabilities are needed to process the information coming from an interfirm relationship. In other words, the information processing needs have to fit the information processing capabilities. These capabilities rely on three major factors, as described by Bensaou & Venkatram (1995): i) structure; ii) process and iii) information technology. According to Bensaou & Venkatraman (1995) there are multiple ways to develop effective interfirm relationships (rather than one best way) and there are multiple ways of balancing the information processing needs and the information processing capabilities. What is important is to reduce the information processing needs (through reduced sources of uncertainty). Uncertainty and ambiguity, however, always remain present (Gadde & Snehota, 2000). Successful relationships exhibit a strong fit between information processing needs and information processing capabilities.

One important property of successful relationships is the high levels of information and knowledge exchange (Zsidisin & Ellram, 2001). Successful relationships can be characterized by a lower level of vertical integration (Cusumano & Takeishi, 1991). Also, generally speaking, fewer suppliers are involved per part (Cusumano & Takeishi, 1991). As the supplier and the buyer are engaged in a more exclusive relationship and the buyer is more committed to the supplier and vice versa.

Having discussed various antecedents and factors associated with successful relationship management, Paragraph 3.4.5 discusses the factors and characteristics of unsuccessful relationship management.

3.4.5 FACTORS FOR UNSUCCESSFUL RELATIONSHIP MANAGEMENT

For any supplier relationship there are not only traits and factors that distinguish and determine the success of these relationships, several factors can be distinguished that characterize unsuccessful relationships. Also, several aspects hinder the build-up of a successful relationship. These aspects and factors are discussed in the following section.

Most importantly, unsuccessful supplier-buyer relationships are often characterized by a lack of trust (Lorange, Roos, & Brønn, 1992). A lack of trust restricts the free flow of information and this free flow of information is critical for NPD success (Sivadas & Dwyer, 2000). To increase the level of involvement or to build a supplier relationship, investment logic should not be used as the only or main criteria. Thus, using investment logic as only criteria will often result in a decision not to invest in a relationship even though the buying firm might profit from such a relationship (Gadde & Snehota, 2000). This condition also holds for the downside: establishing a supplier relationship might seem fruitful based on investment logic however; a supplier may e.g. lack motivation to engage in such a relationship with the buyer. So, a buying firm should not let the decision depend on investment logic alone, but should consider a much wider set of conditions and criteria.

Furthermore, unsuccessful relationship management can manifest itself in other ways. First of all, buying firms in unsuccessful relationships often have to deal with very inaccurate part price projections (i.e. around 10% over target) (Cusumano & Takeishi, 1991). These part prices are frequently revised upward, which harms the business case and profit margins of the NPD project. Too much emphasis on initial prices by the buying firm lead to situations where suppliers submit low prices in order to win the bid and then raise the price during the development process or after market introduction (Cusumano & Takeishi, 1991). This revision finds its cause in the fact that requests for quotation are made early in the process (Cusumano & Takeishi, 1991). At that moment uncertainty is still high, which often leads to inaccurate price projections. Furthermore, these projects display
more project delays when managed unsuccessful and are often characterized by miscommunications (Primo & Amundson, 2002).

Another critical issue is that buying firms do not have enough relationship build-up to delegate detailed design and outsource higher level of detailed controlled parts (Cusumano & Takeishi, 1991). That build-up may be falling behind due to lower manufacturing volumes and/or a shorter history of operations, which makes it more difficult to work closely with suppliers (Cusumano & Takeishi, 1991). Not enough relationship build-up leads to a lack of trust, which hinders the buying firm in entrusting responsibilities to the supplier. When trust is established, it can be easily broken and a lack of trust will likely lead to poor supplier performance (Zsidisin & Ellram, 2001).

Once engaged in a more extensive relationship with a supplier a lack of flexibility of the supplier or the buyer may hinder the effectiveness of the relationship (Sivas & Dwyer, 2000). Furthermore, insufficient mutual alignment and adjustments manifesting in conflicting priorities may seriously skew the relationship (Sivas & Dwyer, 2000). Communication being impaired is an insurmountable obstacle in building a successful relationship (Wognum, Fisscher, & Weenink, 2002). Communication difficulties may arise from, for example, cultural differences; technical difficulties; and mismatches in coding schemes (Walter, 2003).

Effective knowledge sharing is widely regarded as an important property of successful relationships and this may be hindered by communication problems or by having two different organizational governance structures taking part in the relationship (Knudsen, 2007). A lack of effective knowledge sharing is associated with unsuccessful relationships. Even though the exchange of knowledge may be successful, it is no guarantee for success of the relationship. The nature of the exchanged knowledge may impair the effectiveness of the supplier-buyer relationship (Knudsen, 2007).

Many factors that may impede the build-up and success of supplier-buyer relationship can be traced back to the factors leading to the success of the relationship. This is not surprising, for instance: trust is crucial to the build-up of a relationship, so naturally the absence of trust will harm the relationship. Although the factors that may impede the build-up of a successful supplier-buyer relationship have been discussed in the previous section, this Paragraph is concluded by focusing on the terms for a successful relationship. Trust; communication; coordination & cooperation and knowledge sharing are crucial for the success of a relationship. The alignment of organizations is critical and the control processes must be aligned. Knowledge and understanding of each other’s business and way of working are also important (Wognum, Fisscher, & Weenink, 2002).

3.4.6 Role of Purchasing

When the approach of the buying firm shifts from purchasing to establishing value-creating supplier relationships, a richer analytical framework is needed to deal with the complexity of the task (e.g. the supplier selection process is not designed to select new type of suppliers) (Gadde & Snehota, 2000; Wognum, Fisscher, & Weenink, 2002). In order to engage in long term supplier relationships, purchasers need to become relationship managers or relationship promoters (Wognum, Fisscher, & Weenink, 2002; Walter, 2003). Managers functioning as relationship promoters have a positive influence on supplier involvement in NPD (Walter, 2003). Purchasing is generally first in line, when it comes to relationships with supplier. Within an organization they are responsible for selecting, contracting, contacting and evaluating suppliers. Due to this central role, the functioning of purchasing in establishing supplier relationships in NPD deserves special consideration.

In order to benefit from collaborating with suppliers on the long and the short term, purchasing professionals must continually provide valuable input into these relationships through their corporate
influence, use of information technology, and participate in various proactive purchasing activities (Zsidisin & Ellram, 2001).

3.4.7 Perspective of the supplier

Relationship management has been mostly been discussed from the perspective of the supplier until now. The emphasis of this literature review and this research lies on the dyad in a NPD context. Even though not all factors mentioned earlier strictly relate to the buying side of the relationship, it is important to separately discuss the perspective of the supplier.

The increased involvement of suppliers in the new product development process has important implications for the strategic performance of organizations. The role of suppliers has been and should be changing as a result of increasing involvement of suppliers in NPD processes (Croom, 2001). This new role is typified by Croom (2001) with increased responsibility and increased autonomy in the development process.

Suppliers can benefit from adopting a strategy of maintaining long-term relationships with their customers rather than employing a transactional approach. Empirical evidence shows that suppliers with a number of long-term customer relationships outperformed suppliers with fewer, if any, long-term relationship customers (LaBahn & Krapfel, 2000). Developing, maintaining, and enhancing relationships with customers can be an effective strategy for suppliers. Long-term collaboration between suppliers and customers provides benefits for both actors, e.g., cooperation leads to higher quality products more quickly (LaBahn & Krapfel, 2000). Even more, suppliers are able to reduce their inventory holding costs, as well as reduce expenses as administrative, selling, and overhead costs (LaBahn & Krapfel, 2000).

For suppliers to create successful relationship with customers, they should pay attention to three key areas (LaBahn & Krapfel, 2000). First of all, suppliers should pay attention to a customer’s exchange behaviors. Secondly, it is important for suppliers to focus on the level of customer power (advantage) and interdependence, the overall level of mutual supplier and customer dependence in the relationship (LaBahn & Krapfel, 2000). For a relationship to be successful for both actors, the relationship ought to be balanced. The dependence between supplier and buyer can be defined by two dimensions (LaBahn & Krapfel, 2000). Suppliers should pay attention to interdependence and power asymmetry. These dimensions define the underlying nature of the relationship and intentions of the exchange partners. A supplier should be alert on any signs of customer power advantage within the relationship. To maintain a relationship with a customer, suppliers should provide assistance to a customer (Cusumano & Takeishi, 1991). The last area that requires attention from the supplier consists of the technical factors that come along with the relationship and the exchange of products, according to LaBahn & Krapfel (2000).

Goal definition is crucial for the supplier and the buyer. For a supplier is it important to understand in what conditions they should establish a closer partnership with a particular customer. Furthermore, a supplier’s intention to collaborate with a customer will improve the adherence of the customer to its agreements (LaBahn & Krapfel, 2000). The buying firm may tick all the boxes and create an ideal climate for successful relationship build-up; a supplier may still be reluctant to enter a NPD relationship (Walter, 2003). This may be due to the fact that a supplier is reluctant to become dependent on the buyer. Furthermore, suppliers may find it difficult to demonstrate trust and commitment (Walter, 2003). This comes forth from previous experiences or a fear of being exploited (Walter, 2003).

Monczka et al. (2011) have interviewed several suppliers with regard to collaboration with buyers in product development processes. The suppliers have provided several recommendations which can positively
influence the collaboration and NPD performance. These recommendations show to be quite similar to constructs and aspects mentioned in Paragraph 3.4.3 & 3.4.5.

For one, it is important to suppliers to establish higher degrees of trust and communication between multiple and cross-functional touch points between organizations that lead to improved supplier innovation results. This trust is required for buyers to obtain, evaluate and implement innovations contributed by suppliers. Secondly, buyers should develop an effective and efficient process for collecting, analyzing and processing suppliers’ contributions to the NPD process and other innovative ideas to increase supplier participation as well NPD performance.

Furthermore, suppliers want to be made partial responsible for the NPD project, effectively meaning that the project management should be shared across organizations. This will accelerate the NPD process. Also, suppliers emphasize the importance of alignment and risk sharing. This will enable both firms to commit and focus resources and will increase the stability of the project team and the project itself.

For suppliers to truly get involved in a NPD project, they require equitable agreements which would include risk/reward sharing and business case understanding about project requirements concerning investments in resources, proposed TTM and market insights.

Concluding, the interviewed suppliers recommend that buyers select suppliers on basis of ROI instead of the cost-only focus. This will allow buyers to select innovative suppliers and suppliers to contribute to NPD projects. These recommendations address some of the most important concerns put forward by suppliers. A buying organization should heed these recommendations and keep these in mind regarding supplier collaboration.

This brief description illustrates the concerns and aspects which play a role of importance to suppliers, upon deciding to establish an extensive relationship with the buyer. The next Paragraph 3.5 will discuss the importance of knowledge transfer with respect to NPD and the relationship between supplier and buyer.

3.5 Knowledge transfer and knowledge sharing
The acquisition and transfer of knowledge across and within organizations is acknowledged as crucial for a firm’s competitiveness and to any relationship between buyer and supplier (Van Wijk, Jansen, & Lyles, 2008) (Van Wijk, Jansen, & Lyles, 2008). The transfer and sharing of knowledge is essential to NPD projects as new ideas are generated with help of new knowledge and the problem-solving capacity is increased. For this research it is important to discuss the various consequences of organizational knowledge transfer as well as the antecedents of organizational knowledge transfer.

Organizational knowledge transfer refers to the process through which organizational actors (e.g. individuals; teams; organizations) exchange, receive and are influenced by the experience and knowledge of others, according to Van Wijk et al. (2008). Organizational knowledge transfer depends on how easily the underlying knowledge sources can be communicated; interpreted and absorbed (Kogut & Zander, 1992)(Kogut & Zander, 1992). This study defines knowledge transfer as the extent to which NPD knowledge flows from the supplier to the customer firm, following the definition of Zhao & Lavin (2012). Knowledge transfer refers to the movement of the supplier’s knowledge, skills, ideas, and experience to the customer (Zhao & Lavin, 2012)(Zhao & Lavin, 2012). In this study the terms knowledge transfer and knowledge sharing (as used by Hansen (1999)) are used interchangeably.

In order to generate value, firms must be able to identify, create and continuously manage knowledge. For many industries the competitive landscape is becoming or has become more knowledge based. Intellectual capabilities are becoming equally or more important than physical assets. The firm’s ability to create, diffuse and utilize knowledge throughout the organization will define the ability to develop, maintain and exploit competitive advantages. Knowledge has become one of the most strategically significant resources the firm
can possess and on which sustainable competitive advantages can be built (Hitt, Ireland, & Lee, 2000)(Hitt, Ireland, & Lee, 2000). Grant (1995) and Hitt, Ireland & Lee (2000) go even further and state that the primary rationale for the firm’s existence is to create, transfer and apply knowledge. This knowledge is transformed and developed into, for example, products or services. Knowledge and knowledge transfer play a central role in this Paragraph. A firm is not able to hold knowledge, rather knowledge is the “shared set of beliefs about causal relationships held by individuals within a group” (Hitt, Ireland, & Lee, 2000)(Hitt, Ireland, & Lee, 2000).

As Grant (1995) stated, knowledge is the most important source of competitive advantage. For a new product development process to be a success, there needs to be a certain amount of knowledge transfer within the developing organization or relationship. When engaged in a (development) relationship with a supplier there needs to be knowledge transfer between the buying and the supplying company. Without knowledge transfer every product development process would fail (Lawson, Petersen, Cousins, & Handfield, 2009)(Lawson, Petersen, Cousins, & Handfield, 2009). Knowledge transfer from suppliers is a key factor for the NPD success of the buying firm (Zhao & Lavin, 2012)(Zhao & Lavin, 2012), as it increases the knowledge and resources of the buying firm which can be used in the NPD project. Product development covers a variety of knowledge and knowledge bases, and therefore it is unlikely that a firm possesses all required knowledge in the NPD process (Zhao & Lavin, 2012)(Zhao & Lavin, 2012). Without (new) knowledge and knowledge transfer an organization and a new product development process will irrevocable fail. Osterloh & Frey (2000) stated: “generation and transfer of knowledge is the most crucial resource of firms”. According to Osterloh & Frey (2000) there is not an optimal organizational or governance form that is most conducive to knowledge generation and transfer. All parties involved in the NPD process, must share, digest and act on information; this transfer and recombination of knowledge allows for the creation of new knowledge (Sivadas & Dwyer, 2000)(Sivadas & Dwyer, 2000) and thus innovations. Knowledge transfer within an NPD process (or renewing of the knowledge base) is needed for an organization to protect its knowledge base from imitation; to save time and money; and to open up development potential. Van Wijk et al. (2008) also acknowledge the importance of knowledge sharing and state that knowledge transfer increases the performance and innovativeness of an organization. Lawson et al. (2009) state that knowledge sharing is positively associated with supplier contributions to the result of NPD processes. For this, social ties are necessary to increase the flow of knowledge. Concluding, knowledge sharing improves the performance of the NPD process, as is acknowledged by many scholars (e.g. Lawson, Petersen, Cousins, & Handfield, 2009; Van Wijk, Jansen, & Lyles, 2008; Zhao & Lavin, 2012)

Knowledge transfer becomes more efficient and effective if the supplier develops a customer-specific knowledge reservoir that permits rapid responses to information and technology needs (Zhao & Lavin, 2012)(Zhao & Lavin, 2012), in other words: if the supplier adapts to the relationship with the buyer. Also, knowledge transfer is closely related to the nature of supplier-customer long-term working relationships (Song & Thieme, 2009). In a longstanding relationship knowledge is often more easily transferred. Knowledge transfer between firms is a complex process that includes transfer among a supplier’s internal units as well as to the customer firm (Zhao & Lavin, 2012)(Zhao & Lavin, 2012). Knowledge transfer (in NPD projects) increases the problem solving capabilities of both firms. Even more, it can improve manufacturability, assist in making design- and cost-trade-offs and increase overall quality of the product. Eventually, knowledge sharing is bound to increase the performance of the overall NPD project (Lawson, Petersen, Cousins, & Handfield, 2009)(Lawson, Petersen, Cousins, & Handfield, 2009).

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). Knowledge transfer for NPD between two companies is not one thing, but a set of experiences and possibly documents, which may be both tacit and explicit in nature (Knudsen, 2007)(Knudsen, 2007). These types of knowledge are discussed in Paragraph 3.5.1.
3.5.1 Types of Knowledge

Many scholars have attempted to categorize the concept knowledge. Most common is the categorization of knowledge in two kinds, explicit and tacit knowledge (Osterloh & Frey, 2000; Hitt, Ireland, & Lee, 2000; Nonaka & Takeuchi, 1995). Explicit knowledge can be codified in documents and protocols, which makes it easier to transfer (Zhao & Lavin, 2012). Tacit knowledge is personalized and usually embedded in employees in the form of experience (Zhao & Lavin, 2012). Explicit knowledge is rooted in tacit knowledge. To transfer this type of knowledge, for example training and coaching is required (Osterloh & Frey, 2000). These two types of knowledge are also known as experiential and articulated knowledge, where articulated knowledge is comparable to explicit knowledge and experiential knowledge to tacit knowledge (Hitt, Ireland, & Lee, 2000). The type of knowledge provides restrictions to the medium with which knowledge transfer can or has to take place. Explicit knowledge, as said earlier, can be coded in writing and symbols. Tacit knowledge is acquired by and stored within individuals and cannot be transferred or traded as a separate entity; it is difficult to codify, articulate and communicate (Hitt, Ireland, & Lee, 2000; Nonaka & Takeuchi, 1995). Not all knowledge can be made explicit and that provides a challenge for knowledge transfer. To illustrate the difference between tacit and explicit knowledge, the following example is given: when learning to sail, one can read and study all manuals in order to pass a written exam. In order to master sailing, however, you need to be in the boat, react to the wind, the water and feel the behavior of the boat. “Explicit knowledge is revealed by its communication while tacit knowledge is revealed through its application” (Hitt, Ireland, & Lee, 2000).

Knowledge accumulated through learning and experience is known as tacit knowledge. The tactiveness suggests that individuals know more than they can tell. Tacit knowledge entails involvement in specific contexts and has a “personal” quality (Hitt, Ireland, & Lee, 2000). Tacit knowledge is a crucial source of sustainable competitive advantage (Osterloh & Frey, 2000). The type of knowledge also brings some sort of delay along. The benefits of explicit knowledge often show immediate benefits, whereas the benefits of tacit knowledge take longer to show benefits (Knudsen, 2007). Furthermore, as the degree of knowledge tacitness increases, it becomes harder to transfer the knowledge from one firm to another (Hansen, 1999). This is not possible because it is used; part of it is unconscious and focusing on the elements of knowledge renders them meaningless; tacit knowledge has been recognized as the basis for discovery.

Kale, Singh & Perlmutter (2000) also discern two types of knowledge and discuss in their paper that firms can acquire two types of knowledge, namely i) information and ii) know-how. Information is very similar to explicit knowledge and holds the characteristic of being easily transmitted without losing its integrity. Information includes for example facts and symbols. Know-how knowledge is tacit, sticky, complex and difficult to codify. Know-how knowledge may be best defined as knowledge that is not yet explained (Kale, Singh, & Perlmutter, 2000). As these types of knowledge described by Kale, Singh & Perlmutter (2000) are similar to the two types of knowledge mentioned earlier; the main distinction made between types of knowledge adopted in this research remains tacit and explicit knowledge.

According to Knudsen (2007) knowledge can be sought (in a relationship with a supplier) by an organization to be complementary or supplementary. Supplementary knowledge is most often exchanged since it has a frame of reference for the partner. This often leads to short term success. The reason a firm seeks out supplementary knowledge is because they want to alleviate pressure on their own resources. Exchanging supplementary knowledge is positively associated with innovative performance and may lead to specialization and decreasing knowledge gaps between the partners (Knudsen, 2007). Although empirically still unproven, complementary knowledge exchange ought to increase the innovative performance in the long term (Knudsen, 2007; Jap, 2001).
only to balance in- and outsourcing, they also have to find a balance between the exchange of complimentary (for exploration use) and supplementary (for exploitation use) knowledge (Knudsen, 2007).

The types of knowledge can reside in an individual or in the collective organization. Hitt, Ireland & Lee (2000) have described these locations and types of knowledge presented in Table 3-3.

**Table 3-3 2x2-matrix displaying the type and location of knowledge. Adapted from Hitt, Ireland & Lee (2000)**

<table>
<thead>
<tr>
<th>Type of knowledge</th>
<th>Location of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
</tr>
<tr>
<td>Explicit knowledge</td>
<td>Conscious knowledge</td>
</tr>
<tr>
<td>Tacit knowledge</td>
<td>Automatic knowledge</td>
</tr>
</tbody>
</table>

Another distinction can be made between types of knowledge, namely the difference between component and architectural knowledge (Hitt, Ireland, & Lee, 2000). Whereas component knowledge regards a particular aspect of an organization’s product, process or operation, architectural knowledge is related to the various ways in which the components are integrate and linked together into a complete system. Component knowledge can exist independently, a characteristic it shares with explicit knowledge. Architectural knowledge cannot be decomposed in independent parts and resides within a larger system. How do these types of knowledge fit in Table 3-3? Architectural knowledge is collective and tacit by nature. Architectural knowledge has the property that it is difficult for any one person to hold the whole architectural knowledge alone (Hitt, Ireland, & Lee, 2000). Component knowledge can reside in the individual as well as the collective with tacit or explicit characteristics.

**Exhibit 3-3 Process of Knowledge Management in Organizations (Hislop, 2004)**

Exhibit 3-3, one of the leading scholars regarding (organizational) knowledge, proposes the following taxonomy of knowledge, shown in Exhibit 3-3. Firstly, data, which is meaningless on itself and the simplest form to transfer. Data are representations of observations and measurements. For data to become valuable, it has to be arranged in meaningful patterns. This is called information. Lastly, when data or information is structured and linked with existing systems of beliefs and bodies of knowledge, it becomes knowledge. Knowledge is the most rich and meaningful form. Even though only the last form is named knowledge according to Hislop (2004), in this research all three forms belong to the domain knowledge, where data and information generally are called explicit knowledge and ‘knowledge’ is mostly named tacit knowledge.

The properties of knowledge described above facilitate the understanding of the critical and unique relationship between the characteristics of a particular type of knowledge and the firm’s ability to create value. The creation of value is necessary to compete in an uncertain, dynamic and volatile market and
competitive landscape. The very nature of the knowledge embedded in many technologies and in many organizations makes it difficult to manage (Hitt, Ireland, & Lee, 2000). To successfully manage knowledge, two issues must be addressed; i) various knowledge integrating mechanisms must be in place to enhance the breadth, depth and speed of learning; ii) knowledge must be integrated with strategy in a dynamic manner. Having acknowledged the importance of knowledge for firms and discussed the types of knowledge, finding the right balance between insourcing and outsourcing is crucial. Outsourcing introduces the risk of leakage of knowledge beyond the boundaries of the firm, which should be taken into account upon deciding (Osterloh & Frey, 2000; Knudsen, 2007).

The transfer of these types of knowledge does not take place automatically. There have to be several mechanisms in place to facilitate knowledge transfer. These mechanisms or promoters will be discussed in the following section.

3.5.2 Drivers and antecedents of knowledge transfer

There are many drivers of knowledge transfer. This Paragraph starts with a discussion based on the typology of Van Wijk et al. (2008) to continue with a more general discussion. Van Wijk et al. (2008) categorize the drivers and antecedents of knowledge transfer into three distinct categories: knowledge, organizational and network characteristics. This categorization is adopted in this study.

Knowledge characteristics

Many scholars regard the attributes and characteristics of knowledge as playing an important role in knowledge transfer (Kogut & Zander, 1992). Knowledge ambiguity contributes to protecting knowledge from being imitated. Knowledge ambiguity is otherwise known as the uncertainty that comes with knowledge and refers to what the underlying knowledge components and sources are (Van Wijk, Jansen, & Lyles, 2008). This ambiguity is a result of combination of the tacitness of the knowledge, its specificity and the complexity of the knowledge being transferred. The ambiguity of knowledge not only protects from being imitated, it can also hinder the knowledge transfer between organizations. Even though knowledge ambiguity has a positive effect on NPD performance, it has a negative effect on knowledge transfer (Van Wijk, Jansen, & Lyles, 2008).

Organizational characteristics

Due to the complexity of organizations, there are many organizational characteristics that play a role in knowledge transfer. Within knowledge transfer literature, absorptive capacity has emerged as a prominent theme (Van Wijk, Jansen, & Lyles, 2008). This concept has been introduced and described by Cohen & Levinthal (1990) as the ability to recognize, apply and assimilate new and external knowledge. It facilitates interorganizational knowledge transfer and it contributes to the amount of knowledge learned across units and across firms. Absorptive capacity therefore plays a critical role in increasing intra- and inter-organizational knowledge transfer (Van Wijk, Jansen, & Lyles, 2008).

The effects of organizational size on knowledge transfer are found to be mixed (Van Wijk, Jansen, & Lyles, 2008). This also holds for the age of the organization. Literature has proved to be inconclusive about the role and effect of age on knowledge transfer (Van Wijk, Jansen, & Lyles, 2008). Decentralization has been found to play a positive role in knowledge transfer between organizations. Decentralization refers to the extent to which decision-making is allocated throughout an organization. The quality and quantity of ideas and knowledge that is shared are improved by decentralization (Van Wijk, Jansen, & Lyles, 2008).

Network characteristics
The third and last category of antecedents covers attributes operating at the network-level or within a dyad. Many of these attributes are embedded in the social behaviors and resources of an organization and a relationship. Social relationships play an important role in knowledge transfer and the social context of a relationship can be categorized and discussed with help of three dimensions: the structural, the relational and the cognitive dimension (Van Wijk, Jansen, & Lyles, 2008). Relationships can increase the accessibility of knowledge, ideas and/or resources and also increase the amount and probability of knowledge transfer.

Any relationship has a certain structure and configuration. These characteristics of a relationship are grouped under the structural dimension. Hanssen (1999) indicated that the number of relations with other firms increase the accessibility and transfer of relevant knowledge. A centralized position in a relationship-network determines to a great extent whether the acquired knowledge can be used to the benefit of the organization. A centralized position enables an organization to locate relevant information or knowledge and to exchange it within the network, by being a sort of knowledge broker (Van Wijk, Jansen, & Lyles, 2008). Organizations in a central network position display greater levels of knowledge sharing (Van Wijk, Jansen, & Lyles, 2008).

The relational aspect of a network is the second dimension under discussion. It refers to the nature of the relationships themselves and the intangible assets and resources embedded in the relationship (Van Wijk, Jansen, & Lyles, 2008). One relational aspect that increases knowledge transfer is the strength of the tie. Tie strength relates to the closeness of a relationship between partners, and increases with the frequency of communication and interaction between partners (Hansen, 1999). Furthermore, their paper suggests that NPD itself is a process of knowledge development and that trust is a major facilitator of knowledge transfer from supplier to buyer.

The cognitive dimension is the last one under discussion here and it refers to the resources within the relationship that provides and contributes to shared interpretations, representations and systems of meaning (Van Wijk, Jansen, & Lyles, 2008). This facilitates common understanding of collective goals. Shared vision and systems promote mutual understanding and helps actors to integrate knowledge (Van Wijk, Jansen, & Lyles, 2008). Therefore, shared visions and systems are likely to contribute to knowledge transfer. On the other hand, cultural differences can increase the costs of setting up a relationship and establishing knowledge transfer routines. Cultural distance and differences between partners may lead to misunderstandings that create inhibitions to share knowledge between them and thus limit the overall knowledge sharing between the organizations (Van Wijk, Jansen, & Lyles, 2008).

According to Van Wijk et al. (2008) play the relational and cognitive dimension a crucial network-determining role for transferring knowledge. The structural capital of a firm works through a brokerage mechanism to search and gain access to new, diverse knowledge available at other organizations. It shows that the three dimensions play an important role and work together to increase knowledge transfer. For the actual knowledge transfer, the relational and cognitive dimensions play a crucial role.

Besides these three dimensions, several other aspects have been identified which are discussed in the following sections. Trust and communication are the two main channels of knowledge transfer (Zhao & Lavin, 2012; Song, Berends, van der Bij, & Weggeman, 2007). The closeness of the relationship between firms determines the extent of knowledge transfer (Zhao & Lavin, 2012). Also, supplier relationship-specific adaptations, supplier flexibility, and relationship history (or length of relationship) are critical for knowledge transfer (He, Gallear, & Ghobadian, 2011). Another view on knowledge transfer is based on the paper of Berends, van der Bij, Debackere, & Weggeman (2006). The transfer of knowledge has six related basic issues to take into account. These issues play a crucial role in
facilitating or hindering knowledge transfer within or between organizations. These are: i) infrastructure & face-to-face meetings; ii) motivation; iii) relationship; iv) detecting opportunities for knowledge sharing; v) knowledge characteristics; and vi) boundaries. These six issues are all discussed in this Paragraph.

Knowledge transfer of complex and tacit knowledge requires a minimum face-to-face interaction which is problematic and costly (Knudsen, 2007; Kale, Singh, & Perlmutter, 2000). Close and intense interaction between individual members of the two organizations acts as an effective mechanism to transfer sticky and tacit knowledge across and within the organizational boundaries, face-to-face communication and personal interaction are able to carry more media-richness (Lawson, Petersen, Cousins, & Handfield, 2009). Face-to-face communication is of value for the actors in a relationship because it increases the capacity for tacit knowledge sharing. Also, it increases the relationship building capacity of the actors. The spontaneity of knowledge sharing is facilitated as well (Song, Berends, van der Bij, & Weggeman, 2007). Furthermore, a firm is able to learn or access the knowledge of their partner more easily when their relationship is transparent and open (Kale, Singh, & Perlmutter, 2000). To attain these levels of openness and transparency, mutual trust is essential. The fear of opportunistic behavior of an organization may hinder openness in a relationship.

To facilitate learning, knowledge transfer needs to take place. What holds for tacit and explicit knowledge, is that motivation is crucial to generate and transfer these two types of knowledge. There are two types of motivation to be distinguished: intrinsic and extrinsic motivation. Motivation is intrinsic if an activity is undertaken for one’s immediate need satisfaction. It is valued for its own sake and voluntary by nature. This type of motivation is difficult to control (Osterloh & Frey, 2000). Extrinsic motivation is a motivation to undertake an activity to satisfy their needs indirectly (e.g. via monetary compensation). There is one particular strong form of extrinsic motivation, called opportunism, where an individual seeks a maximal payoff for his behavior. Often, this is not in the best interest of the organization or team (Osterloh & Frey, 2000). Since tacit knowledge cannot be measured or valued (in absolute terms) it is impossible to pay an employee according his contribution to tacit knowledge. This has consequences for the motivational aspect of knowledge transfer. This implies that tacit knowledge transfer will not take place on merit of extrinsic motivation alone. Even though these two types of motivation have been discussed separately, they interact and influence each other (Osterloh & Frey, 2000). According to Song et al. (2007), intrinsic motivation and commitment from both actors in the knowledge sharing relationship play an important role in increasing knowledge transfer. Whenever two types of motivation interact, these exists a crowding effect (i.e. extrinsic motivation can crowd out intrinsic motivation). For any organization this has consequences. First, reward on performance can crowd out intrinsic motivation. Secondly, personal relationships are a precondition for psychological contracts (e.g. team spirit). They also enhance the intrinsic motivation to cooperate. These factors should be taken into account, when trying to establish a relationship in which knowledge transfer should take place. So, balancing these two types of motivation is important and difficult.

Socialization mechanisms have been recognized in literature (e.g. Lawson et al. 2009) as a key means of facilitating the flow of knowledge across firms. Socialization mechanisms enable the actors in a relationship to learn about the other’s culture and to adjust its behavior accordingly to establish successful outcomes. Social mechanisms facilitate to connect individuals across both actors, with the resulting pattern of close interaction creating a network of interdependent social exchanges and increasing the level of mutual trust and respect across the development teams. This, in turn, leads to more frequent, more informal, earlier and of increasing quality information exchanges (Lawson, Petersen, Cousins, & Handfield, 2009). Informal socialization mechanisms (e.g. social events) play an important role in facilitating interorganizational knowledge sharing. The formal socialization mechanisms (e.g. cross-functional teams) act indirectly through informal socialization to influence knowledge sharing; they do not have an impact on the
level of knowledge sharing (Lawson, Petersen, Cousins, & Handfield, 2009). Especially for the transfer of tacit knowledge is relational contact crucial. Tacit knowledge cannot generally be accessed or acquired through open-market transactions (Lawson, Petersen, Cousins, & Handfield, 2009).

As mentioned earlier, the accumulation of relational experience is an important factor. An organization, experienced in managing relationships with suppliers, is more likely to achieve successful knowledge flows (Knudsen, 2007). The strength of a relationship or tie determines to a large extent the knowledge transfer capacity of a relationship (Song, Berends, van der Bij, & Weggeman, 2007).

An important factor in knowledge transfer is being aware of opportunities to share knowledge. For an organization to effectively access knowledge, valuable for e.g. their NPD process, it has to know about the existence and location of that knowledge. An organization has to have so-called meta-knowledge (Berends, van der Bij, Debackere, & Weggeman, 2006). Without that information, an organization may remain unable to transfer or share knowledge necessary for the attainment of their goal, e.g. a more efficient NPD process. An organization can acquire and hold this meta-knowledge through the strength of weak ties. By having a lot of weak ties to other organization and bodies of knowledge, the location of the required knowledge is more easily known.

Concluding, many drivers and antecedents refer to the constructs that determine the quality and performance of a relationship between supplier and buyer.

3.5.3 BARRIERS TO KNOWLEDGE TRANSFER

Barriers to knowledge transfer consist of difficulties in search of sources, identification of usefulness of knowledge, and transfer of different types of knowledge (Zhao & Lavin, 2012). Tacit knowledge is difficult to transfer (Knudsen, 2007). Knowledge that is tacit, however, is often more valuable for an organization. Furthermore, knowledge can be embedded in practice, which introduces the issue of boundaries (Zhao & Lavin, 2012; Hislop, 2004). Tacit knowledge can be of greater value to a firm than explicit knowledge, however it remains difficult to interpret and transfer (Zhao & Lavin, 2012). To access and transfer this knowledge the boundaries need to be overcome. Boundaries between the supplier-customer organizations make it difficult to transfer experiences and technology know-how (Zhao & Lavin, 2012). Boundaries can manifest themselves in various forms and form a barrier to effective knowledge sharing. Syntactic boundaries refer to a lack of common lexicon. The way the knowledge is articulated and communicated is not understood by both actors involved in the knowledge transfer. Therefore the knowledge loses its value for the receiving party. Semantic boundaries can occur for example because of cultural differences. It refers to a lack of common meanings. The last type of boundaries, distinguished by Berends et al. (2006) is pragmatic boundaries or a lack of common interest. This creates a mismatch in the relationship, which impedes knowledge sharing or reduces the appropriateness of the knowledge shared. Suppliers committed to the relationship tend to understand the knowledge transfer activities and contribute to their success, despite the unpredictability and uncertainty surrounding the transfer process of tacit knowledge (Wynstra, Von Corswant, & Wetzel, 2010). Nonaka & Takeuchi (1995) state that tacit knowledge can best be learned through collaborative experience and working together. The transfer of tacit knowledge is more easily over strong ties, whereas weak ties facilitate explicit knowledge sharing to a greater extent (Hansen, 1999).

Sharing tacit knowledge introduces risks such as loss of competitive advantage. When trust exists within a relationship, organization are willing to share useful knowledge (Lawson, Petersen, Cousins, & Handfield, 2009; Zhao & Lavin, 2012). Trust is a crucial antecedent for knowledge transfer. The absence of a prior relationship and face-to-face interaction hinders the transfer of knowledge (Knudsen, 2007).
As Hansen (1999) states: the transfer of tacit knowledge requires interaction and communication between the actors. Moreover, face-to-face interaction or communication via telephone has shown to be most conducive for tacit knowledge transfer. The more tacit the knowledge becomes; the more trust, communication and relationship history is needed to transfer knowledge (effectively) between two actors. Without flexibility and relationship-specific adaptations the transfer of tacit knowledge will remain difficult. Flexible suppliers with buyer-specific adaptations contribute to a structure characterized by informal as well as formal, standardized procedures essential for the transfer of tacit knowledge (Handfield, Ragatz, Petersen, & Monczka, 1999)(Handfield, Ragatz, Petersen, & Monczka, 1999). A lack of communication may lead to unclear agreements and diverging goals and expectations, which hinders the effectiveness and efficiency of knowledge transfer, the relationship and the NPD process (Zhao & Lavin, 2012)(Zhao & Lavin, 2012).

The barriers mentioned in this Paragraph and the antecedents discussed in Paragraph 3.5.2 describe the elements that are crucial for knowledge transfer to take place. The absence of the antecedents and drivers mentioned in Paragraph 3.5.2 can be referred to as a barrier to knowledge transfer. To conclude, successful relationships with suppliers contribute and facilitate effective knowledge sharing and transfer. Many aforementioned issues can be overcome by establishing successful relationships with suppliers. To conclude, it can be said that in order for an organization to share and transfer knowledge and benefit from this transfer, this organization should first of all establish a (trustful) relationship with the supplier whose knowledge it wants to access and use in their NPD process.

### 3.6 Supplier Relationship Quality and NPD Performance

The previous Paragraphs have described the impact of supplier relationships and knowledge transfer on the performance of NPD processes. The performance of new product development is generally evaluated by multiple criteria. In literature the NPD performance is expressed in measures of effectiveness, innovativeness and efficiency (Lin & Huang, 2013; Johnsen, 2009). Effectiveness consists of a relation between financial performance and product quality, efficiency describes the relation between development costs and development time on one side and the result of the process on the other side. The innovativeness of a product development process is usually measured by the extent to which a developed product is new to the organization and new to the market (Lin & Huang, 2013). Strong inter-firm relationships have a positive impact on efficiency and on the effectiveness of the NPD process (Lin & Huang, 2013). Knowledge sharing is facilitated whenever a relationship is strong. 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). Furthermore, this knowledge is transferred timely and accurately according to Lin & Huang (2013). This timely and effective knowledge transfer will increase the effectiveness and efficiency of the NPD process. It is shown, that whenever a buying firm intends to collaborate with a supplier in their 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 (and empirical evidence) has shown that buying firms should pay attention to all twelve discussed antecedents for successful relationship management, with special focus on: trust; communication, information & knowledge transfer; and cooperation & coordination.

### 3.7 Knowledge Transfer and NPD Performance

Any NPD process requires utilization, recombination and creation of knowledge (Zhao & Lavin, 2012; Knudsen, 2007). For any buying firm, knowledge can be valuable when it is
complementary to its own knowledge (Knudsen, 2007). 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). With the additional knowledge of a supplier, a buyer is more likely to generate more new product ideas, develop them more quickly and have more ways to improve its product, eventually resulting in higher NPD performance (Zhao & Lavin, 2012; Brown & Eisenhardt, 1995). 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. Knowledge transfer increases both performance and innovativeness of an organization (Van Wijk, Jansen, & Lyles, 2008). The transfer of tacit knowledge is more important for NPD performance than the transfer of explicit knowledge. 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). Tacit knowledge is more valuable for the buyer and has a greater impact on the performance of the NPD process (Hansen, 1999).

Based on the literature review can be concluded that an increase in inter- and intrafirm knowledge transfer is crucial to the performance on NPD processes.

3.8 Conceptual framework

The preceding Paragraphs have discussed both the importance of SRM and knowledge transfer for NPD performance. It is shown that these concepts have a large influence on each other. The mechanisms and relationships through which this influence is exerted on NPD performance are compiled and shown in Exhibit 3-4. This exhibit shows that the four main constructs (trust; communication; information & knowledge sharing; and cooperation & coordination) and the remaining eight other constructs have a positive relation with relationship quality, meaning that the greater the presence of a construct within a relationship, the quality of the relationship increases. In turn, whenever the quality of the relationship increases it displays a positive effect on knowledge transfer within the relationship. It helps overcome the barriers to knowledge transfer and reinforces the drivers to knowledge transfer. Especially, the transfer of tacit knowledge increases. Eventually, the increased transfer of (tacit) knowledge has a positive influence on the performance of the NPD process. It may result in many different outcomes as mentioned in Paragraph 3.4.2.

Concluding, the conceptual framework presented in Exhibit 3-4 depicts the complex relations between relationship quality, knowledge transfer and NPD performance. The framework serves as a basis for the empirical research (i.e. case studies).
EXHIBIT 3-4 CONCEPTUAL FRAMEWORK DEPICTING THE RELATIONS BETWEEN SRM, KNOWLEDGE TRANSFER AND NPD PERFORMANCE, CONSTRUCTED BY AUTHOR
3.9 Conclusion

This paper is drafted in preparation of the planned empirical research. After analyzing the context of Philips MCC and a careful review of literature, a gap in literature has been identified. This gap concerns the relation between knowledge transfer; SRM and NPD performance. This is used as input in constructing the four research questions, which have formed the basis for this review. A short reflection on these questions is given hereafter:

How is supplier relationship management (SRM) in NPD defined?

Supplier relationship management is defined as a governance mode with which the collaboration with a supplier is managed. SRM can be seen as an attempt to control and steer the behaviors of the supplier, the behaviors within the relationship and the outcome of the relationship with help of informal and formal mechanisms. Whereas the longstanding view has been that this is best done with help of formal, contractual governance structures, nowadays there is a strong sense amongst scholars and practitioners that informal governance structures are more effective and lead, quicker, to better outcomes of the relationship. SRM is managing the interactions with a supplier (that may supply goods and/or services) in order to maximize the value and outcome of those interactions. In practice, it entails the creation of more collaborative and closer relationships with supplier to access resources, value and knowledge in an NPD context otherwise unattainable (or difficult to attain individually) for the buying firm.

What are the key determinants regarding supplier relationship management that affect NPD performance?

In this literature review twelve main constructs have been identified that contribute to the success of SRM and eventually to the quality of the relationship. Four of these constructs have been identified as being crucial to SRM and having a very large influence on the quality of the relationship. These are: trust; communication; information & knowledge sharing; and cooperation & coordination. These twelve constructs interact and influence each other and help to establish interpersonal relationships.

What are the goals that can be attained with SRM in a NPD context?

Collaborating with suppliers can have a positive influence on the performance of the NPD process. This, however, is only the case when the relationship is actively managed. Especially, higher quality products, a shorter TTM and reduced (development) costs are highly sought after and are more likely to be attained in successful relationships with involved suppliers. This literature review has identified seventeen outcomes of SRM, supplier involvement in the NPD process. In all cases, the results of successful supplier relationship contribute to competitive advantage.

What is the role of knowledge and knowledge transfer regarding NPD performance?

Knowledge transfer is identified as having a significant impact on the performance of NPD projects. The transfer, recombination, creation and use of (new) knowledge in NPD processes is critical to attain a positive result. Any NPD process requires the utilization, recombination and creation of knowledge. This also holds for knowledge transfer between buyer and supplier (or two collaborating entities); without knowledge transfer the effectiveness and efficiency of NPD projects would suffer. Knowledge transfer increases both performance and innovativeness of an organization.

The review serves as input for the conceptual framework, presented and discussed in Paragraph 3.8. This report also describes a methodology of the planned empirical research, consisting of four case studies. Furthermore, an approach for case selection, data collection and analysis was proposed.
3.10 Reflection

In this Chapter a short reflection on the literature study is presented. An evaluation is given to what extent the literature study addresses the problems and issues identified within the organization. Furthermore, a concise overview is presented discussing the measures and procedures Philips has implemented that address the same set of problems, aimed at SRM and ESI in a NPD context.

The literature study focusses on the relationship between supplier relationship management, knowledge transfer and NPD performance. This is done to provide us with input which aides in the overcoming the main problem. This problem is described as follows:

*the new product development processes suffer from inefficiency and ineffectiveness.*

This inefficiency and ineffectiveness translate into problems such as

*increased pressure on resources; project delay and additional (development) costs.*

This problem analysis has been divided amongst five categories, being: the organizations of NPD projects; MCC’s innovation strategy; internal capabilities; supplier selection; and SRM. This discussion is structured according to these categories starting with SRM.

**Supplier relationship management**

The literature study addresses many problems identified within this category. First of all, the literature study provides the problem owner with insight in many important elements regarding supplier relationship management. Philips does not fully grasp the extent and value of SRM and this study offers a comprehensive overview not only of the important constructs of SRM, but also the dynamics and its potential influence on the NPD performance. The study identifies issues that may come up in dealing with supplier in a NPD context and suggests a number of behaviors that address problems such as: lack of trust and communication issues.

**Supplier selection**

This literature study does not address the problems in this category directly. However, it has identified several qualities and capabilities that could be incorporated as criteria in the supplier selection process. Especially concerning ODM- and OEM-projects are these constructs important. By combining these constructs with the regular selection criteria, Philips can partially ensure that the selected supplier has certain qualities and capabilities that enable him to build a high quality relationship, which in turn positively affects the performance of the project.

**Internal capabilities**

Philips traditionally is product developer and manufacturer. This has created a hesitation towards outsourcing product development. Furthermore, Philips has shown not to be very capable of managing supplier relationship in order to leverage the knowledge and capabilities of the supplier in the NPD project. This literature study provides an overview on how to manage supplier relationships in a NPD context and indicates which capabilities and skills are essential to managing supplier relationships.

**Organization NPD projects**

The problems mentioned regarding the organization of NPD projects are addressed to some extent by the literature study. The study does not indicate how to organize the organization specifically, but it does indicate how project teams can be organized and what skills and behaviors are necessary for successful SRM in NPD.

**Philips MCC’s innovation strategy**

This literature review does very limited address the issues regarding the innovation strategy of Philips MCC. It does provide MCC with insight on the impact of their different sourcing models and provides the
management of MCC with more insight with regard to their decision making process regarding supplier involvement.

**PHILIPS PROCEDURES AND WAY-OF-WORKING**

The complete list of investigated documentation is presented in Appendix 8.11. This list also included documents that are outdated or in the process of being updated. This is done to generate a complete as possible overview. Even more, it provides insight any shifts in focus within the Philips organization. In total, 57 documents have been analyzed.

The processes in place at Philips are aimed at guiding product development concerning >EUR 1M projects. Furthermore, these processes can be characterized by the legacy stemming from the history of Philips in electronics and lighting. These procedures are aimed at guiding complex projects. Philips has instituted their Value Sourcing program, especially aimed at involving supplier in their NPD projects.

The protocols and manuals drafted by Philips to guide their employees in the way of working generally do not provide employees involved in NPD projects with input on how to behave. The manuals and protocols do not offer insight in how to operationalize SRM in NPD projects. Instead, they are limited to providing tools and insight referring to the tactical or strategic level of an organization. The actual behaviors that employees need to pursue are never part of this extensive document set. The result of this is clearly visible within the research context. Philips has the intention to involve supplier in their NPD project, but fails to operationalize this intention, leading to unexploited potential of supplier involvement in NPD projects.

The overview of documents shows that many are very old; even outdated. Furthermore, these documents have often been drafted specific for one sector, business unit or category of Philips. Nonetheless, these documents are used as a template for the whole of Philips. The number of manual, templates and instructions depicted in Appendix 8.11 can be seen as a reflection of Philips’ strict and rigid way of working.

The document analysis has shown that within Philips as a whole there is a lack of attention on how to operationalize supplier involvement in NPD projects. Many of the documents are aimed at securing liabilities and covering risks; in other words: focused on the negative sides of supplier involvement. Very little attention is paid on how to exactly leverage the knowledge and capabilities of the supplier in NPD process. This research is an attempt to provide Philips with a model in which is made clear how to operationalize the supplier involvement in NPD projects.
4 Empirical research

This Chapter presents the results and findings of the empirical research. The aim of this Chapter is to provide us with input in order to answer the following research questions:

RQ5: In the current NPD-projects, how does Philips MCC manage supplier relationships?

RQ6: What are the key determinants regarding best practices of supplier relationship management?

RQ7: What aspects are important in managing supplier relationships in NPD projects successfully?

RQ8: In which way should these aspects be organized at Philips MCC in order to set up a best practice on managing supplier relationships in NPD projects?

Furthermore, the empirical research is done to verify and validate the conceptual model presented in Exhibit 3-4. The findings from the empirical research will be used to change the conceptual model in order to compose the final model.

The findings of the four cases are discussed in Paragraph 4.1 to Paragraph 4.4. The chapter is concluded by the cross-case analysis in Paragraph 4.5 and the conclusion in Paragraph 4.6.

For the presentation of the findings the structure of the conceptual framework is followed, along with the chronology present within the separate cases.

4.1 Case study 1: Nevada

4.1.1 Description of the case

The first case under discussion is the project Nevada. The aim of the project is to redesign, re-develop the existing plastic cup range produced by Philips. There are three types of cups for toddlers with varying volumes. The lid and spout of the bottles need to be re-designed such that they also fit the glass bottle range of MCC. This inter-exchangeability will increase the functionality of the range and increases the attractiveness of the product for the consumer.

For this project an in-house sourcing model was chosen. This was not the first choice of Philips; their initial intention was to have a supplier develop the product. That supplier was Item. However, Philips and Item only had contact before and during the beginning of the project. It soon became clear that not only Batam was able to produce to a much lower price than Item, Item also had difficulties translating the technical requirements to a product that would support this inter-exchangeability. In this project, which is essentially a collaboration between one location of Philips and another location of Philips, clear agreements were made on the communication structure. Every member of the team has its own counterpart at the supplier. This structure was not rigid throughout the project, but had the flexibility to adapt to the dynamics of the project. The collaboration went smooth, to a large extent thanks to the good collaboration and relationship with Batam. The fact that they speak the same Philips-language, regarding technical information, procedures and processes increased the ease and efficiency of the communication and collaboration. It must be noted, however, that there still were difficulties in the communication during the project. It is remarkable that during the project, even though Batam and MCC are part of Philips, there still occurred some misalignment between the organizations.

Batam is a manufacturing site owned by Philips and is purely responsible for the production of the bottles. Their role is strongly focused on lifecycle management of the product; so their aim is ensuring the quality of the product throughout production, for longer periods of time. This means that Batam is responsible for developing tools, purchasing the bill-of-material and configuring the production line.
The core of the project team at Philips has remained the same throughout the whole project. The team was composed of a project leader, functional developer, PRC, QPL and lead engineer. Other functions (e.g. purchasing and NPI) were involved during the project, but did not belong to the core team.

The project itself was delayed due to some difficulties that arose during the development. Furthermore, development has remained more or less within budget. Even though the project planning has been exceeded (which introduces additional costs), the investment costs has remained on target. The target factory cost price has been exceeded to such an extent that the product will now cost six eurocents more to produce compared to the FCP quoted by Item. The product launch is planned in the first quarter of 2014. An overview of the main characteristics of the case study is presented in Table 4-1.

### Table 4-1 The main characteristics of case Nevada

<table>
<thead>
<tr>
<th>Case study 1: Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td><strong>Project type</strong></td>
</tr>
<tr>
<td><strong>Innovation type</strong></td>
</tr>
<tr>
<td><strong>Sourcing model</strong></td>
</tr>
<tr>
<td><strong>Start date – end date</strong></td>
</tr>
<tr>
<td><strong>Proposed TTM</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Team</strong></td>
</tr>
<tr>
<td><strong>Market maturity</strong></td>
</tr>
<tr>
<td><strong>R&amp;D spend</strong></td>
</tr>
<tr>
<td><strong>Supplier</strong></td>
</tr>
<tr>
<td><strong>Supplier characteristics</strong></td>
</tr>
</tbody>
</table>

#### 4.1.2 Data collection characteristics

In this paragraph the characteristics of the data collection and sources are discussed and the Paragraph is concluded by an evaluation to what extent this meets the data collection conditions set in Paragraph 0.

- From the project team, the IPL; lead engineer and responsible purchaser were interviewed. Three members of the management team were interviewed as well and finally the involved supplier has been interviewed.
- All interviews took place with a single respondent present.
- Six out of seven interviews were conducted face-to-face (in Dutch); the remaining interview was conducted via Microsoft Lync (in English) or a similar program.
- The average interview lasted 39 minutes (ranging between 25 and 1h1 minute).
- The interviews were recorded and transcribed from tape to text. These transcriptions covered 28 pages (Calibri; 10pt)
Regarding supplier relationship management and data triangulation, it can be concluded that the conditions set in Paragraph 0 are met. Not only are members of the project team included in the interview, also the leading management team and the counterpart at the supplier are interviewed.

4.1.3 MAIN FINDINGS

In this Paragraph the main findings from this case are discussed. As stated in the beginning of the report, the data are discussed according to the chronology of the project and the elements of the conceptual framework.

SUPPLIER SELECTION

Philips has started scouting for suppliers in the T&FC-phase of the project. After this scouting, Philips started working together with Item, a Chinese manufacturer. The intention of Philips was to have them develop and produce the plastic cups. The assumption in the beginning of Philips was that this project could be done as an ODM-project, where Item would be responsible for the development as well. Philips would have the lead regarding the technical specifications of the product and the supplier would be designing and developing the product according to these specifications. The assumption of Philips was based on the fact that Item was one of the five largest suppliers in this product category in China.

However, early on in the project it appeared that Item did not have the capability to develop such a product. Furthermore, Philips was struggling to define the scope of the project and specify the product. Item was able to develop a product, but it was largely based on technical quality, and not on the specifications and drawings delivered by Philips. So, for Philips it was not guaranteed that the quality of the product would be consistent throughout the production. Eventually, Philips found out that their competitors, who used the same supplier, did their development in-house, only to use Item as a CM. There were many difficulties regarding communication, no clear agreements were made and there was little insight in the processes of Item.

Upon this realization, Philips decided to develop the product in-house and contract a supplier as CM. The final supplier selection was largely based on financial grounds. Batam, being a Philips-owned manufacturing site, offered by far the lowest quote and thus was selected. The fact is that Batam as an in-house manufacturer offers Philips several other benefits, which are more difficult to obtain when collaborating with an external supplier. For one, the collaboration with Batam is much better (as compared to external suppliers). The supplier speaks the same technical ‘language’ and regarding processes. Both working for the same company makes goal alignment much easier.

In retrospect, Philips based their initial supplier selection on too limited information, regarding the scoping of the project and the suppliers available. This contributed to the selection of a “wrong” supplier and caused delay in the project. Eventually, after freeing up development resources within MCC, Batam is used a CM and Philips develops the complete product in-house.

SUPPLIER RELATIONSHIP QUALITY

The project team is satisfied with the overall quality of the relationship. They acknowledge the benefits of collaborating with a supplier, which is a Philips organization and has the same way of working. Another aspect that contributed to the relationship is that Batam was involved very early in the project. Within the project, several decisions could be made as a result of a better quality relationship with the supplier.

The project team in Eindhoven found that they could communicate with Batam very effectively and efficiently. This was partly caused by the technical knowledge Batam possesses; this saved time and effort which is usually needed for clarification. Also, the communication was very open and honest. The interviewees indicated that this level of openness was very difficult to attain if the project was done with an external
The baseline of trust that exists between Philips Batam and Philips Eindhoven enabled high quality communication.

Further along in the project, some difficulties arose. This was mainly caused by the content and set-up of the project. The development was taking place in Eindhoven and Batam tried to anticipate on the work and input coming from Eindhoven. This caused some misalignment in the project. To overcome this problem, the project leader set-up a communication structure ensuring knowledge and content sharing. This structure also aided the project through facilitating more informal discussions. This communication structure consists of many teleconference-calls and e-mails. For the project leader it meant that no one was in contact with Batam without him knowing it. Also, after every conversation and meeting the supplier was asked to repeat what was agreed upon to verify whether they understood what was being asked or told. The interviewees were all of the opinion that this method increased the progress and alignment of the project.

Furthermore, the lead engineer went on a visit to Batam during the project. The project leader described the impact of that visit as follows: “The fact that our lead engineer was on site in Batam must have saved us one to two months in the project. The speed with which steps were made in the project and content was shared was unlike anything I have seen in other projects.” The project team in Eindhoven was satisfied with this progress and way of working, that upon return of the lead engineer they set-up a new procedure. From then on the lead engineer would receive all communication of Batam: their suppliers; engineers; and NPI. This way the lead engineer can quickly verify if there are any misunderstandings or wrong messages. The lead engineer evaluated his visit as follows: “This trip did not only increase the progress of the project regarding content, it also allowed me to work on the relationship with Batam. This also proved to be valuable for the course of the project.”

As Batam is a Philips owned organization there were little issues regarding trust. There was a trustful relationship between Batam and MCC, which was strengthened by the visit of the lead engineer. One of the effects mentioned of this trustful relationship is that the problem solving capacity increased during the project. Both parties are willing to think along and contribute to a solution.

In the beginning of the project the amount of information shared was limited. As the relationship developed and the project progresses this quantity increased. Philips requires of their suppliers to keep track of the project in the project documentation. During this project Eindhoven has not received any of this documentation. In the event that Batam was an external supplier, this would be escalated, however for this project it is not a problem as Eindhoven trusts that this data is present at Batam.

The information and knowledge sharing is both high in quality as in quantity. This is due to the clear communication structure which both organizations agreed upon. The project leader indicated that the visit was vital for the project; otherwise the only way of transferring knowledge was via a computer. This would, in his view, limit the quality and value of what was shared. Information sharing is mostly done via (conference) calls; weekly team meetings; documents and e-mails.

To ensure the build-up and coordination of the relationship, the IPL and lead engineer took the lead in developing procedures regarding interaction and contact. The IPL is strongly in the lead of the project. He is responsible for coordination the collaboration and ensuring the cooperation of the supplier. In the beginning of the project the involved project members were all assigned to a contact at the supplier. As the project evolved, it showed that some of these coordinating structures were too rigid and stifling the flexibility needed in the project. Batam is familiar with the Philips way-of-working and could easily adapt to the request made by Eindhoven. Also, as Batam and Eindhoven were both working towards the same goal and for the same boss, they were both strongly committed to the project. Batam, however, did not always allocate the promised number of employees to the project; neither did Philips.
Batam experienced Philips Eindhoven as being in the lead; despite both organizations work for Philips. The project leader remarked that Batam was very flexible during the project. They were quick to adapt to shifting requirements and changed demands. Towards the end of the project, the communication structures and procedures proved to be somewhat too rigid. The project leader adjusted this accordingly. As for reputation and relationship history there is little to be said. The supplier performed as would be expected of a Philips organization and this project is the first projects of MCC with Batam.

**Knowledge Transfer**

As discussed in the previous section, the sharing of knowledge and information between Philips Eindhoven and Philips Batam was of good quantity and quality. Even though, this was not always the case during the project, the overall feeling of the interviewees that the project performed well on this aspect.

A lot of project data was communicated via documents (excel- and word-documents), technical drawings and calls. As the supplier is used to the Philips way-of-working their method of documentation is thorough. So, with regard to the transfer and sharing of explicit knowledge this project has performed well. The visit of the lead engineer facilitated the transfer of tacit knowledge. During the visit general discussions were held about the overall progress of the project, about the worries of the supplier and the lead engineer used this visit to educate and train the engineers and NPI located in Batam.

**NPD Performance**

The project does not perform well; the project is slipping time wise. This is not because of the collaboration with the supplier, but caused by the limited scoping done before the start of the project. During the project, Philips decided to expand on some aspects of the development. The budget of the project is largely under control; the budget set on EUR 1.1M is currently exceeded by EUR 60k.

The project team strongly feels that the performance of their project is influenced by the quality of the relationship with the supplier. Especially the capability on problem solving is strongly increased by having a solid relationship with the supplier. This forms the basis for constructive discussions on how to approach any problems or challenges occurring during the project.

This is reinforced by being present at the supplier. To illustrate, the following quote from the lead engineer is presented: “One time during the project, we ran into a problem with a supplier in the Netherlands. At that time I was present at Batam and during dinner, the situation was casually discussed. The next day, Batam proposed a solution to the problem, even though they did not own the problem. This averted a possible delay in the overall project”.

Batam is more engaged in the project due to the good relationship. This limits any blind spots during the project and increases the available knowledge within the project. According to the lead engineer the difference in dynamics and in working with an external supplier and an in-house manufacturer are like night and day. Nonetheless, he acknowledges the value of meeting face-to-face with the supplier and having a relationship present to have a better process and performance of the project.

Lastly the attitude of the project leader greatly contributed to the course of the project. He is of the opinion that you can only discuss content if the relationship is in place. This project is performing well, only because the relationship is in place and the content of the project can easily be discussed. The direct and open connection with Batam has contributed to a more realistic cost price of the product. This cost price feedback was used in the project during the design and development of the product. Eventually, this contributes to a more realistic business case for the project. The project leader is dissatisfied with the high workload for his team and the team located at the supplier. This pressure increases the difficulty to have a flawless project execution.
Overall, the feeling exists that if any problem occurs during the remainder of the project, these can be easily overcome, partly due to the close relationship. Even though the supplier was selected partly based on a lower quoted FCP, Philips has altered their product proposition during the project, that the current quoted FCP lies six eurocents higher that the quote of Item.; meaning that the initial advantage of insourcing is lost by the over-specification and way of working of Philips.

**Supplier relationship management**

In order to qualify and evaluate the above, it is crucial to discuss in what way the relationship between Batam and Philips was managed. This provides us with insight in the effort that was put into establishing a relationship with the supplier. The aspects mentioned earlier in the Paragraph are not reiterated in this section.

The project leader responsible for the project has a very distinct way in managing the relationship. Other than other interviewees he voluntarily began discussing the value of a relationship with the supplier and the importance of a good relationship when collaborating. He indicated that he was responsible for establishing a relationship with the supplier. To him, the only way to execute a project with a supplier is to first work on the relationship. When the relationship is in place, the content will follow automatically. The presence of trust in a relationship will significantly increase the problem solving capacity within the project. Both the project leader and the lead engineer explained that they try and create trust by committing to the supplier, defending choices of the supplier and offering support when issues come up. There has to be mutual dependence, or as the project leader stated: “...it has to feel like you are linked by a rope and together trying to climb a mountain; if one falls, the other will fall too. So it is vital to support each other”.

Furthermore, a project team should always meet up with the supplier face-to-face, according to the project leader and lead engineer. Also, for aligning and maintaining the relationship the project leader put a communication structure and procedure in place. Thanks to this structure the team in Eindhoven was always up-to-date regarding any issues and difficulties of Batam. This allowed for quick intervention when needed and minimized any delays.

**Additional findings**

The lead engineer mentioned an issue that has not been mentioned yet. Establishing a relationship with the supplier faces another difficulty. Not only are there language barriers and cultural differences to overcome, especially for Asian suppliers, but these suppliers have a high personnel turnover. Usually around the Chinese New Year employees quit their jobs, celebrate with their family and search for a new, better paying job. This causes not only an outflow of knowledge, but it also becomes increasingly difficult to establish a long term relationship. Furthermore, the amount and quality of technical knowledge of a supplier can contribute to better collaboration and a more established relationship.

Remarkable to find was that all interviewees spoke of collaborating and cooperating with the (internal) supplier, however, as soon as the discussion was about an external supplier, the conversation focused more on conflict resolution.

**Perspective of the supplier**

The analysis of the case would not be complete without the input of the involved supplier. These findings are discussed in this section. The findings are presented following the chronology of the project combined with the structure of the conceptual framework.

To the supplier, there was one major issue. At the start of the project the resources were committed and the processes were committed in a way that was clear for Batam and for Philips. The problem was that during the project Philips pulled away some employees from their team, even though they were committed to the
project. As a result, the submission of some drawings was delayed and Batam had to communicate with their suppliers that the project was delayed. Because Philips did not commit their resources to this project, Batam had to keep its resources staffed longer on the project and they had to request their supplier to keep the resources committed as well.

Besides this, Batam is satisfied with the relationship with Philips. The supplier said the following: “The relationship is ok. It is satisfactionary. [...] I think the communication is quite prompt.” So the responsiveness and communication is valued by the supplier. Batam feels that the relationship is balanced, mainly due to their mutual goals. However, pulling away the resources is a sign for Batam that Philips is more in the lead.

Even though both organization belong Philips, there is a difference in way of working. For Batam, the dependence on procedures and processes by Philips has a negative effect on the project: “I think the I&D-team of Philips is quite reliant on things like simulation. I am not sure that they should rely so much on simulation. I think they might be too dependent on the results of the simulation. This is because reality might be quite different. One of the reasons why the project was delayed I think is also because of the simulations and these extensive procedures.” Later in the interview the supplier stated the following: “I believe that there is too much bureaucracy around the project. [...] I think it is difficult from a business point of view to have a system that is good to cater to all the businesses and needs. That is why I know the templates tend to change a bit and when you are pressed for time, it can be quite frustrating.”

The communication with Philips was very smooth. Batam feels that the message between Philips and Batam is often clearly conveyed. Also, during the project the supplier ran into several problems and Philips was very willing to listen and help reach a solution. The supplier explained it as follows: “The reason our communication was of such a high quality, is because we [Philips and Batam] agreed up front upon a communication structure.” The communication was very open and honest. The visit of Philips’ team to Batam has helped in establishing a relationship and increased the cooperation on both sides. Batam was provided with a good overview of the project and market. Also, Philips provided Batam with an overview of budgeting, investments and the timing of the project. Furthermore, Batam valued it greatly that the scope of the project was communicated clearly. However, the physical distance was a problem as the communication sometimes became less frequent and there was not much time to discuss the project. According to Batam, Philips did not deliver as promised in the beginning of the project. The supplier found this to be very frustrating.

Batam has a clear view on how to manage the relationship with a customer: “I think we should help each other. In that sense, we have our own limitations and they have their limitations and we should work in companionship. The working relationship should be constructive, positive. Finger pointing for instance is not going to be helpful in the project. When problems come up, we sit together and work things out. We should always aim for a win-win situation. For example, in terms of costs or quotation, maybe they issue some quotation based on some assumptions, which might be wrong. They might have alternative costs during the project. We check them entirely, we sit down and study the quotation on what is reasonable and what is not reasonable and then wherever we can help, we help.”

The fact that the relationship with Philips Eindhoven was better quality, certainly improved the speed and quality of the project, according to the supplier. The transparency, not only regarding the content of the project, between Philips and Batam not only helped the relationship, but the project as well. Lastly, Batam is satisfied with the result and course of the project.

4.1.4 Summary of the findings

Firstly, the supplier selection was based on incomplete assumptions. Furthermore, Philips 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 (Batam) was responsible for
production and MCC designed and developed the product, with help of Batam. Batam was selected based mainly on the quoted FCP, which was the lowest and the fact that Batam is a Philips organization. Both project teams are satisfied with the relationship. During the project, the benefits of working with a supplier which was familiar with Philips’ 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 Batam in the project and the communication structure.

The face-to-face visits of the Philips team to Batam 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 Batam and Philips 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. Batam 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 Philips 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 Batam is not only successfully leading to a new product range, the input of Batam also helped with issues Philips had within the project.

The main findings regarding the conceptual framework are summarized in Table 4-2.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Experience</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship quality</td>
<td>(o)/(+)</td>
<td>- Face-to-face visits increased trust</td>
</tr>
<tr>
<td>Trust</td>
<td>(+)</td>
<td>- The communication structure greatly improved the quality of the communication and alignment between the two organizations</td>
</tr>
<tr>
<td>Communication</td>
<td>(+)</td>
<td>- Face-to-face visits increased effectiveness</td>
</tr>
<tr>
<td>Information and knowledge sharing</td>
<td>(-)/(+)</td>
<td>- Difficult due to language barriers and geographical differences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Open information sharing due to trustful relationship</td>
</tr>
</tbody>
</table>
| Cooperation and coordination | (+) | - Proper understanding and alignment on the way-of-working  
- Cooperation supported by displayed flexibility |
| Adapations and investments | (-) | - Supplier had difficulties fully adapting to MCC’s way-of-working |
| Commitment | (-) | - Resources being pulled from the project |
| Satisfaction | (+) |  |
| Dependency and power | (o) | - Both organizations are Philips |
| Flexibility | (-)/(+)| - Batam found the procedures of Philips too rigid  
- Philips was satisfied with the flexibility of Batam |
| Reputation | (o) | - Appears to have no effect |
| Loyalty | (+) |  |
| Relationship history | (o) | - Appears to have no effect |
| Additional findings | (+) | - Batam is a Philips organization and thus familiar with the way-of-working  
- Transparency increased the quality of the relationship |
| Knowledge transfer | (+) |  |
| Explicit knowledge | (+) | - Ensured by communication set-up and familiarity of way-of-working |
| Tacit knowledge | (+) | - The face-to-face meetings contributed to the transfer of tacit knowledge |
| Additional findings |  |
| Performance of the NPD project | (+) |  |
| Timing | (-) | - Time schedule slipped due to limited project scoping |
| Budget | (+)/(-) | - The budget has remained under control  
- Batam selected because of low FCP; due to increasing requirements and shifting design the FCP has exceeded quoted FCP by Item |
| Quality | (+) | - No significant issues regarding quality |
| Additional findings | (+) | - Increased project solving capacity due to communication and trust  
- Alignment due to communication |

### 4.1.5 Implications for the Conceptual Framework

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.

All interviewees agreed with the proposed relationship presented in the conceptual model. Barring some nuances on the twelve constructs, the interviewees acknowledged the importance of the constructs for a relationship with a supplier. Furthermore, a higher quality relationship definitely improved the quantity and quality of knowledge transfer, where one interviewee remarked: “Especially sharing experiences is easier
when you have a close relationship with your supplier. You tend to be more open in discussions; people tend to propose more ideas and are less afraid to speak up.” Lastly, a NPD project will always benefit from a good relationship between the supplier and the buyer, according to one of the interviewees.

To support the chain of evidence in this case study, all interviewees were asked to grade the relationship (grade 1 to 5; 5 being the highest; Appendix 8.10.2) with the supplier (or customer) on the different constructs presented in the conceptual framework. These results are presented in Exhibit 4-1.

![Exhibit 4-1 Ratings on the different constructs of case Nevada](image)

The exhibit provides support for the findings discussed in the previous sections. Both organizations give high scores regarding the main four constructs (i.e. trust; communication; information and knowledge sharing; and cooperation and coordination). Transparency was mentioned as a great contributor to the quality of the relationship; the suggestion would therefore be to include transparency in the framework. The perceived lack of commitment by Philips is reflected by the difference on commitment and loyalty. Whereas Philips scored the constructs very high, Batam rated them lower. The dissatisfaction and concerns of Batam about the extensive and rigid procedures can be found in the poor ratings on flexibility mainly and reputation. The relationship history did not have an effect on the relationship quality that was worth mentioning according to the interviewees. They could also not recall any project where that was the case; the relevance of relationship history in the conceptual model can therefore be questioned. These ratings are to a large extent in line with the findings from the interviews. The overall performance of the NPD project and satisfaction with the collaboration is reflected by the ratings on the individual constructs and the findings from the interviews. It appears that the satisfaction with the relationship and the strong presence of the four main constructs within the relationship have contributed to the overall knowledge transfer and eventually to the performance of the NPD project. This is not translated into the actual results of the project itself; internal factors (e.g. lack of scoping and shifting demands) of Philips have caused the project to perform poorly.

4.2 Case study 2: Microwave sterilizing bag

4.2.1 Description of the case

The second case under discussion is the development of a microwave sterilizing bag (MSB). The aim of the project is to develop a plastic bag in which a consumer can sterilize multiple bottles in a microwave. By adding a small amount of water and the bottles in the bag and putting the bag in the microwave, the bottles are sterilized. This prepares the bottles for bottle-feeding a baby or toddler. The bag itself is a ‘standard’ plastic product, with a zipper and a valve through which excess steam can escape. This product is a typical me-too
product, according to Philips, as several of Philips’ competitors have similar products in the market with the same functionality. Philips’ aim is to differentiate itself from its competitors by adding a steam-release; increasing the volume of the bag to accommodate multiple bottles and by adding several warnings to increase the user-friendliness. All-in-all, it is a standard product with some minor adjustments of Philips.

From the onset Philips has decided to outsource the development and production, mainly based on two arguments: the MSB is an accessory, with little possibility to make a superior claim. Therefore the strategic importance of this product is considered to be relatively low. Furthermore, Philips does and did not have the knowledge in house regarding sterilizing food-containers and the product itself. The management of MCC thought of the project as being simple; the project should not cause any problems and should be quick and lean. This was the approach of Philips. The project is an OEM-OTS project, where Philips intended to have the product developed by the supplier, where Philips communicated the additional functionalities and characteristics of the product to the supplier.

For the project, the company [Company A] was selected as supplier. [Company A] is a Chinese plastic bag manufacturer. During the supplier scouting, [Company B] scored highest on cleanliness, hygiene, procedures and factory operations. On that basis, and their reputation as high-volume bag manufacturer, [Company B] was selected and released as supplier.

The project team on Philips side was composed of a project leader, a purchaser and a NPI. No engineer was involved in the project, as Philips assumed that the supplier was able to translate Philips’ requirements into a product. The project itself went difficult. After several unsuccessful product proposals of [Company A], Philips came to realization that [Company A] did not have the development capability they assumed they had. This resulted in Philips taking much of the development back in house. Even though the project initially started as an OEM-OTS project, where much of the responsibility lies with the supplier, it has shifted towards a CM sourcing model, with Philips doing much of the development and the supplier being mainly a manufacturer. Eventually, the product was developed to a large extent by Philips engineers and was launched in the market. An overview of the main characteristics of the case study is presented in Table 4-3.

<table>
<thead>
<tr>
<th>Case study 2: Microwave sterilizing bag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td><strong>Project type</strong></td>
</tr>
<tr>
<td><strong>Innovation type</strong></td>
</tr>
<tr>
<td><strong>Sourcing model</strong></td>
</tr>
<tr>
<td><strong>Start date – end date</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Team</strong></td>
</tr>
<tr>
<td><strong>Market maturity</strong></td>
</tr>
<tr>
<td><strong>R&amp;D spend in EUR</strong></td>
</tr>
<tr>
<td><strong>Supplier</strong></td>
</tr>
<tr>
<td><strong>Supplier</strong></td>
</tr>
</tbody>
</table>
### 4.2.2 Data collection characteristics

In this paragraph the characteristics of the data collection and sources are discussed and the Paragraph is concluded by an evaluation to what extent this meets the data collection conditions set in Paragraph 0.

- The IPL, NPI-lead and responsible purchaser were interviewed. Four members of the management team were interviewed as well and finally the involved supplier has been interviewed.
- All interviews took place with a single respondent present.
- Six out of eight interviews were conducted face-to-face (in Dutch); the remaining two interviews were conducted via Microsoft Lync (in English) or a similar program (Skype).
- The average interview, lasted 51 minutes (ranging between 34 and 1h4 minutes).
- The interviews were recorded and transcribed from tape to text. These transcriptions covered 33 pages (Calibri; 10pt)

Regarding supplier relationship management and data triangulation, it can be concluded that the conditions set in Paragraph 0 are met. Not only are members of the project team included in the interview, also the leading management team and the counterpart at the supplier are interviewed.

### 4.2.3 Main findings

In this Paragraph the main findings from this case are discussed. As stated in the beginning of the report, the data is discussed according to the chronology of the project and the elements of the conceptual framework.

**Supplier selection**

Philips contacted the suppliers with the project description in which was stated that the desired product should be similar to competitors’ products, with some small adjustments in order to differentiate from the competitors. There has been a supplier scouting in Asia and Europa to see which suppliers was able to produce such a product. This resulted in a shortlist of five suppliers, which were all thoroughly assessed. Philips was disappointed with the results, as the number of suppliers that could meet the standard and needs of Philips was low.

The selection of the supplier was based on three aspects: an assessment of their capabilities, an assessment of their factories and how well their procedures were defined. The assessment of the supplier was largely based on how well the potential supplier performed in the industry; the soft-skills assessment was mostly neglected. During the scouting of the supplier, Philips was very focused on documentation; on the hardware. For the project,  was selected as supplier. During the supplier scouting,  scored highest on cleanliness, hygiene, procedures and factory operations. On that basis, and their reputation as high-volume bag manufacturer,  was selected.

One of the problems was that the IPD process of Philips did not match the product development process at . As a result there were difficulties in finding the right (functional) counterpart and aligning the responsibilities. One of the interviewees put it as follows: “Philips is not very interested to understand the
competencies or the legacy of the industry and therefore they [Philips] will just ask them [\text{Supplier}] to do whatever Philips wants, from the perspective of our own IPD-process, without thorough understanding of the supplier."

In retrospect, the choice for \text{Supplier} as our supplier has not been a successful one. The assessment was that \text{Supplier} had much greater capabilities. The assumption was that, because they had a lot of large customers and they employed engineers, \text{Supplier} would be able to design according to the specification delivered by Philips. The expectation on Philips’ side was that it was a standard product (development) for the supplier and that they would be able to process the functional specification of Philips. During the project, it showed that \text{Supplier} did not have those capabilities within their organization. \text{Supplier} proved unable to translate Philips’ request into a product.

\textit{Supplier relationship quality}

The relationship with \text{Supplier} proved to be very difficult. In the project team located at the supplier there are three people involved; those people collaborate with Philips. The main issue is two persons do not speak and understand English, or at least very poorly, and the third person does speak English but lacks any technical knowledge. This makes the communication very troublesome; both parties involved have trouble making themselves understandable. The purchaser of the project said the following: “Most of the times they [\text{Supplier}] do not understand what is being discussed. There is a lot of communication, but is not effective.”

Even though Philips Hong Kong was involved in the project, there still were many language issues; the language barrier played big a role; it made it very difficult to communicate content. The communication was mainly problem-driving and reactive; there was no structured communication in place. The fact that there was no possibility to meet face to face hindered the collaboration. “Especially in dealing with a supplier located in Asia, face to face meetings are crucial” as was mentioned by one of the interviewees. For more straightforward communication, e-mail and teleconferencing proved to be effective. To illustrate how strained the communication was at times, another quote from the purchaser is provided: “Sometimes during the project, there were some difficulties in the project, which were discussed over the telephone. However, the counterpart at the supplier would often get angry and hang up the phone. For Philips, this is unacceptable behavior.” It is clear that this communication break-down increases the complexity of the development process and further deteriorates the relationship between \text{Supplier} and Philips. The absence of fixed communication channels and communication protocols further complicated the communication in the project, causing confusion and delay. \text{Supplier} got confused by all the different voices and inputs.

The relation between the purchaser and the CEO of \text{Supplier} is very good. They are in close contact and call at least once a month. These short meetings are regarded as highly effective, but overall the relationship with \text{Supplier} is still very difficult. According to Philips, it is unusual that a purchaser has direct contact with the CEO of the supplier. The relationship proved helpful, as the CEO understood English and was able to communicate the technical information and requests to his employees. Thank to that better quality relationship the purchaser was confident that the supplier would put in extra effort to comply with all of Philips procedures and protocols, even though this meant extra work. Furthermore, due to this relationship, any problems that came up during the project have been solved quicker and with less effort.

Besides the issues regarding communication, Philips does not trust the supplier in this project. This is mainly because of three reasons. First, sharing of information with the supplier was of poor quality. Secondly, the amount of shared knowledge and information was poor. Finally, even though \text{Supplier} stated that they were able to develop the product Philips had requested, they had failed to deliver. This failure to deliver has damaged the relationship and made Philips lose trust in \text{Supplier} and its capabilities.
During the project, Philips tried to share a lot of information and knowledge with the supplier. This was done to guide them through the development process. Philips perceived the development process of as a black box; Philips makes a request and a product/solution comes out. And even though this might comply with the request Philips made, Philips would like to gain insight in how and why; the development process. For Philips this made the process more difficult as they had little ground or information available to make recommendations to or steer them during the process. Even though there was some information sharing, the general view is that both parties were not transparent in their actions and thoughts.

Regarding the coordination of the project, the roles within the project were not properly defined from the start of the project. The cooperation of was not satisfactionary for Philips. As had difficulties understanding the IPD process of Philips, Philips trained them in their way of working. Even though Philips has made a lot of investments in and the relationship, it sorted little effect. Philips freed up resources and provided training to; however this was not as effective as they had hoped. Philips does not perceive the supplier as being committed to the project, the actions of the supplier lack effectiveness and quality. For Philips loyalty is less of an issue, as this project does not have a lot of IP-related content. has shown in the project quite some goodwill; however they lack the capabilities to deliver the right solutions to Philips.

Philips is satisfied with the supplier now that mass-production of the product has started; however there are still some legacy issues, since the development phase was problematic. During the whole of the collaboration communicating and translating technical information/know-how from to Eindhoven (and vice-versa) was difficult. As this is the first project with, some start-up issues were bound to occur.

There were two interesting findings that came during the interviews. Philips does not have the feeling that they are an attractive customer for and it is thought that this hinders to a great extent the relationship-buildup and the collaboration. The second finding is regarding the travel ban; travel is limited and the project therefore did not start with a face-to-face kickoff. The first time the project leader and the counterpart at met each other was four months in the project. Immediately, the effect of the visit was clear. Several weeks after the visit, the communication went much smoother and progress was faster. However, quickly after that, the attention slackens and the process is again showing difficulties. The general view is that if Philips had set up a kick-off with the supplier, the project had been much more aligned and would have run smoother.

**Knowledge Transfer**

As is discussed in the previous section, the sharing and transfer of knowledge between Philips and was problematic. Due to the difficulties in communication, it took a lot of effort of discuss technical information. Let alone the transfer of explicit knowledge, the transfer of tacit knowledge was nearly nonexistent because of this limited communication and strained relationship. This limited knowledge transfer had some very clear effect on the performance of the project, which are discussed in the following section.

**NPD Performance**

The project did not go as Philips or the supplier had hoped or anticipated. The communication with management is fine, however closer to the operational level it is very difficult communicate and transfer knowledge to the supplier. This has produced problems regarding trust during the project. Philips labels the supplier in question as ‘weak’, for not being able to fulfill the requirements. Due to these difficulties in communication, there were a lot of misunderstandings and failures to align on goals and specifications. A lot of time was spent on communication. Even on the simplest things, a lot of time was lost. Also, the lack of communication structure hindered the progress of the project substantially.

The NPD processes of Philips and were very different. As a result there were difficulties in finding the right (functional) counterpart and aligning the responsibilities within the project. The processes of the
supplier were not transparent and messy. The quality inspection and the function tests have all been performed, but sloppy, making the results unusable and inconsistent, according to Philips' standard. did require a lot of support to conduct the quality testing from Philips, in material form and in discussions.

The assessment of Philips that had knowledge and expertise about the product architecture and characteristics was correct, however they proved to be unable to translate that into solutions and a design. This was very frustrating during the project, for both parties. As a result of that, there was a lot of communication with the supplier; way too much, as mentioned by one of the interviewees.

Another interviewee indicated: “There were a lot of discussions between Philips and during the project. It was not that did not show commitment, however the solutions they came up with were not the ones we [Philips] wanted. It was a real struggle.” During the project everything had to be explained many times. One of the main shortfalls on Philips’ side was that they did not staff an engineer on the project. Even though the chosen sourcing model did not require that, it would have been really helpful in this project. Because of these problems in the project, the initial sourcing model has not been followed. It had to be an OEM-OTS project, or at least ODM; however Philips was chose to return to a CM model.

The NPI-lead reflected on the project as follows: “In retrospect, Philips did not scope the project adequately, the sourcing model was inappropriate and a wrong supplier was selected for this project, causing a lot of problems during the project. These problems resulted mainly in delays and frustration.” A member of the management team of ISE shared the following thoughts on the performance of the project: “Even though we eventually succeeded in getting the product to the market, the process in getting there could not have been more difficult. The amount of attention we had to pay for this project is way too high. All in all, this project has been very frustrating to me.”

Regarding expectations, Philips had high expectations and refused to lower them, even though the actual results showed they should have. This has caused that not only Philips got frustrated, but also the supplier got annoyed with the changing demands and specifications. Philips still indicated that this project was valuable for them. The project and process was valuable, because Philips did learn a lot about the operations of this type of industry and manufacturing.

Due to all the difficulties, the project was delayed. To such extent, that one launch-window was missed. That is unacceptable for this kind of project, according to a member of the management team of ISE. Moreover, the project exceeded its budget. The initial target was EUR 25k, based on the OEM model. However, with the shift in sourcing model, the budget was increased to EUR 100k. This number was not exceeded; the initial budget was exceeded by more than 300 percent. This is mainly because Philips had to increase their resources in order to guide through the project. Philips exceeded its budget, not only because the sourcing model changed during the project, also because there is no clear project-end at ISE. So, even though a product has entered another stage in its lifecycle, questions and issues still keep coming back to the project team, requiring time and effort of the engineers and developers.

Now that the product is in production, the quality of the product is very high. The experience of clearly shows regarding the production process. The product is performing well in the market and the development costs will be covered by the sales, faster than expected. The project has shown that having contracts and formal agreements alone in place is not enough to guarantee a successful product development project; there has to be an informal dimension present that can contribute to the success of the product development process.

Supplier relationship management

In order to qualify and evaluate the above, it is crucial to discuss in what way the relationship between and Philips was managed. This provides us with insight in the effort that has been put into establishing a

SUPPLIER RELATIONSHIP MANAGEMENT

In order to qualify and evaluate the above, it is crucial to discuss in what way the relationship between and Philips was managed. This provides us with insight in the effort that has been put into establishing a
relationship with the supplier. The aspects mentioned earlier in the paragraph are not reiterated in this section.

To keep the relationship with working, the purchaser had regular calls with the CEO of which is unusual. The purchaser of the project held business review meetings with the CEO. This was an event of two days in which all outstanding issues and decisions were discussed. This proved to be very valuable for the relationship and the project itself. The purchaser has regular calls with the CEO of at least once a month. This helps the project along, but still the attention slips away after a while. The purchaser stated: “I consider that as a real shortcoming of the supplier, unacceptable.”

Philips has not agreed upon a communication structure with the supplier, even though during the project the communication continued to be difficult. For this project, as for many projects at ISE, Philips was occupied with the content of the project. They failed to plan and set up an effective way to collaborate and communicate. “This makes any project with a sourcing model other than CM a great, perhaps undo-able, challenge” as stated by one of interviewees. The management of ISE indicated that they expect the project leader to set this up, however they also indicated that the project leader was not offered support in doing so.

Philips had assumed the role of demanding customer. Even though the way of working of differed in many aspects from Philips’ expectations that developed the product according to Philips’ IPD process, first time right. Only later in the project did Philips offer support and training to guide the project. Furthermore, the lack of face-to-face contact has proved to increase the lack of trust and hinder the communication.

**Additional findings**

During the project, the business review meetings proved to be valuable; both in the overall performance of the project and the relationship between Philips and . Furthermore, several interviewees showed their concerns about the lack of alignment between Philips and . This concern was amplified by the lack of transparency (with regard to processes) at both parties involved. Furthermore, according to the NPI-lead, Philips should use the PB milestone (the start of the project) to link up and align with the supplier. This could prevent many discussions and difficulties further on in the project.

Much in line what has been said about the business review meetings, a kick-off of the project face-to-face would have been beneficial to the project. Such a kick-off helps in sharing information that neither party wants to have written down; as soon as it is written down the other party can use this as a legal document. This is the value of meeting face-to-face. Furthermore, this would increase the build-up of trust and communication. To a great extent, a successful collaboration is about transparency. It is best for the project to share as much information as possible. The only filter you need to apply is the one that keeps your negotiation position intact. In the end it is all about being profitable, as soon as you lose that, the business is over.

**Perspective of the supplier**

The analysis of the case would not be complete without the input of the involved supplier. These findings are discussed in the following section. The findings are presented following the chronology of the project combined with the structure of the conceptual framework.

The supplier supplies not only microwave sterilizing bags, but also all sorts of other (specialty) plastic bags. Their main clients are competitors of Philips. was surprised to see Philips’ requirements for the product. A lot of design changes and adjustments to the product were requested. Regarding these requirements, stated the following: “For us, this was an OTS-project, as was communicated by Philips. As we supply many of their competitors with similar products, this was not a problem. However, Philips requested us to make several changes to the product, which we have not much experience in. So we had to learn how to do this.”
This project was very difficult for the supplier. In their opinion, Philips did not communicate well enough in the beginning of the project the extent of the design-changes that were asked. Even more, during the project the communication was troublesome. Most of these issues were due to the language barrier. There were a lot of misunderstandings. In order to clarify the situation and get the project aligned once again, the CEO of often had to intervene. found this highly frustrating, but they did not have the resources available to commit to this project. According to the interviewee, if Philips had indicated the scope of the project better, than would have been prepared to try and allocate additional resources to the project.

To the supplier it is clear that Philips has little understanding of the character of this type of industry. Philips paid little attention to our way of working. has indicated that they do trust Philips as they have a good reputation. The reputation of an organization is important for , as it is a reflection of experiences other organizations had with Philips. The CEO indicated that he can communicate well with the purchaser of Philips, however he also understands and acknowledged that his employees often had trouble communicating with Philips. According to there was a lot of confusion regarding the responsibilities. It was not always clear who was in the lead at Philips. The supplier indicated that communicating with the purchaser is very effective, however this is not their usual way of working.

Furthermore, even though had proposed a product that met the requirements set by Philips, Philips was not satisfied and wanted to discuss with us how we developed the product. The CEO stated the following: “We are not used to these kinds of request. Most of the times, the customer verifies if the proposed solution complies with the requirements and if it does, the project progresses. Philips, however, wanted to see every step of our process.”

found Philips to be very committed to the project and to them. Philips shared a lot of information and knowledge with, on their way of working; new product development; and quality assurance. This feeling was strengthened as Philips tried to educate.

Currently, is very satisfied with the relationship with Philips. The product was released to the market and the production is running smooth.

4.2.4 SUMMARY OF THE FINDINGS

The intention of Philips was to buy the product off-the-shelf. However, the number of adjustments Philips proposed for this product implied an ODM project instead of an OEM-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 as being one of the largest plastic bag manufacturers in China. Furthermore, as the project was set-up as an OEM-OTS project, no engineer was allocated to the project. This strained the communication between Philips and as had no technical counterpart at Philips to discuss solutions and difficulties with the requests of Philips. The NPI-lead added to this that Philips had not scoped the project well enough; Philips 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. Philips found it troublesome for the project that’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 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 Philips 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.
For Philips, the failure to deliver and perform had a detrimental effect on the relationship. This caused Philips to lose trust in as a development partner. on the other hand, did trust Philips, 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, Philips provided training to . As a result, thought Philips to be very committed to the project. Philips did not perceive as committed, due to a lack of performance. Philips strongly got the feeling that they were not a highly valued customer for ; the behaviors and attitude of enforced that feeling. Furthermore, the development processes of and Philips 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. Philips tried, but the exchange of tacit knowledge was nonexistent. Eventually, explicit knowledge was shared, but only after great effort by Philips.

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 Philips had to assign extra resources to guide through the development process.

Finally, the project was performed following the CM sourcing model. Philips ended up designing and writing the specifications for the product and 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.

The main findings regarding the conceptual framework are summarized in Table 4-4.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Experience</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship quality</td>
<td>(-)</td>
<td>• The lack of communication decreased the trust of both and Philips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The lack of performance of , further reduced the trust of Philips in</td>
</tr>
<tr>
<td>Trust</td>
<td>(-)</td>
<td>• The communication was strained and nearly impossible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There was strong language and knowledge barrier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No clear communication structure</td>
</tr>
<tr>
<td>Communication</td>
<td>(-)</td>
<td>• The issues in communicating nearly made information and knowledge sharing impossible</td>
</tr>
<tr>
<td>Information and knowledge</td>
<td>(-)</td>
<td>• No agreements on responsibilities and communication structure were made, which caused confusion at the supplier</td>
</tr>
<tr>
<td>sharing</td>
<td></td>
<td>• Philips had invested a lot in the supplier, but this did not influence the relationship or the performance of</td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>(-)</td>
<td>• Philips felt that was not committed at all; seemed to be lacking effort and not to value Philips as a customer</td>
</tr>
<tr>
<td>Adaptations and investments</td>
<td>(-)</td>
<td>• For , Philips provided them with training</td>
</tr>
<tr>
<td>Commitment</td>
<td>(-)/(+)</td>
<td></td>
</tr>
</tbody>
</table>
Satisfaction (o)

Dependency and power (-) * Philips was clearly in the lead as customer, however did not act as if Philips was an attractive customer

Flexibility (o) * Neither party mentioned flexibility as a large influence on the relationship

Reputation (-) * Both Philips and thought of the other as having a good reputation, which, certainly for Philips raised the expectations

Loyalty (o) * There was little IP-related content in the project, so for Philips loyalty did not play much of a role

Relationship history (-)/(o) * This was the first time working with , so there were a lot of difficulties aligning the way of working

Additional findings (-) * Transparency was missed by Philips, this would have contributed to trust and information and knowledge sharing
* Philips felt unvalued by as a customer

Knowledge transfer (-)

Explicit knowledge (-) * The transfer of explicit knowledge was very much limited due to the issues regarding communication

Tacit knowledge (-) * The transfer of tacit knowledge was very much limited due to travel ban and the communication issues

Additional findings

Performance of the NPD project (-)

Timing (-) * The initial launch-window was missed

Budget (-) * Due to the allocation of extra resources of Philips, the budget has been exceeded

Quality (+) * Being in mass-production, the quality of the product very high

Additional findings

4.2.5 IMPLICATIONS FOR THE CONCEPTUAL FRAMEWORK

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.

The project leader supported the relation described in the conceptual framework. Regarding this relationship, he stated the following: “When you trust each other and have established a relationship, any problem during the project can be solved easier and quicker. Eventually, this relationship positively influences the outcome of a NPD project.” The other interviewees supported this relation as well, however it was stated that a supplier should also perform. The purchaser and NPI-lead mentioned that a relationship with a supplier can certainly improve the performance of an NPD project; however, the basis should be the performance of the supplier. Without this, building and maintaining the relationship can become very difficult.
To support the chain of evidence in this case study, all interviewees were asked to grade the relationship (grade 1 to 5; 5 being the highest; Appendix 8.10.2) with the supplier (or customer) on the different constructs presented in the conceptual framework. These results are presented in Exhibit 4-2.

**Exhibit 4-2  Ratings on the different constructs of case MSB**

The exhibit clearly shows that the relationship does not score very high, according to the interviewees. This is in line with the findings discussed in the previous sections. Even though the scores on reputation and cooperation are high, this has proved insufficient to increase the overall quality of the relationship. For Philips, the underperformance of is represented by a poor score on the first four constructs. Also Philips did not consider to be very committed, as is supported by Exhibit 4-2. All in all, the exhibit is an accurate representation of the perception of the relationship quality of both Philips and .

This case is exemplar for the importance of communication for a relationship and collaboration. The bad performance on communication negatively influenced other constructs, such as trust; information and knowledge sharing; cooperation and coordination. found that the project was poorly coordinated by Philips, which was the cause for confusion at . The absence of an agreement on a communication structure has had a negative effect on the relationship and knowledge transfer. The use of Hong Kong has improved the progress and communication of the project.

For Philips, performance appears to have a large influence on the relationship quality, in particular on trust. Also, Philips values transparency of the development process of the supplier. This contributes to trust and information sharing and, according to Philips, will eventually contribute to the success of the project. Transparency can be regarded as a suggestion for the conceptual framework.

Lastly, Philips did not sense that they were an attractive customer for . This showed through the somewhat lackluster attitude of to improve upon the process, collaboration and effort. This attractiveness can also be regarded as a suggestion for the conceptual framework

**4.3 Case study 3: Mare**

**4.3.1 Description of the case**

The third case under discussion is the development of a milk frother. The project has the aim to develop a freestanding milk frother. This product has mechanical functionality, with a heating element to warm up the milk. To foam the milk, a rotating element beats the air into the milk. Philips already has a product in the market with similar functionality; however that product targets the high-end market whereas this new product is aimed at the mid-end market.
The previous development project was done by Philips Saeco with the same supplier ( ). The previous project was not successful as the profitability of the business case could not be maintained. Even though this is the second project; this project had to start from scratch. As part of the supplier selection process a number of supplier assessments have been performed. was selected as supplier; Philips already had experience with which was very important according to the project leader. Furthermore, is known to be one of the largest suppliers of kettles. The quote of was the lowest, where the competing quotes were up to twice as high. The assumption of Philips was that most members of the project team of the previous project were available and still employed by . This proved to be untrue. Because of the previous project, Philips was aware of shortcomings of the supplier, but failed to take these into account in setting up and performing the project. The project was a ODM-DTS project; meaning that Philips was responsible for the specification of the product and was responsible for translating these specifications to a design and product. Philips chose this model to ensure the profitability of the business case; if Philips had proposed the project as ODM-DTC or CM the project would not have been profitable from the start.

It soon showed that did not possess the development capabilities required for the project. The supplier proposed solutions that were unfeasible or simple did not function. The initial aim of Philips to do this project with minimal resources soon had to be let go. Due to the difficulties and issues in the project, Philips was forced to take up parts of the development. The result was that Philips directed the complete development process, which was frustrating to both and Philips.

The project itself proved to be difficult. Philips had to put in a lot of effort and invested more than they had planned. Not only the investments were a lot higher than planned for, the FCP went up as well. Philips was forced to twice stop the project, in order to re-negotiate the price with . This meant that Philips had to increase the going price of the product to ensure their margin. Even though Philips had to invest a lot of money into the project, the relatively low FCP is bound to quickly pay back these extra investments, according to Philips. Overall, both Philips and are satisfied with the result of the project. An overview of the main characteristics of the case study is presented in Table 4-5.

**Table 4-5 The main characteristics of case Mare**

<table>
<thead>
<tr>
<th>Case study 3: Mare</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Name</strong></td>
<td>Mare</td>
</tr>
<tr>
<td><strong>Category</strong></td>
<td>BG Coffee &amp; Beverages</td>
</tr>
<tr>
<td><strong>Project type</strong></td>
<td>IPD</td>
</tr>
<tr>
<td><strong>Innovation type</strong></td>
<td>New to Philips</td>
</tr>
<tr>
<td><strong>Sourcing model</strong></td>
<td>ODM – Design to specification</td>
</tr>
<tr>
<td><strong>Start date – end date</strong></td>
<td>Released for Sales</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Development of a milk-foamer. This product exists already in the market; Philips however only has it since recently in their portfolio.</td>
</tr>
</tbody>
</table>
| **Team completeness**   | - Management: Available  
- Project team: Complete, DTS/DTC development model  
- Supplier: Complete, knowledge gap on Electronics. Picked up by Philips development |
| **Market maturity**     | Slightly growing |
| **R&D spend**           |               |
| **Supplier**            |               |
| **Supplier**            | Supplier ought to have knowledge and expertise on milk-frothers/kettles and all |
4.3.2 DATA COLLECTION CHARACTERISTICS

In this paragraph the characteristics of the data collection and sources are discussed and the Paragraph is concluded by an evaluation to what extent this meets the data collection conditions set in Paragraph 0.

- The IPL, lead-engineer and responsible purchaser were interviewed. Two members of the management team were interviewed as well and finally the involved supplier has been interviewed.
- All interviews took place with a single respondent present.
- One interview was conducted face-to-face (in Dutch); the remaining five interviews were conducted via Microsoft Lync (in English and Dutch) or a similar program (Skype).
- The average interview lasted 1h6 minutes (ranging between 32 and 1h38 minutes).
- The interviews were recorded and transcribed from tape to text. These transcriptions covered 37 pages (Calibri; 10pt)

Regarding supplier relationship management and data triangulation, it can be concluded that the conditions set in Paragraph 0 are met. Not only are members of the project team included in the interview, also the leading management team and the counterpart at the supplier are interviewed.

4.3.3 MAIN FINDINGS

In this Paragraph the main findings from this case are discussed. As stated in the beginning of the report, the data will be discussed according to the chronology of the project and the elements of the conceptual framework.

SUPPLIER SELECTION

As has been discussed earlier in this Paragraph, the supplier selection is largely based on the previous experience with the supplier. Philips had already done a project with the selected supplier. However, that project, which is almost identical to the project under discussion, failed as the business case collapsed during the project.

Before the start of the project, a market scouting was performed and several potential suppliers have been assessed. Eventually, Philips ended up with as they showed most potential to meet the requirements of Philips. Furthermore, Philips assumed that most project member that were involved in the previous project, and thus familiar to the Philips way-of-working, would be available for this project. The involved purchaser put it as follows: “...when you once did something together, you would always expect that the next time would be better; or at least better than collaborating with a new supplier.” This supplier is known as one of the largest producers of kettles in China. The management of Philips had a more pessimistic view on the supplier selection for this project: “There is not always an alternative. Even though the earlier
project was not successful, I would still rather choose for a supplier of which its problems and shortcomings are known, than contract a new supplier of which we know little."

... gave by far the lowest quote for this project, which contributed to its selection. However, the RfQ for various suppliers was not more than a formality as Philips had already indicated that they were most likely to be granted the project. According to the project leader this undermined the negotiation position of Philips, as ... was more or less convinced that they would be contracted by Philips. The project leader is of the opinion that Philips should have first scoped the project better and only then should have requested a quotation of the potential suppliers.

... proved to be incapable of translating the specifications of Philips into a feasible and working product, which met the quality standard set by Philips. The feeling at Philips remains that, even though the project itself was very difficult and required a lot of effort and investment, ... is by far the cheapest supplier for this product, but not the most capable or innovative. Thus, Philips had to develop the product mostly by itself and tried to involve ... on certain and limited aspects of the development process. Regardless of the lack of capability of ..., both parties found that the relationship was of high quality. Even though this did not show in the result of the project, during the project problems and issues were discussed openly and honestly, which allowed for the problems to be quickly resolved.

**Supplier relationship quality**

Philips had hoped to benefit from the experience with ... they had. Also, Philips had anticipated that ... was able to translate their specifications into a product. Philips was, despite the difficulties in the project, quite pleased with the quality of the relationship. Both the purchaser as the supplier stated that they like working with people and supporting people. The purchaser indicated that to him a written agreement is the basis for any collaboration. Without this everything else is bullshit, according to the purchaser.

The project provided an example which illustrates not only the way-of-working in this project but also the relationship between Philips and ... The example goes as follows: "The intention of the project was to let the supplier be responsible for the complete development and testing; Philips would provide the specification and would assume a guiding role. The deadline set for the project was very ambitious from the start and it became tight and almost critical further along the project. This was partly because we [Philips] had to re-negotiate the FCP with ... The supplier was unwilling to commit to this deadline, even though this commitment was needed to pass the milestone PPC. The supplier found that in the previous project they were wrongfully held accountable for some delays and were forced to pay [because they had committed to these deadlines]. This had a negative impact on the reputation of Philips and still frustrated the supplier. Therefore, to avoid the same situation, ... would not commit from the start of the project. In order to deal with the situation and to pass the PPC-milestone, a visit to the supplier was arranged. The project leader and the counterpart at the supplier discussed the situation and the reasons why ... was unwilling to commit, upon which the project leader indicated that he understood and respected their point of view. Both parties agreed that they would not commit to each other, but both would try and support the other as best they could. This was completely based on the quality of the relationship between the two parties." From that moment on, the project ran very smoothly. According to the project leader this is because Philips was willing to focus on the informal aspects of the collaboration and acknowledge and respect the concerns of the supplier.

Both the lead engineer and the project leader stated that it was important to have a relationship with the people they are working with. The reputation of a company becomes irrelevant if you focus on the individuals. By focusing on the people, you will see an increase in effort, according to the lead engineer.

Regarding the communication with ..., Philips did not have much to remark. Within the project the communication flows were well established and both organizations were aligned. The purchaser stated that he
did not have a lot of communication with $$$, because overall the project went well and the project leader clearly took the lead regarding communication. Both organizations agreed on the way to communicate, which consisted of mainly teleconference calls and e-mails. The fact that $$$ was very good in writing and speaking English made the communication a lot easier and effective. The fact that $$$ is a relatively small organization (compared to Philips) made it for Philips easier to locate and contact the appropriate person. Furthermore, the project leader actively aims to meet the supplier face-to-face; on one hand to ensure the progress and alignment of the project and on the other hand to build and maintain the relationship. Everything that is discussed and agreed upon during a call is also summarized in an e-mail afterwards. These teleconference calls are also sometimes set up as a group discussion in which the agenda has room for discussions.

Philips indicated that they do not trust $$$ as an organization, but they do however trust the people of the project team at $$. For the purchaser trust is built when parties show commitment; which is the case. Also, having a written agreement contributes to a trustful relationship. The visits of the project leader and lead engineer to the supplier helped getting familiar with the supplier and opening up to a more informal relationship. These visits increased the openness in the relationship with $$. Philips believes trust at the supplier is created by granting the project to the supplier. Also, both project leader and purchaser find that you can create trust at the supplier by being transparent about future projects of the innovation pipeline.

Even though being transparent is important in the relationship, Philips certainly was selective with what they shared or as the purchaser put it: “If you cannot tell something to your counterpart, you better not tell it. Or tell what we cannot tell.” $$ was very transparent on their price setting, which allowed for an open discussion. Philips found that $$ was very involved in the project. They were willing to share a lot of information; they proposed ideas; and were challenging Philips regarding proposed solutions. Furthermore, the collaboration was well coordinated and both parties cooperated well. According to the purchaser, this was mainly thanks to the project leader. The project leader was not only demanding; he was also very much involved with the supplier and collaborative. He actively tried to understand the supplier and to create a good relationship with the supplier. This has proved to be valuable for the project and the collaboration.

For the relationship it is important to Philips that the supplier commits and stays committed to the project. During this development project, $$ has always displayed the willingness to stay committed to the project. The fact that $$ was pro-actively proposing ideas was a sign for Philips that $$ was fully committed to the project. Philips did not mention any adaptations that influenced the relationship with $$. The relationship was balanced, as both organizations both found that they were pursuing mutual goals. This alignment showed through the displayed flexibility by $$ which is illustrated by the following example: “Despite that $$ was pressed for time, they allocated two engineers in order to design an alternate solution upon request of Philips.” This was only possible thanks to the good relationship.

**Knowledge Transfer**

Even though both companies filtered the information they shared in the project, the knowledge transfer between the two organizations was well established. Combining visits with electronic communication appeared to be very effective in this project. The quality of the relationship gave the supplier enough confidence to propose their own ideas and defend their proposed solutions. Although not all of this input proved viable and effective, Philips highly valued this input in the project.

**NPD Performance**

Despite some difficulties, both parties appear to be satisfied with the resulting product. $$ lacked certain development capabilities, but this proved not to affect the result of the project. It did require Philips to take on a more directive role in the problem and allocate extra resources to do parts of the development. The ownership $$ showed during the project was beneficial for the amount of knowledge sharing between the
two organizations and resulted in some very good ideas and propositions which eventually were implemented in the product.

Philips had halted the project twice; however this had little impact on the relationship between and Philips. The Philips team had made clear agreements that the formal negotiations (regarding FCP) were to be done by the purchaser and the informal discussions were led by the project leader. When it comes to problem solving, the project team tried to leverage the relationship with the supplier so that they can together solve the problem at hand; the impact on the price was always discussed by the purchaser. This division of responsibility allowed for a close relationship between the two project teams and increased the problem solving capacity.

The first phase of the project was quite slow; was struggling with their development responsibilities and Philips did not want to interfere. Only when the progress was too slow, Philips interfered and assumed a more directive role in the project. Both and Philips were satisfied with this new set-up of the project. still remained responsible for the development of the product, but Philips provided more support.

The negotiations had no effect on the relationship between Philips and ; the timing of the project however did come under pressure. To make up for the lost time, Philips and had to assign more employees to the project. This caused the budget to be exceeded. This was necessary to ensure the quality of the product and to remain close to the initially quoted FCP. Philips experienced that thanks to the relationship; was putting in extra effort to ensure the success of the project. Philips’ willingness to be flexible regarding the formal commitment from increased the trust and (informal) commitment at .

Finally, the supplier was very involved in the project and the behavior of the project leader has contributed greatly to the relationship with the supplier. As a result the product was launched on schedule and with a slightly higher going price. The budget has been exceeded, however to an acceptable extent according to Philips.

SUPPLIER RELATIONSHIP MANAGEMENT

In order to qualify and evaluate the above, it is crucial to discuss in what way the relationship between and Philips was managed. This provides us with insight in the effort that has been put into establishing a relationship with the supplier. The aspects mentioned earlier in the Paragraph are not reiterated in this section.

The involved purchaser of Philips has a very clear view on managing the relationship with the supplier. For him one aspect is important: “I am a guy who is committing and when I commit, I deliver, so I expect the same from the supplier. I always make clear with the supplier on how I like to do business and they should know that I am working with commitment and a trust-approach.” When this commitment is also displayed by the supplier, a win-win situation becomes possible. This is the goal of the project.

For the purchaser it is important to have the right project leader for the project. For OEM/ODM-projects the purchaser preferably sees a cooperative project leader, not too demanding. In many projects were the project leader is very demanding and clearly assumes the role of customer, the purchaser has to interfere and restore the relationship. For this project, the right project leader was selected. The project leader, lead engineer and purchaser all feel that in an OEM/ODM-project it is like being married. “You have to act as a couple to make it happen. Do not only expect of the supplier to be trustworthy, but also try to behave as a reliable and trustworthy customer.” This attitude and trust is important to reduce the fear at Philips of exploitation and reduces the fear at the supplier of opportunistic behavior.

The project leader made the decision very early on in the project to separate the financial and contractual negotiations from the discussions about the content of the project. This creates transparency on the responsibilities of the project team members and keeps the focus on the development project. By actively
trying to build a relationship with the supplier, it becomes easier to discuss with each other during conflict situations. This proves to be crucial for the progress of the project. By focusing on the informal part of the collaboration, people tend to become more open. It increases the flexibility and commitment to one another.

**Additional findings**

For Philips, the ownership displayed throughout the project was very important. Within this project there was a big difference between people involved in purchasing and the people involved in the project. The purchaser strongly adhered to a more rational approach, and the project members focused more on the emotional and informal aspect of the collaboration. By combining these separate approaches in a project, many problems have been solved quickly.

Furthermore, the purchaser cannot always act in a way a project leader wants. The purchaser has to maintain the relationship with the supplier and the project of a project leader may not be the only project with this respective supplier. Effectively this means that the purchaser has to balance the interest of the individual project leaders/projects, the overall business, the supplier and his own targets. Therefore, a purchaser cannot always be used as an enforcer whenever a problem arises and thus should the project team build a relationship with the supplier as well to rely on solving problems.

The choice for the project leader should be strongly linked to the type of sourcing model chosen for the project. According to all interviewees it requires a very different skillset to lead an ODM project compared to a CM project. One of these skills is leadership; as a project leader the attitude and behavior you display and how you react to problems determines the relationship with the supplier and eventually is decisive for the performance of the project. These findings have come up during the interviews and did not naturally fit into the conceptual model.

**Perspective of the supplier**

The findings of the supplier are discussed in the following sections. These findings are presented following the chronology of the project combined with the structure of the conceptual framework.

Philips already had done a project with . This project was cancelled because the business case became unprofitable during the project. This was a disappointment for however Philips had gone to great lengths to communicate and discuss the project end with . Even though the project cancellation meant a loss of potential business for , the way Philips had closed the project was satisfying. However, was disappointed that the project had been killed and that Philips held accountable for this failure. was therefore not willing to commit in this project. Philips had indicated that in the event that another project was started, that most likely would be involved early in this project.

The supplier thought that Philips way-of-working was fair and honest. The visits of the project team and the purchaser were valuable to the supplier. To them, this was a token of commitment and trust. Furthermore, it increased the effectiveness and efficiency of communication. There was one major issue that frustrated the supplier. Philips had stopped the project two times to re-negotiate the project; which was difficult to accept for . However, the honest approach of Philips had helped to accept it. For it was clear who was responsible for which aspect of the collaboration.

Furthermore, the project started with being responsible for the development of the product. Early on the project, Philips increased their interference with the project and started directing the project instead of guiding it. Even though Philips stated that the reason was that the project was not progressed fast enough and the proposed solution were not feasible, to it felt like Philips did not trust in their capability and project management skills. The regular communication with Philips and the face-to-face meetings helped in accepting this changed set-up of the project and aided in aligning the goals of both organizations.
was very satisfied with the communication and information sharing with Philips. Especially the attitude of the project leader was very collaborative and the project coordinated the collaboration well. All in all, the supplier was satisfied with the relationship with Philips and above all, really satisfied to be doing business with Philips; remarks that Philips as a very attractive customer. The somewhat negative experience had with the first dealings with Philips has been reversed to a more positive experience.

4.3.4 SUMMARY OF THE FINDINGS

This is a case where both Philips 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 Philips had assumed. Nonetheless, the quote of was so much lower than its competitors that Philips immediately selected as the supplier. This decision was even further supported as was already involved in a previous project with Philips that eventually was cancelled. already knew, more or less, that they were the most likely partner for this project. This reduced the leverage of Philips to use in the negotiations. After the start, the project had to be stopped or paused in order for Philips to re-negotiate the increased FCP. Many projects would have suffered from this action; however the relationship between and Philips 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 , Philips had a very strong and collaborative team staffed to the project. Philips stated that despite the supplier’s team not being complete capable, that 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 and Philips. 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 main findings regarding the conceptual framework are summarized in Table 4-6.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Experience</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship quality</td>
<td>(+)</td>
<td>Increased by the quality of communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased by honesty and transparency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A lot of effort was shown by the supplier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trust between the project teams; not between organizations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A lot of face-to-face meetings/visits</td>
</tr>
<tr>
<td>Communication</td>
<td>(+)</td>
<td>Open and honest communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good comprehension of English by supplier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A lot of face-to-face meetings/visits</td>
</tr>
<tr>
<td>Information and knowledge sharing</td>
<td>(+)</td>
<td>Perceived as strongly present by both companies</td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>(+)</td>
<td>Highly cooperative attitude of both organizations</td>
</tr>
</tbody>
</table>
Adaptations and investments (o)/(+): Both companies were willing to invest into the collaboration.

Commitment (+): Increased by the quality of communication; Both parties delivered what they promised and were very much involved; A lot of effort was shown by the supplier.

Satisfaction (o)/(+): The ability to deliver increased the satisfaction with the collaboration; Had little effect on the quality of the relationship.

Dependency and power (+): Balanced relationship.

Flexibility (-): Found that Philips was too inflexible and too directive.

Reputation (o): Appears to have no effect.

Loyalty (o): Appears to have no effect.

Relationship history (o): Appears to have no effect.

Additional findings (+): Both organizations were very much aligned; Ability to deliver was high; Both organizations had a very strong team present; Project leader had skill set vital for collaboration; The transparency and honesty proved very valuable for the relationship; Relationship can only work on top of a formal agreement.

Knowledge transfer (+): Via agreed upon communication structure.

Explicit knowledge (+): Very much present due to many face-to-face visits; Many ideas and propositions put forward by supplier.

Tacit knowledge (+): Via agreed upon communication structure.

Additional findings:

Performance of the NPD project (+): Project within planned timeframe.

Timing (+): Project within planned timeframe.

Budget (-): The project required extra investments.

Quality (+): Very high quality products.

Additional findings:

4.3.5 Implications for the Conceptual Framework

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.

From this case several Implications for the conceptual framework can be distilled. This appears to be a case were both supplier and Philips are satisfied with the relationship and with the resulting product. According to the supplier and the purchaser, the choice for the project leader and the project is very
important. The team has to have a skillset with which they can manage a supplier and build a relationship. This, however, does not hold for all projects, but mainly for ODM/OEM-projects.

Furthermore, the honesty and openness of the communication and in the relationship appears to contribute to the quality of the relationship and performance of the project. Especially, transparency helps to increase the mutual trust. These elements can be considered for inclusion in the conceptual model. Philips clearly acknowledges the importance of having commitment and involvement for the relationship and the project.

The project leader agreed with the proposed relationship between the quality of the relationship and the NPD performance, via knowledge transfer. However, he did add that the formal agreement should always be the basis for the collaboration: “The formal agreement should be in place for all projects. Of course there might be some project specifics in the agreement. On top of that, for OEM and ODM projects you would preferably have an informal relationship with the supplier as well. This keeps the supplier involved in the project and this can complement the short-comings of a contractual agreement.”

The supplier was even more in favor of a personal relationship. Their experience is that projects tend to go much smoother when you have a close personal relationship with the buyer. They do acknowledge the danger of becoming too familiar with the buyer, as you may lose sight on the competitiveness of your organization.

To support the chain of evidence in this case study, all interviewees were asked to grade the relationship (grade 1 to 5; 5 being the highest; Appendix 8.10.2) with the supplier (or customer) on the different constructs presented in the conceptual framework. These results are presented in Exhibit 4-3.

![Exhibit 4-3 Ratings on the different constructs of case Mare](image)

The ratings are very much in line with the findings described in the previous sections. The overall performance of the NPD project and satisfaction with the collaboration is reflected by the rating on the individual constructs and the findings from the interviews.

Even though the constructs on the constructs satisfaction and reputation have been included in the conceptual model, none of the interviewees indicated these constructs are of real importance to the quality of the relationship. However, the skill-set of the project team had been mentioned several instances, as well as leadership-traits by the project leader. Furthermore, transparency and the ability to deliver have been mentioned as having a great impact on the quality of the relationship between [ ] and Philips, along with communication; cooperation; and information and knowledge sharing. Relationship-specific adaptations are
somewhat relegated to one of the more optional conditions or constructs in a relationship. Both parties did not rate trust very high, mainly based on the first project.

According to both organizations was the collaboration and relationship of high quality. The positive perception on communication; information sharing and cooperation do not only correspond with the findings from the interviews, they are also mutual. Barron some minor disagreements and poor ratings on flexibility and reputation, the overall image is that of a successful relationship between Philips and [ ], resulting in high quality products, according to both project teams.

4.4 CASE STUDY 4: GRIND AND BREW

4.4.1 DESCRIPTION OF THE CASE

The last case under discussion is the development of the Grind and Brew. The Grind and Brew drip filter coffeemaker, which has the functionality to grind the coffee beans. Philips already has a version of this product in the market; this project is aimed at developing an improved product. This second version should be of higher quality and with a lower field call rate.

The first generation product was developed by the supplier, by Saeco’s request. Saeco was acquired by Philips, so the Philips became the project owner. However, not long after the market introduction, our competitors were introducing (almost) similar products. In order to stand out from the competitors, Philips decided to develop a second generation product. This product should have the same functionality; however, the aesthetic design should be completely Philips-owned. This is to prevent any competitors from copying the product. That is one important goal of the project. The second goal is to improve on quality. With the first generation coffee maker there are a lot of quality issues and the second generation has to be of a higher quality. The third aim was to increase the usability of the product.

Since the start of the project Philips has decided to outsource the development and production, based on two arguments: the (technical) functionality for the previous generation was developed and is owned by the supplier, [ ]. The second reason is that Philips regards only the aesthetic design as having strategic importance, therefore Philips chose to design the product themselves and let the supplier do the development. The sourcing model of the project was OEM-OTS, where Philips intended to have the product developed by the supplier and Philips delivered the design and appearance of the product. This project was owned by Saeco and now had to be transferred to the Philips organization, which introduced extra complexity.

For this project [ ] was selected as supplier. [ ] is the supplier that was contracted to develop the first generation of the product. The product is more complex than, for instance, the development of a plastic bottle, therefore the project itself showed a lot complexity. One of the issues during the project was the amount of quality issues. Even though [ ] is one of the largest suppliers in its kind, they do not seem to get the quality-assurance in order. Nonetheless, this supplier is able to supply against a very low price.

The project team on Philips’ side was composed as follows: in Hong Kong Philips the project leader; NPI; SQM; and quality engineer were located. The purchaser was located in Italy; the designers were located in Amsterdam as well as marketing and the product development was located in Drachten. Furthermore, the project team of the supplier was fully located in China. Halfway during the project, the project leader from Philips was replaced (from based in the Netherlands to Hong Kong based), in order to help with some of the communication problems. The project itself went difficult. Philips has put quite a lot of effort and energy into the supplier and its development. The involvement of Hong Kong in the project has proven to be valuable; it helped in the communication. But most of all, they were able to visit the supplier, which helped the project along; it provided Drachten with feedback and input, they would not normally get when collaborating with a supplier in Asia. Even though Hong Kong made the project run smoother, their inclusion introduced another difficulty. As opposed to the team in Drachten, the Hong Kong team was inexperienced. Thus the development
team in Drachten had to establish a relationship with them as well and train them to some extent in the IPD processes. The process at the supplier side required a lot of interventions of Philips. was unaccustomed to the Philips way of working and appeared unable to control and solve the quality issues. Therefore, Philips had to intervene and free up additional resources in order to keep the project on track. The project was very extensive; there were quite a lot of problems regarding quality and the schedule. Eventually the product was released to the market, but again not without quality issues. These have been resolved; however Philips is not satisfied with the product and the project itself. An overview of the main characteristics of the case study is presented in Table 4-7

**Table 4-7  THE MAIN CHARACTERISTICS OF CASE GRIND AND BREW**

<table>
<thead>
<tr>
<th><strong>Case study 4: Grind and Brew</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td><strong>Project type</strong></td>
</tr>
<tr>
<td><strong>Innovation type</strong></td>
</tr>
<tr>
<td><strong>Sourcing model</strong></td>
</tr>
<tr>
<td><strong>Start date – end date</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Team** | - Management: Available
- Project team: Complete, DTS development model.
- Supplier: Complete, knowledge gap on execution of development. Picked up by Philips development |
| **Market maturity** | Mature |
| **R&D spend** | |
| **Supplier** | Philips regards the supplier as unpredictable with respect to results of development and process control leading to project delay and fluctuation in product quality. |
| **Supplier instructive** | Multi site project team (Drachten, Hongkong). Development according OEM model by supplier. |
| **Must** | Quality on target (improvement versus previous Off the shelf appliance) |
| **Remarks** | This is a 2nd generation product. First generation was OTS project. Now own (aesthetical) design and Philips heater. Exclusive proposition (Dual bean selection). Development model: Design to specification but many interventions during development required. |
| **Project organization** | Multi site project team (Drachten, Hongkong). Involvement of 3rd party development (in sourcing) and development according OEM model by supplier. |

**4.4.2 DATA COLLECTION CHARACTERISTICS**

In this paragraph the characteristics of the data collection and sources are discussed and the Paragraph is concluded by an evaluation to what extent this meets the data collection conditions set in Paragraph 0.
• The IPL, lead-engineer and responsible purchaser were interviewed. Two members of the management team were interviewed as well and finally the involved supplier has been interviewed.
• All interviews took place with a single respondent present.
• Two out of six interviews were conducted face-to-face (in Dutch); the remaining four interviews were conducted via Microsoft Lync (in English) or a similar program (Skype).
• The average interview lasted 60 minutes (ranging between 31 and 1h44 minutes).
• The interviews were recorded and transcribed from tape to text. These transcriptions covered 32 pages (Calibri; 10pt)

Regarding supplier relationship management and data triangulation, it can be concluded that the conditions set in Paragraph 0 are met. Not only are members of the project team included in the interview, also the leading management team and the counterpart at the supplier are interviewed.

4.4.3 Main findings
In this Paragraph the main findings from this case are discussed. As stated in the beginning of the report, the data is discussed according to the chronology of the project and the elements of the conceptual framework.

Supplier selection

The supplier selection for this project was largely based on the previous project. That supplier, [REDACTED], owns the IP-rights on the grinder and the motor for the coffeemaker and developed the first generation product for Philips. [REDACTED] was, at least Philips assumed this, familiar with the IPD-process of Philips. They knew the way of working and communicating of Philips. One of the interviewees put it as follows: “If you have a car and always go to the same garage, you both know what to expect. When you change your garage you have to start all over and find a new way of collaborating”. This consideration played a large role in the supplier selection process. Philips felt more comfortable with a choice for a supplier with known problems and difficulties, than to introduce a new supplier with unknown issues and difficulties.

As this second generation coffeemaker was making use of the same platform as the first generation, it made a lot of sense for Philips, to select the initial supplier. For the selection of the supplier, the experiences from the previous project leaders were taken into account to assess the performance of [REDACTED]. Philips did perform a market scouting in order to identify other suppliers capable of developing the product, however [REDACTED] came out on top, based on superior capability, their price level and the development effort shown. Philips assumed that [REDACTED] had experienced developers. Their price level was the lowest, but [REDACTED] showed many quality issues. The assumption of Philips was that they were able to train the supplier to achieve the desired quality level.

Even though there may have been more suitable suppliers on the market, the fact that Philips knew the way of working of this supplier and their shortcomings, combined with the time pressure on this project, made supplier choice for this project sub-optimal.

Supplier relationship quality

Philips experienced the relationship with [REDACTED] as troublesome. All interviewed people were of the opinion that there was not much of a relationship with [REDACTED]. The project leader indicated that for this project he assessed that the documentation and contract to be more important that any personal relationship.

One of the biggest challenges during this project was communication. The involved purchaser admitted that he communicated a lot with [REDACTED] This was due to the difficulty in aligning the project with the
supplier and the complexity of the project. Furthermore, having simple phone calls proved to be difficult, as there were difficulties (e.g. in establishing a functioning connection).

The project leader indicated that the project benefitted from the fact that he is Chinese; it was easier to communicate with the supplier. However, as the rest of the employees of Philips involved in the project were located in Netherlands, the language barrier still played a large role. The supplier was unable to speak and write English and even the documentation they provided was in Chinese. Therefore, a lot of translation had to be done which caused not only a delay but also resulting in some elements being “lost in translation”. Due to the language barrier, a lot of communication was done via e-mail. The conference calls were done by the project leader as he spoke Chinese.

Furthermore, the supplier was not as responsive as Philips would have liked. Halfway into the project was decided to set up and communication structure to eliminate some of the problems. Weekly calls were planned and the project leader started paying regular visits to the supplier, to help with issues on site and assist with setting up the production line.

This face-to-face time was much needed in the project and helped the project further along. Philips increased their effort by sending their lead engineer on regular basis to the supplier, for periods up to six weeks. During those visits, the value of the communication increase substantially and a lot more information was shared. The supplier felt more comfortable to ask questions and show their uncertainties. Also the presence of Philips at the supplier has increased the trust. However, upon return to the Netherlands, this richness of communication soon disappeared and many of the same communication problems re-appeared.

When it comes to trust, one of the interviewees mentioned the following: “For me, with Chinese, you need to have a contract in place. The rest is bullshit. Only after you have agreed on the contract, it becomes interesting to talk about trust”. The involved purchased agreed to this as well, although he added another dimension: “...it is not about the legal aspect of a contract; it is about having a written agreement, which reflects commitment of both parties”. Philips has little trust in the supplier, caused to a large extent by a failure to deliver of the supplier. Also, the inability to meet the quality and process standard of Philips had a negative effect on trust. Within the project, this lack of trust manifest itself in the following way: the project leader, who stated that he did not trust the supplier at all, is very demanding and focused on details. He asks evidence, about what is done and even asks evidence of evidence. Upon inquiry, the project leader stated the following: “To me, trust is only there when the performance is there. As long as they do not perform to the Philips standard and do not follow the procedures stipulated by Philips, I will interfere and will be very demanding of the supplier.”

This attitude of the project leader has caused the purchaser to get much more involved. He had to interfere, clean up and mediate the relationship. Even though the performance of the supplier was insufficient according to Philips, the lead engineer did however trust the supplier. He noticed the commitment with which they listened to the remarks and directions of Philips and took action. Especially, on the supplier’s site, did he experience that the supplier could be trusted, to put in the effort to let the project succeed.

The issues regarding trust and communication have caused the information and knowledge sharing to become an issue as well. According to Philips, the supplier is not good at sharing information. The expectation of the purchaser was that the supplier would share more information and would challenge Philips on their proposition, because owns the IP behind and the functionality of the product. This view is shared by the project leader. The supplier does not share or have ideas about the product and does not challenge Philips on the design and development choices. The lead engineer, however, has a different view: “I see a willingness to learn and therefore they are prepared to share information in the expectation that we [Philips] are able to help them [the supplier]”.
On the amount of information sharing by Philips, the following has been said: “You have to be very selective what information you share with the supplier. Since they own the IP and are responsible for the project, the trick is to share just enough information that the responsibility does not shift towards Philips. You do not want to have a situation where the supplier is hiding behind the fact that Philips told them so. So there is a fine balance”.

Another factor that has hindered information sharing is that Philips was very directive and demanding. Instead of thinking along, Philips assumed the position of demanding customer and relied on the hierarchy of supplier-buyer. This impeded the sharing of information, or at least it made more hesitant in sharing information with Philips. The lead engineer especially was hindered by this, as the supplier stopped sharing their difficulties and problems. The overall perception of Philips is that did not cooperate during the project. This view is influenced by the amount of troubles and the difficulties that occurred during the project.

The lead engineer expressed his concern about the way of working of Philips: “We tend to communicate within the organization and with the supplier via action-list and to-do lists. On itself this is fine; however each location keeps its own action-list. Because this is not organized centrally, not all members of the teams on Philips’ and ’s side are aligned on the course of action and the planning of the project.

Since the start of the project Philips has invested a lot of time and effort to help the supplier learn the Philips way of working. However, the results are not visible. This lack of result has been frustrating for Philips and caused Philips become less committed to the project. The project leader feels that is not as committed to the project as should be. This holds not only for the quality aspect, but other areas as well (e.g. the manufacturing site; on shipment and delivery and in freeing up resources for the project); there is a failure to deliver. This view is different from the view of the lead engineer. He was in contact with the supplier every day and does notice the willingness to learn and improve their processes. Especially, during his visits the supplier showed their willingness and commitment. As the project progresses, Philips has become more and more dissatisfied with the supplier and the project.

As mentioned earlier, Philips relied on the hierarchy of supplier-buyer. The collaboration during the project shifted from Philips working clearly with the supplier to Philips demanding solutions from the supplier. This has not been beneficial for the overall relationship between Philips and . Furthermore, according to Philips, did not show enough flexibility during the project. The project leader described his view as follows: “Even though I made suggestion on how could work more effective in the project, they chose not to and adhered to their own way of working.”

This all has caused the reputation of , which was not so good to start with, to get even worse. The same holds for loyalty of . Philips is still of the opinion that the supplier has potential to grow and work closer to with Philips, but fails to show the loyalty and willingness, which is very important to Philips. Even though the experience of Philips with is deteriorating, Philips has been working together with for around six years now and so far the potential to become a close partner of Philips they showed in the beginning of the collaboration is declining.

Knowledge Transfer

Due to the difficulties in communicating, even the simplest form of knowledge transfer was ineffective. E-mails were misinterpreted due to the language barrier and the technical documentation had to be translated. This has caused Philips to refrain from any communication and knowledge beyond the essentials. The fact that is a supplier for the competitors of Philips, also hindered Philips in sharing knowledge that otherwise could have been beneficial for the project. Furthermore, related to the sourcing model, Philips held back their advice and technical know-how. This was done to avoid any conflicts about who is responsible for the project and product. The lead engineer felt that only during his visits there was an honest and open discussion about
the project. Only then did he see that vital information was shared without too much hesitation. He described
the situation as follows: “During my visits I felt that we really were talking and collaborating. The other times I
was merely conveying information from Drachten to , but being there really opened up the discussion.
We did not only share our thoughts on the project and discussed technical solutions, but there was also the
opportunity to discuss my frustration with the progress of the project and the issues of the supplier”.

NPD performance

The project performed very poorly. There were a lot of problems during the project and these problems
related to the quality of the product and the schedule of the project. The quality issues that came up during
the project took a long time to get resolved, because of a lack of capability at the supplier and the struggle to
communicate. These quality issues were also caused by a lack of alignment on the quality standard. Philips has
a very high standard of quality and was expecting that would perform according to this standard. The
project leader is of the opinion that it is impossible for to perform in a way Philips wants them
to perform; they are two different worlds. For example, Philips uses Dekra as their approbation agency, to do
their quality testing. During one of those tests a defect and failure were discovered. Philips returned the
products to and asked them to verify these defects. However, did not understand what
Philips was talking about; they did not understand how to identify the issue and consequently, propose a
solution to the issue.

There is a reciprocal relationship between the amount of communication and the performance of the
project. The project has not performed well and with any issue the frequency of communication increased
rapidly. This also holds the other way round; most of times that communication became less frequent, problems started occurring and and Philips became less aligned. The investments of time, effort and
money did not sort the effect Philips had hoped for; there was no increase in performance, in quality and
speed. More specifically, the purchaser mentioned during the interview: “I tried to build a relationship with
the supplier to improve the quality, but in the end they [the supplier] have to make it happen. And they are
not. This requires a lot of interference by me and Philips being very demanding on the evidence regarding the
quality-improvements.”

Furthermore, the project became much more extensive than Philips had planned for. The interviewees
unanimously agreed that Philips did not scope the project well enough. At the start of the project, Philips did
not have an overview on where the project was going, what to expect of the project or whether the market
was ready for it. On top of that, Philips has done a limited supplier scouting and assessment. It is general belief
that a more appropriate supplier had been selected if Philips had done so; and subsequently the project would
have run smoother. Even if Philips had stayed with as supplier, Philips at least would have known the
amount of resources they needed to reserve for this project and would be more aware about the potential
difficulties that could come up during the project.

During the project, it was difficult for Philips to assist or advice on any difficulties that came up. The lack of transparency of the project’s process and structure on the supplier side, made it very difficult for
Philips to understand what went wrong in the project. Moreover, this lack of transparency, combined with the
lack of trust of Philips, has led to Philips conducting tests to verify the outcome of the tests done by the
supplier. Even more, Philips hires an independent testing agency to conduct the exact same test to double-
check. This course of action may seem superfluous; however the outcomes of the tests remained inconsistent,
so for Philips this testing was crucial to ensure the consistency of quality. The visit of the lead engineer to
has proved to be crucial for the progress and quality of the project. Without the visit, as the lead
engineer declared, the project probably would have suffered more delays and Philips had to increase their
effort to keep the supplier aligned.
The feeling that remains at Philips is dissatisfaction; with the course of the project, the product and the relationship with [redacted]. The product has been released in the market, with some delay, due to the quality errors mentioned earlier. As Philips does not want to miss another launch-window, the products are delivered via air-shipment. This is a much more expensive way of transportation, but the consensus is that this decision is paid back by the extra sales. Even though the project has stayed within budget with regard to investment, the delay has caused a significant cost increase for the project, since the project team had to remain assigned to the project for a longer period than planned. The goals with regard to field-call-rate have not been attained yet, even though the product is already in the market, so the focus and effort remains on improving that.

**Supplier Relationship Management**

In order to qualify and evaluate the above, it is crucial to discuss in what way the relationship between [redacted] and Philips was managed. This provides us with insight in the effort that was put into establishing a relationship with the supplier. The aspects mentioned earlier in the Paragraph are not reiterated in this section.

The involved purchaser of Philips is very outspoken on how he prefers to manage the relationship with a supplier. He states that he always makes clear with the supplier on how he likes to do business and that he is working with full commitment. Or in his words: “If I say I to the supplier I am doing something, I am going to do it”. Furthermore, to the purchaser it is important to be in direct contact with the management of the supplier. As opposed to many other views, the purchaser begins the relationship with the supplier assuming that there is trust and partnership. In practice this means that if there are difficulties, the supplier is there to help and vice versa.

The following quote describes to a great extent which role the purchaser assumed regarding this project: “...if they are late to introduce the product on the market, the first action of Philips and the project team will be to react: The supplier is too late, it is their fault, and they do not care. In the end everyone will push like hell to get the maximum of the cost on the supplier side and to have the solution for tomorrow. And for us, as purchasing, we are representing the organization for the supplier, and representing the supplier in front of the organization; so this is the difficulty, because in one hand we have to be strong to the supplier to make it happen and on the other hand we have to be fair to the supplier to keep the relationship and to be able to ask their support when things go bad. If I push the supplier to do what I want for my organization, if I feel that there is a real issue, I would go back to my organization, and say that we (Philips) are making a mistake for pushing the supplier so hard. We destroy more than we support. We balance this; I always try to go for a win-win situation” This quote captures the challenge for purchasers when it comes to managing supplier relationships.

To keep the relationship with the supplier, the purchaser tries to visit the supplier on regular basis. Even though [redacted] the goal is have a long-term collaboration, the product and innovation roadmap are not shared. Only if the performance is matching up with the expectation will the collaboration be continued.

There is a lot of difference in managing supplier relationships in an ODM/OEM-project compared to CM. As a customer you cannot be demanding as you would be in CM; there has to be willingness from both sides to cooperate and collaborate on solving problems. The project leader in this project, as mentioned earlier, is very demanding of the supplier. This leads to friction in the relationship, which hinders the progress of the project.

Upon asking how the project leader manages the relationship with supplier he stated the following: “For myself, I normally try to be neutral when working on the relationship with the supplier. Sometimes we only stand and act from the perspective of Philips, just put on the pressure and that may not help. Suppliers are also human beings, so let them feel that you are the middle man and you understand them and to try and get the issue resolved together and get the schedule on time. That is the first thing I am trying. And secondly, I try
to be friendly, also from the customer perspective. If I am friendly it becomes easier to work closely with the supplier, they will be more cooperative, but sometimes you still need to keep some distance with them because you are the customer, let them feel you are customer. If you do not do that, they may get to loose and they stop listening to your voice. You need to keep some distance; you cannot make them feel that you are one of their staff and getting too friendly. Certain moments you need to let them feel you are a customer, but you have to give them a feeling that you are helping them, so that they are willing to support and they are happy that you are willing to help them.” There is a mismatch in how the project leader thinks he manages the relationship and how the purchaser perceives the project leader manages the relationship. Based on the input from the supplier, it shows that the project leader indeed assumed a very demanding position and does not act as considerate as the project leader says he does.

The lead engineer only mentioned one way to manage relationships with suppliers: visiting them. He describes the value of travel and face-to-face visits as being two-fold: “On the one hand, when I am there, I am able to see their [the supplier’s] way of working, understand their processes; on the other hand I am there to build the relationship and ensure short communication channels.” According to the lead engineer, the visit to the supplier had to be made early on in the project; within this project it was done too late to make any longstanding changes in the relationship and collaboration.

**Additional findings**

One of the most mentioned aspects that was missing in the behaviors of was ownership. Even though holds the IP and knowledge of the grinder and the motor and was responsible for the development of the first generation of the product, did not show ownership in this project. They failed to challenge Philips on their propositions and displayed an air of negligence. Combined with a sense of overpromising by the supplier, this led to frustration at Philips. This overpromising is rooted in two behaviors: one: a supplier will generally promise more than they can deliver in order to get the business from Philips, and two: Philips has the feeling that may have accepted the demands and requirements of Philips without a thoroughly understanding the impact of this agreement on their resources and business.

Philips tends to push on the supplier as hard as they can. The difficulty arising with this behavior is that even though the contract is respected, the relationship breaks down and the quality of the project and product decreases. This was the case during this project and this also was the reason for the responsible purchaser to step in and communicate to Philips to back down.

Again, some of the difficulties that occurred during the project were caused by limited project scoping by Philips. The project leader mentioned that managing an ODM/OEM project requires different skills and introduces some difficulties into the project. Instead of having to deal with a single point of contact, which is often the case in a CM project, the project leader and the whole team of Philips now has to deal with many different people (which is often changing during the project). This makes it difficult to keep the two organizations aligned and build and maintain effective lines of communication.

**Perspective of the supplier**

The analysis of the case would not be complete without the input of the involved supplier. These findings will be discussed in this section. The findings are presented following the chronology of the project combined with the structure of the conceptual framework.

The supplier clearly indicated that Philips can be trusted as a customer. Philips offers support in order for the supplier to comply with Philips’ way-of-working. One of the interviewees described this support as follows: “...if we have some doubt about the practice, how the Philips team, for example, assures quality, we will invite a Philips team to give us training and they will send people to do the training for us, so the team can have a better understanding of the practice.” This behavior of Philips helped build trust. The supplier recognizes this
behavior as a sign of commitment by Philips. Even more, nearing certain milestones, for example, Philips has sent several engineers to assist in the production line set-up.

During the project, Philips has provided the supplier with all the information need to develop the product. However, in the course of the project there were several technical issues. According to the supplier, Philips did not specify the quality standard well enough in the beginning of the project. Also, Philips did not indicate well enough what the results should be, regarding the technical quality of the product and the process of quality assurance. These technical issues resulted project delay, which could have been avoided according to the supplier. The technical requirements where all properly communicated by Philips.

The supplier remarks that Philips is a high standard customer with strict (quality) requirement on the products and factories, when reflecting on the reputation of Philips,. In the eyes of the supplier Philips does have too cumbersome processes and procedures in place. This influences the speed of the project. To illustrate, the following was mentioned: “When we sent some components to Philips for approval, the speed is quite low. The processing took too long; it took them a long time to give us feedback on these components.” Even though Philips is perceived as being fair in discussions, this behavior is found to be unfair. Philips often presses the supplier to deliver on time and speed up the process; however Philips itself fails to deliver.

The supplier found it very valuable to meet Philips in the beginning, or before the start, of the project. The fact that the supplier could meet the Philips team face-to-face allowed them to discuss some of their uncertainties and contributed to aligning the two project teams. For the supplier, communication and information sharing went well during the project. The only improvement possible for the supplier is that Philips should communicate their quality standard better, as mentioned earlier.

The supplier was disappointed with the delay in the project. A quicker response of Philips could have avoided that. needed time to get familiar with the extensive processes and procedures Philips has in place. To their opinion these are not all necessary and tend to only slow down the project. Philips assisted and taught how to deal with some technical and engineering issues. Issues regarding quality and approval have caused the product to miss the launch date.

To the personal relationship between two teams is important, but it is a business between two companies and it revolves around the contract. Having a personal relationship makes it easier to solve any problems, which was to some extent the case in this project. In order to manage the relationship, the project leader at has proposed to meet once a month and review any open issues between the two teams and discuss how to come with a solution together. It is also very important to meet with the project leader at Philips, so that the project leader has the chance to get to know him.

4.4.4 Summary of the findings

The choice for the supplier was largely based on the fact that was also the supplier for the first generation Gnb. currently holds the IP for both the grinder and the motor (i.e. the complete platform). Philips did perform a market scouting for other suppliers, which resulted in a short-list of suppliers that were deemed more capable than. 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 Philips supplier base. Secondly, Philips had experience in working with and lastly, provided the lowest quote on FCP. Even though there are still many quality issues, the assumption of Philips was that they could train the supplier to achieve the desired level of quality.

Philips experienced the relationship with as troublesome; as opposed to who found that they had a good relationship with Philips. The interviewees on the Philips team found that there was not much of a relationship with. The biggest challenge for Philips was communicating. Without the presence of Philips Hong Kong 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, Philips has set up a communication structure halfway in the project. Also the project leader at Philips was replaced by someone located in Hong Kong. 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 Philips. They perceived Philips as trustworthy and found that the communication did not cause a problem at all. The fact that Philips sent over engineers to train them is recognized by the supplier as a sign of commitment and did build trust. However, the project leader at Philips found that Philips did not communicate their quality standards well enough. The resulting delay decreased the satisfaction of the supplier with the relationship. Also, the suppliers thought that Philips was unresponsive.

For Philips 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 Philips 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 Philips’ way-of-working and to perform according to Philips’ 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 Philips, 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 Philips to the supplier helped the progress of the project. The supplier found it especially valuable that Philips 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: for Hong Kong; Eindhoven; and one overall.

The issues regarding trust and communication have caused the information and knowledge sharing to become an issue as well, according to Philips. The supplier does not share of 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 Philips showed regarding their procedures. They felt that Philips expected them to adapt to the needs and demands of Philips and to be flexible in allocating resources to the project and reacting to the changes in the project description. The supplier thought that if Philips had shown the same flexibility and adaptations that the project would have run a lot smoother and the relationship between the supplier and Philips would be better. It is remarkable to find that Philips also found the project leader 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 Philips 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, Philips only assumed this position as their effort to train the supplier did not result in improvement and success, which increased the frustration at Philips. Also the commitment suffered from this. Furthermore, Philips feels that the 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. They found that the reputation of Philips consisted of demanding and rigid customer, with a lot of procedures and protocols; whereas Philips found that the reputation of the 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 Philips. However, however, stated that it required a lot of effort and commitment to get familiar with Philips’ way-of-working.

Within the project team at Philips 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 [name] and Philips resulted in very limited knowledge transfer. Philips 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 Philips 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 [name] owned the IP for the motor and grinder, Philips thought that [name] did not show any ownership during the project. Philips would have trusted [name] 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. Philips 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 Philips team agreed that if Philips 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. Philips 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 Philips 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.

The main findings regarding the conceptual framework are summarized in Table 4-8.

**Table 4-8**  **The main findings of case Grind and Brew**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Experience</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship quality</td>
<td>(-)/(+)</td>
<td>* Whereas Philips did not trust the supplier, the supplier did trust Philips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* The project leader did not display trustful behavior</td>
</tr>
<tr>
<td>Trust</td>
<td>(-)</td>
<td>* The supplier did not understand English</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* The supplier was unresponsive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Did not improve after implementation of communication structure</td>
</tr>
<tr>
<td>Communication</td>
<td>(-)</td>
<td>* A real issue due to lack of effective communication and lack of trust</td>
</tr>
<tr>
<td>Information and knowledge sharing</td>
<td>(-)</td>
<td>* The visits of Philips increased the willingness of the supplier to cooperate</td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>(o)/(+)</td>
<td>* Philips sent engineers to train the supplier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* The supplier showed willingness to try and adopt Philips’ way-of-working</td>
</tr>
<tr>
<td>Adaptations and investments</td>
<td>(+)</td>
<td>* Philips sent engineers to train the supplier but this did</td>
</tr>
<tr>
<td>Commitment</td>
<td>(-)/(+)</td>
<td></td>
</tr>
</tbody>
</table>
### Additional findings

<table>
<thead>
<tr>
<th></th>
<th>Not sort any effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Satisfaction</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Philips was not satisfied with the performance of the supplier</td>
<td></td>
</tr>
<tr>
<td><strong>Dependency and power</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Philips had assumed the position of demanding customer</td>
<td></td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Philips was very inflexible, especially regarding their way-of-working</td>
<td></td>
</tr>
<tr>
<td><strong>Reputation</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Both companies found that the other had a bad reputation</td>
<td></td>
</tr>
<tr>
<td><strong>Loyalty</strong></td>
<td>(o)</td>
</tr>
<tr>
<td>* Appears to have no effect</td>
<td></td>
</tr>
<tr>
<td><strong>Relationship history</strong></td>
<td>(o)</td>
</tr>
<tr>
<td>* Appears to have no effect</td>
<td></td>
</tr>
<tr>
<td><strong>Additional findings</strong></td>
<td>-</td>
</tr>
<tr>
<td>* A large discrepancy between the perceptions of Philips and the supplier on the relationship</td>
<td></td>
</tr>
<tr>
<td>* The failure to perform very much influenced the opinion of Philips on the relationship</td>
<td></td>
</tr>
</tbody>
</table>

#### Knowledge transfer

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explicit knowledge</strong></td>
<td>-</td>
</tr>
<tr>
<td>* The language barrier hindered the transfer of explicit knowledge</td>
<td></td>
</tr>
<tr>
<td><strong>Tacit knowledge</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Was not knowledgeable on Philips way-of-working and NPD projects</td>
<td></td>
</tr>
</tbody>
</table>

Additional findings

#### Performance of the NPD project

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timing</strong></td>
<td>-</td>
</tr>
<tr>
<td>* The project was very much delayed</td>
<td></td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td>-</td>
</tr>
<tr>
<td>* The delay and investments of Philips, caused the project to be over budget</td>
<td></td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>-</td>
</tr>
<tr>
<td>* There is still a lot of quality issues, which have to be resolved</td>
<td></td>
</tr>
<tr>
<td><strong>Additional findings</strong></td>
<td>-</td>
</tr>
<tr>
<td>* Philips is of the opinion that many problems could have been avoided, had Philips scoped the project to greater extent</td>
<td></td>
</tr>
</tbody>
</table>

### 4.4.5 Implications for the Conceptual Framework

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.

Especially to the purchaser is the relationship with a supplier vital. Even though the purchaser found that there first had to be a written agreement in place, the next step is to build a relationship. When the supplier is a CM, the relationship is of lesser value; however, involving a supplier in the NPD process increases the importance of the relationship with the supplier. The relationship between people is very much decisive for the overall project and its performance. The lead engineer agrees with this view and wholeheartedly support the view that the higher the quality of the relationship, the more successful the NPD project will be.
Furthermore, the supplier supports this proposed relationship as well by stating that having a good relationship with the customer increases the performance of the project.

It is remarkable to find that the project leader of Philips appears to adhere to a formalized way of dealing with the supplier. He stated as a response to the question if the relationship with the supplier had an effect on project performance the following: “Sometimes it is really the trust between two people that is important in the project, sometimes in Asia or China, when you build the relationship with the supplier, you can work more efficient and faster. Also it increases the understanding because you have a personal relationship. That can help on the overall project performance. Furthermore, any problems during the project are more easily solved.” He continued by adding that even though the relationship could add extra value to the project, the performance of a project still relied for 90 per cent on the supplier and the agreements in place. The supplier has to be capable and knowledgeable. Also he stated that if Philips shares their forecasts and innovation pipeline with the supplier, the supplier becomes more supportive and willing to free up resources. Their commitment to Philips increases, with an opportunity to do more projects for Philips in the future.

The management of Philips Drachten did not agree with the proposed relationship presented in the conceptual model. They found that Philips spent a lot of time (also face-to-face) with the supplier, only if the project was underperforming and did not see a change in relationship. The same holds as for the project leader: first the performance of the supplier has to be there and then a relationship can be built with the supplier.

So there is a clear difference in views between the management and project leader of Philips on one hand and the purchaser, lead engineer and supplier on the other hand. These functional differences will be discussed in Paragraph 4.5.3.

To support the chain of evidence in this case study, all interviewees were asked to grade the relationship (grade 1 to 5; 5 being the highest; Appendix 8.10.2) with the supplier (or customer) on the different constructs presented in the conceptual framework. These results are presented in Exhibit 4-4.

This exhibit provides support for the findings support in the previous sections. Exhibit 4-4 clearly shows a difference in perception between Philips and the supplier. The supplier believes that the relationship with Philips is of high quality. This perception is largely driven by the support Philips offers in the project; engineers sent to train and educate them. This support and commitment by Philips contributes to feelings of trust and cooperation. The high mark at relationship-specific adaptations is based on both the support offered by Philips and the supplier’s willingness to adapt their way-of-working to Philips’ way-of-working. Philips rated communication low, mainly because of the difficulties due to the language barrier and the poor responsiveness of the supplier. The poor result of the project appears to be the main driver for Philips of the poor score on satisfaction and reputation.

Philips found that the supplier was not knowledgeable hindered the communication within the relationship. Furthermore, had Philips been more open about potential future project, the supplier would have been more committed to the project. Overall, transparency by both parties on quality standards, uncertainties and issues that had come up would have been beneficial to the overall quality of the relationship and the performance of the project. Philips furthermore is of finds that the supplier should have shown more ownership to the project and that the supplier should have delivered what they promised.
The ratings are to a large extent in line with the findings. The overall performance of the NPD project and satisfaction with the collaboration is reflected by the rating on the individual constructs and the findings from the interviews. Mainly the difficulties and lack of trust have severely hindered the transfer of knowledge between Philips and ''. It appears that Philips acknowledges a reciprocal relationship between the performance of the project and supplier, and the relationship quality. However, found the relationship of a higher quality, but found that the inflexibility of Philips regarding their way-of-working has hindered the project in its performance. Lastly, especially communication proved to be decisive for the quality of the relationship and the construct satisfaction pertains mostly to satisfaction with the performance of the counterpart. This construct appears to be vital in the quality of the relationship and appears to be a reflection of the performance of the NPD project.

4.5 Cross-case analysis

Following the discussion and analysis of the individual cases, this Paragraph presents the cross-case analysis. The findings of the four cases are compared and evaluated in this Paragraph. On top of the patterns distinguished within the four cases, this Paragraph reflects on these findings and explores if there is any pattern with which the differences between the cases can be explained. This discussion follows the same structure applied in the discussion of the individual case; partly following the chronology of the project and partly following the structure of the conceptual framework. It must be noted that the following discussion and analysis will focus more on the proposed relationships, the constructs and the validation of the conceptual framework; deep-dive elements presented in the previous section will only be cited in order to illustrate or in case a distinct pattern appears to be specific (e.g. distinctive behaviors).

In order to verify and potentially support the patterns and findings from the cross-case analysis, a quantitative discussion on the coded interviews is presented in Paragraph 4.5.8. This is done by analyzing the collected data on a meta-level to identify and support any cross-case patterns.

Preceding this main body of the analysis, the data is analyzed to identify additional patterns in Paragraph 4.5.1 to Paragraph 4.5.4. The input for this analysis is again the complete dataset, however this time according to the following categories: characteristics of Philips; characteristics of the suppliers; according to the different functions of the interviewees; and lastly the recommendations of the interviewees are discussed.
A summary overview of the findings of the four case studies is provided in Table 4-9 and Table 4-10. This Paragraph is concluded by a presentation of the implications for the research model and a reflection on the research questions is presented in Paragraph 4.6.

4.5.1 CHARACTERISTICS OF PHILIPS

The characterization of Philips and problem statement discussed in Chapter 1 and Chapter 2 has been largely confirmed by the four case studies. This implies that Philips finds it difficult or is unable to create a context in which they would optimally leverage the knowledge and capabilities of their supplier in NPD projects. The findings that support this view are discussed below.

Two engineers indicated that Philips does not do enough to fully scope the product and project. Three suppliers within the case studies indicated that they have a similar experience with Philips. As a result, in three of the four cases there was a mismatch between the requirements of Philips and the capabilities of the supplier. Philips appears to overestimate the capabilities and the competencies of their selected suppliers. On top of this, it is typical behavior of Philips to adjust the requirements and specifications of the product during the project. These changes are almost never a lower quality standard or a higher tolerance on a product, but imply extra work and effort. This leads to an overburdened supplier and Philips being disappointed with the alleged underperformance of the supplier. As a result, Philips labels the supplier as weak, whereas this not necessarily the case. Eventually, this has a negative impact on the relationship with the supplier. Also, Philips suffers from the not-invented-here-syndrome, meaning that the quality of work of the suppliers is seldom good enough for or accepted by Philips.

According to several interviewees, and reflected by the findings of the cases, Philips finds it difficult to commit to the consequences that come with an OEM-OTS project or an ODM-project. Philips finds it difficult to accept choosing for an OTS-product implies that this product is, by definition, not a premium market proposition. The product is already in the market and the only adjustments would or should be rebranding and minor quality and design adjustments. Philips decides to by a product of the shelf, however, they demand so many adjustments and changes in specification that the project gradually shifts towards an ODM-project and even CM. Not only does this create a lot of frustration at the suppliers, as is supported by the case studies, it also increases the pressure on Philips’ resources, as projects which initially did not require engineers or an extensive project team, suddenly do. Philips has the tendency to define a lot of requirements for the supplier to comply to. Even though it might not be the responsibility of Philips, Philips fails to make sure the supplier fully understands what they are committing and what this collaboration implies for the resources, time and effort.

Philips has a very traditional approach to contracting suppliers. From a historic perspective, Philips is used to a dominant position in any Philips-supplier relationship. Philips tries to push liabilities and risks onto the supplier involved in the project. Philips tends to tie in the supplier with a GPA and the actual contract and does not emphasize developing supplier relationships. Several interviewees admitted that Philips lacks the skills to steer a supplier in a development project; Philips uses its contracts in place to do that.

Furthermore, even though the goal is sometimes to involve the supplier in the development of a product and to have a successful collaboration, Philips often focusses on driving the cost down and pushing the supplier for the lowest quote. Many project leaders of the selected cases have indicated that this behavior hinders the progress and success of their projects. This behavior also has a negative impact on the relationship. Typically, Philips very much aims to reap the benefits of the collaboration, but tries to avoid liabilities and responsibilities, according to many project leaders. The interviewed purchasers expressed their concern that Philips may rely too much on their reputation and brand, regarding their attractiveness as a customer. On an organizational level Philips is seen as very attractive by the interviewed supplier, however regarding the personal level and during projects suppliers do not always think of Philips as an attractive supplier.
This is in contrast with the findings that once Philips commits to a supplier and grants them the project, Philips invests heavily in terms of effort and support. Philips does train their suppliers, by having their engineers train the suppliers in their way of working, testing and development processes.

In all cases it has showed that the extensive procedures and processes embedded in the Philips organization and way of working placed a burden on the collaboration. All suppliers have made negative remarks about the rigidity and inflexibility to deviate from this way of working. According to many suppliers Philips had high quality standards which are not always properly communicated with the suppliers. Many interviewees have indicated that Philips is reliant on formal agreements with suppliers. There appears to be little attention being paid to the informal aspect of the collaboration. This is also supported by the document analysis, presented in Appendix 8.11.

Some interviewees remarked that Philips does not tailor the projects on the characteristics of the project or the suppliers. Instead, Philips has a one-size-fits-all approach. Within the cases, several difficulties have occurred as a result of this way of working.

The Value Sourcing program of Philips does not seem to have the desired effect. The aim is to involve supplier in NPD, but practice shows that this remains a difficult task.

### 4.5.2 Characteristics of Suppliers

Within any relationship there are at least two parties involved. As this research is focused on the dyad in a NPD context, the characteristics of the involved suppliers are discussed, as part of the findings of the four case studies. These findings show that there are several differences between Philips and its suppliers, which is in all cases part of the cause for the issues during the projects.

The findings show that the suppliers selected by Philips have little experience in product development and can often be characterized as manufacturers. Furthermore, all involved suppliers are located in Asia, of which three in China. In all four cases showed that the language barrier plays a large role in the communication and in the project. There was a difference in way of working with Philips, even at their own supplier, Batam. Also, the cultural differences between the involved suppliers and Philips are large, which increased the difficulty of establishing a relationship and collaborating. These cultural differences also show in the way these suppliers do business. Whereas Philips very much rely on contractual agreements, for Asian suppliers business also revolves around personal relationships.

Philips finds it difficult to deal with the high turnover rate of personnel in China. Many employees quit their jobs around Chinese New Year in order to find a new job with a higher salary. This increases the difficulty to build a long-term personal relationship with their customers. Furthermore, in three cases the supplier operated as a black box. They are not transparent in the development process, testing and potential other solutions.

### 4.5.3 Functional differences

The four case studies have brought several functional differences to light, which will be discussed in the following section.

The findings of these four case studies have brought the importance and role of the project leader to light. The behaviors, skills and attitude of the project leader determine to a large extent the success of the collaboration. This view is underlined by remarks of the interviewed purchasers and suppliers. The project leader is responsible for the actual collaboration, on a day-to-day basis, with the supplier, and thus should coordinate the project. However, the findings show that it is not often clear to the project leader how they should approach a project in which the supplier is heavily involved.
It is remarkable to see that the interviewed managers almost all discuss relationships in the light of a collaboration between two organizations. The findings from these interviews almost all discuss how to establish a relationship on the formal level. Their attention is focused on covering liabilities in the project, securing IP-rights and contractual agreements that need to be in place. There has been little discussion about creating a working supplier relationship.

Furthermore, a clear distinction between a relationship on the formal level and on the organizational level is made by the purchasers. In their opinion, their role is to assure the formal agreement between Philips and the supplier and the project is responsible for the informal relationship with the supplier. To use the words of one of the purchasers: “There is a discussion about money and there is a discussion about content. I discuss money.”

One of the most important aspects or constructs of a relationship for engineers is communication. All engineers indicated that for the success of a project, communication with suppliers is crucial. The same holds for project leaders and NPI’s. They are working on a day to day basis with suppliers and indicated that constructs as reputation; relationship history; relationship-specific adaptations; and dependency and power do not necessarily influence the supplier relationship. They go even further by stating that these do not influence the success of the collaboration with the supplier. The constructs trust; communication; information and knowledge sharing; and commitment heavily influence the collaboration and the supplier relationship.

4.5.4 Recommendations of the Interviewees

In addition to the findings and analysis discussed in the previous section, the interviewees also engaged in a discussion about their recommendations for a better quality relationship and successful collaboration. Also the interviewees were asked to indicate their top three of constructs or behaviors essential to the quality of the relationship and collaboration. In this Paragraph, first the findings of the top three of constructs are presented and then recommendations of the interviewees are discussed. The discussion of the top three is structured according to the number of references made by the interviewees. This frequency is depicted in Exhibit 4-5.

![Exhibit 4-5 Frequency of mentions by the interviewees](image_url)
knowledgeable. Lastly, face-to-face meetings are regarded as very valuable for effective communication, as well as the flexibility to adapt the style of communication to the counterpart.

The second construct regarded as important for the collaboration is cooperation and coordination. It is important to have clear agreements on responsibilities and communication. Both parties need to be aligned, in terms of way of working, expectations and goals. These agreements reduce the chance on confusion and may increase the willingness to help each other. Having clear agreements increases the transparency in the collaboration. Furthermore, the leadership shown by the project leader is very important, as he is responsible for coordination the project.

Trust is the third most mentioned construct in the discussion. In order to establish trust within the relationship, it is important to be reliable; open; honest; and transparent. Furthermore, having effective communication further increases trust, along with face-to-face contact. Lastly, good performance is seen as the basis for a trustful relationship.

Fourth, commitment was frequently mentioned by the interviewees. The willingness of the counterpart to put in extra effort for the progress of the project does not only help create trust but is very important for the collaboration. A fair agreement regarding the responsibilities contributes to a sense of commitment. Furthermore, the supplier has to show eagerness doing business with Philips. Lastly, both parties have to deliver what they promise.

Another aspect is the competency and capability of the counterpart. For communication and trust within the relationship; the effectiveness and performance of the collaboration it is important to have the right counterpart, with the appropriate capabilities and knowledge. Furthermore the skill-set of the involved people also determines to a large extent the success of the relationship. As stated earlier, performance is crucial for the success of the collaboration. For this, both parties need to possess technical know-how.

The last two elements mentioned by the interviewees were flexibility and attractiveness to the customer or supplier. The willingness to adapt to the counterpart’s way of working and culture creates trust and increases the quality of the relationship. It is important for the collaboration to tailor the project set-up to the supplier and type of project, instead of assuming a one-size-fits-all approach. Lastly, for any relationship and collaboration it is important to be attractive to your counterpart.

The interviewees have also made several operational recommendations, which are discussed hereafter. Face-to-face contact is very important in NPD project and Philips should make sure to always visit the supplier in the beginning of the project and during the project. This is also proof for the supplier, that Philips is committed to the collaboration and the project. Any costs associated with these visits will be covered by avoided problems and delays in the project.

According to the interviewed engineers, Philips should be more flexible in their specifications, requirements and way of working. Especially in projects where suppliers are involved in the development process, this will greatly contribute to the performance of the project.

Philips needs to better define what they expect from the supplier in terms of design; in terms of quality; and in terms of specifications. Furthermore, Philips should pay more attention to communicate these expectations to the supplier. This contributes to aligning both organizations and reduces the chance on disappointments.

4.5.5 Relationship quality

In the literature study twelve constructs have been identified which contribute to the quality of the relationship. The empirical research was partly set up to verify the effects of these constructs on the quality of
the relationship between Philips and their suppliers. Between the four cases under study, several distinct patterns found.

The constructs: reputation; relationship history; flexibility; relationship-specific adaptations; loyalty; and dependence and power are regarded by managers and purchasers as important for the collaboration and the relationship with the supplier. However, according to the interviewed project leaders; NPI’s; engineers; and suppliers these constructs are less decisive for the quality of the relationship than the constructs trust; communication; information and knowledge sharing; commitment; and cooperation and coordination. This finding is supported by Table 4-10.

It appears that these constructs, found important by managers and purchasers, act on an organizational level and contribute in that sense to the quality of the relationship. The other constructs, found decisive by project leaders; NPI’s; engineers; and suppliers; appear to have a greater effect on the personal level and thus directly influence the perceived quality of the relationship and the collaboration.

Furthermore, in order to have a relationship of better quality both parties need to perceive it that way. The collaboration still remains difficult if only one party perceives the relationship as good. Eventually, this situation leads to difficulties in collaboration and both parties experiencing the relationship as having little quality.

In three of the four cases, transparency was mentioned as a contributor to the quality of the relationship (and the lack of transparency as negative influence). The attractiveness of Philips as a customer has also been identified as an important contributor to the quality of a relationship. To some interviewees, a relationship can only be built on top of fair formal agreements; without these, the relationship would be pointless. Lastly, performance and the ability to deliver have been identified having an influence on the quality of the relationship.

4.5.6 Knowledge Transfer

In the two cases with a better quality relationship, the knowledge transfer was strongly present, for tacit and explicit knowledge. The cases 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.

4.5.7 NPD Performance

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 the cases Nevada and Mare would perform well and the cases MSB and GnB would be underperforming. This expectation is met by the findings of the empirical research. There are however some exceptions in the case study results, which will be explained per case.

First, the project Nevada performed well, however the project has slipped time wise and the FCP has gone up significantly. This finds its cause not in difficulties in the collaboration, but is rooted in the NPD processes and characteristics of Philips. During the project, Philips decided to expand on the development, resulting in project delay. However the project has remained within the budget and resulted in quality products.

For the MSB project, both parties are very satisfied with the quality of the product. Even though the development process did not go without troubles, now that the product is in mass-production the supplier proves to be very capable of manufacturing high quality products. The difficulties in the relationship have proved to hamper the NPD project performance.

Lastly, the project Mare had exceeded budget. The extra investments were made to launch the product within the planned launch-window. The rationale behind these investments was that this would be paid back
through the extra sales. The project did remain on schedule and the product was well-received in the market, with a low field-call-rate.

The cases appear to be confirming the relation proposed in the conceptual framework. The findings show that the cases Nevada and Mare both have a better quality relationship between Philips 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 (e.g. the case Mare had exceeded its budget), 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 the cases MSB and GnB, it appears that a similar dynamic as in the positive cases is at work, yet with a negative connotation. Within the case MSB the relationship quality was poor, according to Philips and the supplier. With nearly every construct Philips 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 the GnB, Philips 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 Philips, mainly because of the commitment Philips showed. Similar to the MSB project, 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.

**Table 4-9 The main findings of the case studies**

<table>
<thead>
<tr>
<th>Construct/element</th>
<th>Nevada</th>
<th>MSB</th>
<th>Mare</th>
<th>GnB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship quality</td>
<td>(o)/(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)/(+)</td>
</tr>
<tr>
<td>Trust</td>
<td>(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>Communication</td>
<td>(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>Information and knowledge sharing</td>
<td>(-)/(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(o)/(+)</td>
</tr>
<tr>
<td>Adaptations and investments</td>
<td>(-)</td>
<td>(-)</td>
<td>(o)/(+)</td>
<td>(+)</td>
</tr>
<tr>
<td>Commitment</td>
<td>(-)</td>
<td>(-)/(+)</td>
<td>(+)</td>
<td>(-)/(+)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>(+)</td>
<td>(o)</td>
<td>(o)/(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>Dependency and power</td>
<td>(o)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>Flexibility</td>
<td>(-)/(+)</td>
<td>(o)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>Reputation</td>
<td>(o)</td>
<td>(-)</td>
<td>(o)</td>
<td>(-)</td>
</tr>
<tr>
<td>Loyalty</td>
<td>(+)</td>
<td>(o)</td>
<td>(o)</td>
<td>(o)</td>
</tr>
<tr>
<td>Relationship history</td>
<td>(o)</td>
<td>(-)/(o)</td>
<td>(o)</td>
<td>(o)</td>
</tr>
<tr>
<td>Additional findings</td>
<td>(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
</tbody>
</table>
### 4.5.8 Quantitative Discussion of the Results

This section presents a discussion on the quantitative coding data gathered in NVivo. This discussion is focused on the coding of the constructs in the conceptual framework. In addition to these twelve constructs, additional findings have been coded separately and are depicted in Exhibit 4-6. This exhibit does not represent any connotation by the interviewees and does not depict negative or positive association with these constructs. It displays the amount of references and mentions which have been coded according to these thirteen categories. First the exhibit is discussed separately, after which these findings are compared with the findings of the cross case analysis.

Exhibit 4-6 shows that the interviewees most frequently and elaborately discussed the construct communication. Furthermore, the constructs trust; information and knowledge sharing and commitment have been extensively discussed. Contrary to the expectation, there was relatively little mentioned about the coordination and cooperation within the collaboration.

The constructs that have been identified as having little, but some, impact on the quality of the relationship were all scarcely mentioned, barring the construct commitment. Furthermore, the data has presented many additional findings which are of influence to the quality of the relationship.

![Exhibit 4-6](image)

**Exhibit 4-6 Frequency of Codings of the Collected Data**

Even though Exhibit 4-6 does not carry the semantics of the coded data, on a meta-level it does imply that regarding the relationship between a supplier and buyer (Philips in this instance) four constructs are decisive:
trust; communication; information and knowledge sharing; and commitment. Furthermore, this data implies that the construct cooperation and coordination does not have a large influence on the quality of the relationship, however, is still of importance. Lastly, the constructs satisfaction; reputation; loyalty and relationship history have been mentioned so rarely, that they appear to play almost no role at all. This can be explained as these constructs may act on the organizational level and the quality of the relationship is assessed based on an individual level. This data supports the findings of the empirical research. The patterns found in the cross-case analysis are supported by this meta-level analysis.

4.5.9 IMPLICATIONS FOR THE RESEARCH MODEL

A summarized overview of the findings of the four case studies is provided in Table 4-9 and Table 4-10. This section discusses the main implications of the findings of the four case studies on the research model. The implications of the cross-case analysis for the research model will be discussed hereafter.

One of the implications of the research model is a division of constructs on the level they are most influential. These two levels are the individual and the 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. Within the project these constructs have not been referred to often by the interviewees as having a large impact on the quality of the relationship.

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. Furthermore, these constructs are 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.

Concluding, the four case studies have provided enough evidence to confirm the proposed positive relation between relationship quality, knowledge transfer and NPD performance.
<table>
<thead>
<tr>
<th>Constructs</th>
<th>Nevada</th>
<th>MSB</th>
<th>Mare</th>
<th>GnB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>Face-to-face visits increased trust</td>
<td>-</td>
<td>Increased by the quality of communication</td>
<td>Whereas Philips did not trust the supplier, the supplier did trust</td>
</tr>
<tr>
<td></td>
<td>The lack of communication decreased the trust of both and Philips</td>
<td>-</td>
<td>Increased by honesty and transparency</td>
<td>Philips</td>
</tr>
<tr>
<td></td>
<td>The lack of performance of further reduced the trust of Philips in</td>
<td>(+)</td>
<td>A lot of effort was shown by the supplier</td>
<td>The project leader did not display trustful behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-)/(+)</td>
<td>Trust between the project teams; not between organizations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A lot of face-to-face meetings/visits</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>The communication structure greatly improved the quality of the</td>
<td></td>
<td>Open and honest communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>communication and alignment between the two organizations</td>
<td></td>
<td>Good comprehension of English by supplier</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Face-to-face visits increased effectiveness</td>
<td></td>
<td>A lot of face-to-face meetings/visits</td>
<td></td>
</tr>
<tr>
<td>Information and knowledge</td>
<td>• Difficult due to language barriers and geographical differences</td>
<td></td>
<td>Perceived as strongly present by both companies</td>
<td>A real issue due to lack of effective communication and lack of trust</td>
</tr>
<tr>
<td>sharing</td>
<td>• Open information sharing due to trustful relationship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>• Proper understanding and alignment on the way-of-working</td>
<td></td>
<td>Highly cooperative attitude of both organizations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cooperation supported by displayed flexibility</td>
<td></td>
<td>The visits of Philips increased the willingness of the supplier to</td>
<td></td>
</tr>
<tr>
<td>Adoptions and investments</td>
<td>Supplier had difficulties fully adapting to MCC’s way-of-working</td>
<td></td>
<td>Cooperate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Philips had invested a lot in the supplier, but this did not influence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the relationship or the performance of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both companies were willing to invest into the collaboration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Philips sent engineers to train the supplier</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The supplier showed willingness to try and adopt Philips’ way-of-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>working</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship quality</td>
<td>Nevada</td>
<td>MSB</td>
<td>Mare</td>
<td>GnB</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
<td>-----</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Constructs</strong></td>
<td>(0)/(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(-)/(+)</td>
</tr>
<tr>
<td>Commitment</td>
<td>Resources being pulled from the project</td>
<td>Philips felt that was not committed at all; seemed to be lacking effort and not to value Philips as a customer</td>
<td>Increased by the quality of communication</td>
<td>Philips sent engineers to train the supplier but this did not sort any effect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Philips provided them with training</td>
<td>Both parties delivered what they promised and were very much involved</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A lot of effort was shown by the supplier</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td></td>
<td>The ability to the deliver increased the satisfaction with the collaboration</td>
<td>Had little effect on the quality of the relationship</td>
<td>Philips was not satisfied with the performance of the supplier</td>
</tr>
<tr>
<td>Dependency and power</td>
<td>Both organizations are Philips</td>
<td>Philips was clearly in the lead as customer, however did not act as if Philips was an attractive customer</td>
<td>Balanced relationship</td>
<td>Philips had assumed the position of demanding customer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>Batam found the procedures of Philips too rigid</td>
<td>Neither party mentioned flexibility as a large influence on the relationship</td>
<td>found that Philips was too inflexible and too directive</td>
<td>Philips was very inflexible, especially regarding their way-of-working</td>
</tr>
<tr>
<td></td>
<td>Philips was satisfied with the flexibility of Batam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reputation</td>
<td>Appears to have no effect</td>
<td>Both Philips and thought of the other as having a good reputation, which, certainly for Philips raised the expectations</td>
<td>Appears to have no effect</td>
<td>Both companies found that the other had a bad reputation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional findings</td>
<td>Batam is a Philips organization and thus familiar with the way-of-working</td>
<td>Transparency was missed by Philips, this would have contributed to trust and information and knowledge sharing</td>
<td>Both organization were aligned</td>
<td>A large discrepancy between the perceptions of Philips and the supplier on the relationship</td>
</tr>
<tr>
<td></td>
<td>Transparency increased the quality of the relationship</td>
<td>Philips felt unvalued by as a customer</td>
<td>Ability to deliver was high</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Both organizations had a strong team present</td>
<td>The failure to perform very much influenced the opinion of Philips on the relationship</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project leader had skill set vital for collaboration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transparency and honesty proved valuable for the relationship</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Relationship can only work on top of a formal agreement</td>
<td></td>
</tr>
</tbody>
</table>

Page 112
### Knowledge transfer

#### Explicit knowledge
- **Nevada**: Ensured by communication set-up and familiarity of way-of-working
- **MSB**: The transfer of explicit knowledge was very much limited due to the issues regarding communication
- **Mare**: Via agreed upon communication structure
- **GnB**: The language barrier hindered the transfer of explicit knowledge

#### Tacit knowledge
- **Nevada**: The face-to-face meetings contributed to the transfer of tacit knowledge
- **MSB**: The transfer of tacit knowledge was very much limited due to travel ban and the communication issues
- **Mare**: Very much present due to many face-to-face visits, many ideas and propositions put forward by supplier
- **GnB**: Philips was not knowledgeable on Philips way-of-working and NPD projects

### NPD Performance

#### Timing
- **Nevada**: Time schedule slipped due to limited project scoping
- **MSB**: The initial launch-window was missed
- **Mare**: Project within planned timeframe
- **GnB**: The project was very much delayed

#### Budget
- **Nevada**: The budget has remained under control
  - Batam selected because of low FCP; due to increasing requirements and shifting design the FCP has exceeded quoted FCP by Item
- **MSB**: Due to the allocation of extra resources of Philips, the budget has been exceeded
- **Mare**: The project required extra investments
- **GnB**: The delay and investments of Philips, caused the project to be over budget

#### Quality
- **Nevada**: No significant issues regarding quality
- **MSB**: The quality of the product is very high in mass production
- **Mare**: Very high quality products
- **GnB**: There a still a lot of quality issues, which have to be resolved

#### Additional findings
- **Nevada**: Increased project solving capacity due to communication and trust, alignment due to communication
- **MSB**:
- **Mare**:
- **GnB**: Philips is of the opinion that many problems could have been avoided, had Philips scoped the project to greater extent
4.6 CONCLUSION

To conclude this Chapter a short reflection is provided on the four research questions posed at the beginning of this Chapter.

*In the current NPD-projects, how does Philips manage supplier relationships?*

The empirical research, consisting of the case study research and cross-case analysis, and the discussion in Chapter 5 have provided a general view on how Philips manages its supplier relationships. The findings show that Philips very much relies on a number of formal processes and procedures to contact and contract a supplier. In order to involve the supplier in the development process Philips uses, for example, design workshops. Managing supplier relationship has proven to be very dependent of the involved purchaser and project leader. Philips has employed a very formal way in managing supplier relationship. However, Philips seems to be failing at operationalizing supplier relationship management on an individual level. Concluding, managing supplier relationships at Philips, or more specifically, successfully managing supplier relationship seems to include some arbitrary elements.

*What are the key determinants regarding best practices of supplier relationship management?*

According to the findings of the empirical research there are several key determinants regarding best practices of supplier relationship management. The best practices all scored very high regarding trust; communication; information and knowledge sharing; cooperation and coordination; and commitment. Furthermore, the best practices have shown that transparency is very important for the relationship and so is the construct performance, capabilities and competence. Zooming in on these best practices it shows that both had a very clear communication structure. There were clear agreements on the responsibilities within the project and the project leader took the lead in establishing a better quality relationship. Furthermore, both projects have reaped the benefits of face-to-face meetings. These behaviors contributed to the perceptions of trust within the relationship. Both projects were very well coordinated, which increased the alignment of both project teams and instilled a sense of mutual goals. The best practices have shown that the responsibility for the formal relationship (e.g. contractual agreements) and the responsibility for the informal relationship are best split between two employees. Preferably, the purchaser is responsible for the formal relationship and the project leader is responsible for the informal relationship; this is off course not strictly separated.

*What aspects are important in managing supplier relationships in NPD projects successfully?*

There are thirteen important aspects in managing supplier relationships in NPD project successfully. On an organizational level, attention should be paid to engaging in a relationship with which both parties are satisfied. Making relationship-specific adaptations and investments will accommodate the counterpart and increase the quality of the relationship. Displays of loyalty, a good reputation and being attractive as a customer/supplier are other aspects that are important for SRM in NPD projects.

On an individual level (e.g. between the project teams) trustful behavior is very important. Furthermore, actively coordinating and cooperation contributed to the success of the relationship. Being committed to the project and the relationship will increase the quality of the relationship. Lastly, the aspects of communication and information and knowledge sharing are aspects that should receive attention in order to have a successful relationship.

Finally, being flexible and transparent within the relationship and collaboration, on both the individual and organizational level, indirectly increases the quality of the relationship. The last aspect is to have a counterpart and be a counterpart that performs well, shows its competence and capabilities in the collaboration. This too will indirectly contribute to the quality of the relationship.
In which way should these aspects be organized at Philips MCC in order to set up a best practice on managing supplier relationships in NPD projects?

To start with, it is vital for Philips to select the right supplier. The supplier has to fit the role Philips has in mind for the project. For CM-project, suppliers require a very different skillset than for OEM-/ODM-projects. All suppliers have to meet a certain standard, however for OEM-/ODM-projects, Philips should make sure to include several other aspects in their supplier assessment. These aspects are related to soft skills. Furthermore, following the same reasoning as above, the project leader should be selected specifically for the type of project. Also, Philips should, in case of supplier involvement, scope their projects to a greater extent, or at least communicate their uncertainties to the supplier. In order to manage supplier relationships in NPD project successfully, Philips should be willing to adjust and adapt their NPD process to the supplier they are working with. This will increase trust and commitment in the relationship and project. Also, Philips needs to remain committed to the sourcing model chosen for the project.

In NPD projects it is important to set up a communication structure with the supplier. The project leader should be made responsible for the build-up of the relationship with the supplier, together with the purchaser. The purchaser is responsible for the business-side of the relationship with the supplier and guards the long-term perspective. The project leader needs to be made responsible for the informal relationship. Also, the project teams needs to be organized in a different way, to represent the communication structure and agreed upon way of working. Most attention has to be paid by Philips to the constructs trust and communication as they have shown to be the bottlenecks for successful collaboration.

Philips needs to be transparent and flexible in the NPD project. Philips should invest in visiting the suppliers involved in the NPD projects on a regular basis. Philips should involve their supplier early in the projects and discuss the approach to maintain for the specific project. Lastly, the project leader needs to actively coordinate the collaboration with the supplier.
5 Final model

The final research model is depicted in Exhibit 5-1. For the presentation of the findings the final model is discussed following the structure of the model (i.e. from left ‘Relationship quality’ to right ‘NPD performance’). This final model is the result of a synthesis of the findings from the literature study and the empirical research.

5.1 Relationship quality

From the findings of the research can be concluded that the quality of the relationship is determined by constructs acting on the organizational and individual level. Three constructs have been identified to have an indirect influence on the quality of a relationship. The first constructs is flexibility; flexibility contributes to the sense of commitment and is seen as a display of loyalty. Furthermore, flexibility contributes to the presence of trust. Flexibility is shown, for instance, by allocating extra resources to the project in order to meet a deadline or adjusting the way of working to accommodate the counterpart. The second construct is transparency; transparency contributes to the constructs trust; communication; and information and knowledge sharing. Transparency can also help to increase the attractiveness as customer/supplier. Transparency in a project may consist of, for example, providing insight in processes and test-results. The third and last construct to have a more indirect effect on the quality of a relationship is performance; capability; and competence. This constructs influences a number of constructs; it can influence the satisfaction, perception of loyalty and attractiveness. Furthermore, the construct can help build trust, ease communication; and contribute to the construct cooperation and coordination. For example, the skills of the project leader prove to be decisive for the quality of the relationship and the success of the project.

Several other constructs have been identified to be of direct influence on the quality of a relationship. These are divided into two categories: constructs that act on an organizational level and constructs that act on an individual level. First, the constructs of the organizational level are discussed.

The construct satisfaction is strongly linked to the construct performance; capability; and competence. The case studies showed that satisfaction did not play a large role on the individual level, but more on the organizational level. Being satisfied with the relationship can contribute to the effectiveness and efficiency of the NPD project. The second construct is relationship-specific adaptations and investments. Adaptations of the counterpart to your way of working and investments in the NPD project are perceived to contribute to the quality of the relationship. Loyalty is third construct under discussion. Behaviors of loyalty of an organization contribute to the quality of the relationship, for example respecting the intellectual property rights of an organization. The fourth construct is the reputation of an organization. This construct is strongly linked to the construct performance; capability; and competence as well, but also to the construct satisfaction. This construct is often of influence during the start of a NPD project. Once the project has started, this construct is of little value for the quality of the relationship. The last construct is the attractiveness as customer/supplier. During the whole of the project, both parties have to make sure to be and remain attractive for the counterpart. This pertains not only to the business-side of the collaboration (e.g. the profitability of the project), but should also be reflected by the behaviors of an organization and the involved individuals.

There are five constructs that act on an individual level that contribute to the quality of a relationship within a NPD context. These constructs all strongly influence each other. The first construct is trust, which consist of the not only the ability to trust your counterpart, but also to induce trust with your behavior. Behavior that may help induce trust in a relationship is, for example, meeting face-to-face or being transparent and honest. This construct is strongly linked to communication; commitment; information and knowledge sharing; transparency; and commitment. The second construct is communication. Agreeing on and implementing a communication structure, for example, in the NPD project can greatly improve the effectiveness and efficiency of the communication and in turn increases the quality of the relationship. Communication helps in the transfer of knowledge and helps create trust between the two parties. In line with
communication is the construct information and knowledge sharing. When this is strongly present within a relationship, there will a lot of knowledge transfer and this will have its effect on the performance of the NPD project. This constructs has a reciprocal relationship with the constructs trust and communication. The second to last construct that contributes to the quality of the relationship is cooperation and coordination. A collaboration where clear agreements are present concerning responsibilities and expectations is more likely to have a better quality relationship, as is supported by the case studies. The last constructs to contribute to the quality of the relationship is commitment. This construct is strongly linked to loyalty, trust and flexibility. This construct does not only improve the performance of the NPD project, but also increases the quality of the relationship.

Lastly, the constructs relationship history and dependency and power are omitted in the final model. These constructs have proved to be of very little influence on the quality of a relationship between buyer and supplier.

5.2 Knowledge transfer

In this research it appears that knowledge transfer plays an important role in the performance of NPD projects. The results of the case studies have shown that even the transfer of explicit knowledge can be difficult. This is often, but not only, caused by ineffective or bad communication within the project. Issues regarding, for instance, language barriers, the geographical distance and differences in way of working can have a negative effect on the transfer of explicit knowledge.

The literature study showed that the transfer of tacit knowledge is very difficult to accomplish (in a NPD context). The findings of the case studies support this view. In two cases there was effective tacit knowledge transfer. This was only possible, according to the interviewees, due to a better quality relationship. Meeting face-to-face was indicated as a driver for tacit knowledge transfer. Furthermore, both parties need to possess certain capabilities; expertise; and/or competencies to have effective tacit knowledge transfer. The manifestations of constructs that act on an individual level are an enabler for tacit knowledge transfer.

The quality of the relationship has a strong influence on the amount and quality of the knowledge transfer within the project. In turn, knowledge transfer is of influence to the performance of NPD projects. This positive relation is supported by the findings of the literature study as well as the empirical research.

5.3 NPD performance

The performance of NPD projects is certainly influenced by the quality of the relationship and knowledge transfer. The findings show that formal agreements are important for the NPD performance and form the basis of the collaboration. Once both parties are engaged in a project, the quality of the relationship can contribute to the performance of the NPD project. A better quality relationship is beneficial for the progress of the project. The relationship contributes also to keeping the project within budget. Furthermore, the findings show that having a high quality relationship increases the problem solving capacity of the collaboration. As a result, the project is more likely to stay on planning and additional costs for any delay are avoided. One of the cases has shown that a bad relationship with the supplier results in many quality issues in the project. The empirical research has also shown that having a good relationship resulted in more and innovative ideas being proposed by the supplier.

The findings from the empirical research are in line with the findings from the literature study. The outcomes of buyer-supplier relationship described in Paragraph 3.4.2 have been partly identified in the four case studies. It can be concluded that the constructs acting on an individual level contribute the most to the quality of the relationship. In turn, these also contribute the quality and quantity of knowledge transfer. Where effective communication is crucial for the transfer of explicit knowledge, the transfer of tacit
knowledge is mostly facilitated by the constructs trust; commitment; communication; transparency; and performance; capability and competence
Exhibit 5-1  Final model
6 CONCLUSIONS

This final Chapter presents the conclusions based on the research questions, formulated in Paragraph 2.4. Following, theoretical and practical implications are derived from the main conclusions and are discussed in Paragraph 6.2 and Paragraph 6.3. This Chapter is concluded with a discussion of the limitations and directions for future research in Paragraph 6.4 respectively.

6.1 CONCLUSIONS

In the introduction of this research, eight central questions were posed. These questions are closely related to the conceptual model (presented in Exhibit 5-1) and have been addressed. In this Paragraph the insights gained regarding the research questions are discussed.

RQ1: How is supplier relationship management (SRM) in NPD defined?

Supplier relationship management is defined as a governance mode with which the collaboration with a supplier is managed. SRM can be seen as an attempt to control and steer the behaviors of the supplier, the behaviors within the relationship and the outcome of the relationship with help of informal and formal mechanisms. Whereas the longstanding view has been that this is best done with help of formal, contractual governance structures, nowadays there is a strong sense amongst scholars and practitioners that informal governance structures are more effective and lead, quicker, to better outcomes of the relationship. SRM is managing the interactions with a supplier (that may supply goods and/or services) in order to maximize the value and outcome of those interactions. In practice, it entails the creation of more collaborative and closer relationships with supplier to access resources, value and knowledge in an NPD context otherwise unattainable (or difficult to attain individually) for the buying firm.

RQ2: What are the key determinants regarding supplier relationship management that affect NPD performance?

In this literature review twelve main constructs have been identified that contribute to the success of SRM and eventually to the quality of the relationship. Four of these constructs have been identified as being crucial to SRM and having a very large influence on the quality of the relationship. These are: trust; communication; information & knowledge sharing; and cooperation & coordination. These twelve constructs interact and influence each other and help to establish interpersonal relationships.

RQ3: What are the goals that can be attained with SRM in a NPD context?

Collaborating with suppliers can have a positive influence on the performance of the NPD process. This is only the case when the relationship is actively managed. Especially, higher quality products, a shorter TTM and reduced (development) costs are highly sought after and are more likely to be attained in successful relationships with involved suppliers. This literature review has identified seventeen outcomes of SRM, supplier involvement in the NPD process. In all cases, the results of successful supplier relationship contribute to competitive advantage.

RQ4: What is the role of knowledge and knowledge transfer regarding NPD performance?

Knowledge transfer is identified as having a significant impact on the performance of NPD projects. The transfer, recombination, creation and use of (new) knowledge in NPD processes is critical to attain a positive result. Any NPD process requires the utilization, recombination and creation of knowledge. This also holds for knowledge transfer between buyer and supplier (or two collaborating entities); without knowledge transfer the effectiveness and efficiency of NPD projects would suffer. Knowledge transfer increases both performance and innovativeness of an organization.
RQ5: In the current NPD-projects, how does Philips manage supplier relationships?

The empirical research, consisting of the case study research and cross-case analysis, and the discussion in Chapter 5 have provided a general view on how Philips manages its supplier relationships. The findings show that Philips very much relies on a number of formal processes and procedures to contact and contract a supplier. In order to involve the supplier in the development process uses, for example, design workshops. Managing supplier relationship has proven to be very dependent of the involved purchaser and project leader. Philips has employed a very formal way in managing supplier relationship. However, Philips seems to be failing at operationalizing supplier relationship management on an individual level. Concluding, managing supplier relationships at Philips, or more specifically, successfully managing supplier relationship seems include some arbitrary elements.

RQ6: What are the key determinants regarding best practices of supplier relationship management?

There are several key determinants regarding best practices of supplier relationship management. The best practices have all scored very high regarding trust; communication; information and knowledge sharing; cooperation and coordination; and commitment. The best practices have shown that transparency is very important for the relationship and so is the construct performance, capabilities and competence. Zooming in on these best practices it shows that both had a very clear communication structure. There were clear agreements on the responsibilities within the project and the project leader took the lead in establishing a high quality relationship. Furthermore, both projects have reaped the benefits of face-to-face meetings. These behaviors contributed to the perceptions of trust within the relationship. Both projects were very well coordinated, which increased the alignment of both project teams and instilled a sense of mutual goals. The best practices have shown that the responsibility for the formal relationship (e.g. contractual agreements) and the responsibility for the informal relationship are best split between two employees. Preferably, the purchaser is responsible for the formal relationship and the project leader is responsible for the informal relationship. This is of course not strictly separated.

RQ7: What aspects are important in managing supplier relationships in NPD project successfully?

There are thirteen important aspects in managing supplier relationships in NPD project successfully. On an organizational level, attention should be paid to engaging in a relationship with which both parties are satisfied. Making relationship-specific adaptations and investments will accommodate the counterpart and increase the quality of the relationship. Displays of loyalty, a good reputation and being attractive as a customer/supplier are other aspects that are important for SRM in NPD projects.

On an individual level (e.g. between the project teams) trustful behavior is very important. Actively coordinating and cooperation contributed to the success of the relationship. Being committed to the project and the relationship will increase the quality of the relationship. Lastly, the aspects of communication and information and knowledge sharing are aspects that should receive attention in order to have a successful relationship.

Finally, being flexible and transparent within the relationship and collaboration, on both the individual and organizational level, indirectly increases the quality of the relationship. The last aspect is to have a counterpart and be a counterpart that performs well, shows its competence and capabilities in the collaboration. This too will indirectly contribute to the quality of the relationship.

RQ8: In which way should these aspects be organized at Philips MCC in order to set up a best practice on managing supplier relationships in NPD projects?

To start with, it is vital for Philips to select the right supplier. The supplier has to fit the role Philips has in mind for the project. For OEM-/ODM-project, managing suppliers require a very different skillset than for CM-
projects. All suppliers have to meet a certain standard, however for OEM-/ODM-projects, Philips should make sure to include several other aspects in their supplier assessment. These aspects are related to soft skills. It makes sense that the project leader should be selected specifically for the type of project. Also, Philips should, in case of supplier involvement, scope their projects to a greater extent, or at least communicate their uncertainties to the supplier. In order to manage supplier relationships in NPD project successfully, Philips should be willing to adjust and adapt their NPD process to the supplier they are working with. This will increase trust and commitment in the relationship and project. Also, Philips needs to remain committed to the sourcing model chosen for the project.

In NPD projects it is important to set up a communication structure with the supplier. The project leader should be made responsible for the build-up of the relationship with the supplier, together with the purchaser. The purchaser is responsible for the business-side of the relationship with the supplier and guards the long-term perspective. The project leader needs to be made responsible for the informal relationship. Also, the project teams needs to be organized in a different way, to represent the communication structure and agreed upon way of working. Most attention has to be paid by Philips to the constructs trust and communication as they have shown to be the bottlenecks for NPD projects.

Philips needs to be transparent and flexible in the NPD project. Philips should invest in visiting the suppliers involved in the NPD projects on a regular basis. Philips should involve their supplier early in the projects and discuss the approach to maintain for the specific project. The project leader needs to actively coordinate the collaboration with the supplier.

These research questions serve as input to address the main question of this research, which is presented hereafter:

**How can Philips MCC adapt its organization and new product development processes in order to manage supplier relationships in NPD projects in such a way that it effectively gives access to and utilization of the knowledge and capabilities of suppliers?**

The main question of this research is answered with the input from the eight research questions, which have guided this research.

These findings, along with the findings of the literature research have provided the input to answer our research question. A higher relationship quality has a positive effect on knowledge transfer within the buyer-seller dyad which will eventually result in a higher NPD performance. This expresses itself, for instance, in higher quality products; shorter time to market (TTM) and lower development/production costs. An elaboration of the implications of the model is given in the following sections. The study appears to indicate that Philips does not have sufficient capabilities to always successfully involve supplier in their NPD projects.

Philips MCC can manage supplier relationships in NPD projects more successfully and effectively by explicitly paying attention to the constructs depicted in Exhibit 5-1. To do so, Philips needs to make changes in its organization. Philips has to reconsider the role and responsibilities of all employees involved in the NPD process. Philips MCC needs to be flexible and transparent in their collaboration with the supplier. Furthermore, MCC needs to assess suppliers based on their performance, capabilities and competencies and not only on an initial low factory cost price. The ambition to involve suppliers in NPD projects is insufficiently embedded on the project level.

On an organizational level, Philips need to focus on having a good formal relationship and understanding with a supplier as this improves its customer position in a number of ways. To affect this, Philips need to be willing to invest (in kind) and adapt to the needs and characteristics of the supplier.

Finally, on an individual level, Philips has to make sure that the constructs trust; communication; information and knowledge sharing; cooperation and coordination; and commitment are present within the
personal Philips-supplier relationships. Philips need to have the right incentives to make sure that these constructs are in place and also need to verify the actual use of these constructs. Here it makes sense that the project leader is made explicitly responsible for managing the supplier relationship regarding the informal aspects and the purchaser is made responsible for managing the supplier relationship regarding the formal aspects. The project leader should be specifically selected for the type of project. Whenever an ODM or OEM project is started, Philips should make sure to select a project leader who is experienced in building relationships with supplier and/or possess a skillset which is required for the effective build-up of a relationship with the supplier. The operationalization of these constructs is further discussed in Paragraph 6.3.

The conclusion serves as input for the formulation of several theoretical and practical implications in the following Paragraphs.

6.2 Theoretical implications

Several contributions to existing theory have been identified. These implications are discussed below. From these implications several propositions have been derived, which are presented as well.

Firstly, this study contributes to theory as it explicates the dynamics of the relation between relationship quality, knowledge transfer and NPD performance. This study has researched the impact of individual constructs on the quality of a relationship between a buyer and supplier in a NPD context. 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. This research encompasses all three elements and studied them in a NPD context. Moreover, this research described how SRM affects knowledge transfer and in turn affects NPD performance, which provides a holistic view on the dynamics of ESI in NPD projects. The role of relationship quality and knowledge transfer regarding the NPD performance is explicated and studied across four case studies.

Practice and theory have shown that the right supplier relationship indeed facilitate and accommodate supplier involvement in NPD processes which subsequently results in a superior innovation performance. A higher relationship quality has a positive effect on knowledge transfer within the buyer-seller dyad which will eventually result in a higher NPD performance. This expresses itself, for instance, in higher quality products; shorter time to market (TTM) and lower development/production costs. An elaboration of the implication of the model is given in the following sections.

Proposition 1: A relationship between a supplier and buyer of high quality will increase the quality and quantity of knowledge transfer, which will contribute to the NPD performance

This study is one of the few in which SRM in relation to NPD performance is researched in another context than the automotive industry. By focusing on the NPD context of a consumer (electronics) organization, the research domain is provided with another perspective and expanded beyond the automotive industry.

This research underpins the influence of several constructs on the quality of the relationship as described by earlier research; it adds however three constructs as having an influence on the quality of the relationship. These are transparency; performance, capability and competence; and attractiveness of a customer/supplier.

Proposition 2: The construct transparency contributes to the quality of a buyer-supplier relationship

Proposition 3: The construct performance, capability and competence contributes to the quality of a buyer-supplier relationship

Proposition 4: The construct attractiveness of a customer/supplier contributes to the quality of a buyer-supplier relationship
Additionally, this study identified that these constructs can be categorized into two different categories. A set of constructs act mainly on the individual level, whereas the other constructs act on an organizational level. This leads to the following proposition:

**Proposition 5:** The constructs that influence the quality of the buyer-supplier relationship act on an individual and organizational level

The case studies showed that communication is crucial for the performance of NPD project, knowledge transfer and the quality of a relationship. In order to ensure a better quality relationship and attain NPD success, organizations need to make sure that the communication between the two involved organizations is well established, in term of effectiveness and efficiency.

**Proposition 6:** The construct communication is crucial for the quality of the relationship and the success of the NPD project

Not only does a better quality relationship contribute to the performance of the NPD project in term of time to market, costs and quality, this research proved that it also increase the problem solving capacity of the collaboration. Also in a better quality relationship, the supplier is more likely to propose (innovative) ideas and solutions that may contribute to the performance of the NPD project.

**Proposition 7:** The problem solving capacity within a NPD project is positively related to the quality of the relationship

**Proposition 8:** Establishing a high quality relationship is likely to result in more (innovative) ideas and solutions being proposed by the supplier

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.

**Proposition 9:** Buyer-supplier relationships of a poor quality can harm the performance of a NPD project

Finally, whereas much research on ESI in NPD and SRM in NPD was conducted from the perspective of TCE, this research takes mainly RBV and Agency Theory into account. Thus this research moves away from merely a focus on the dyad, but takes the firm level into account as well. This provided the research with more depth to analyze the complex topics under research.

### 6.3 Practical implications

#### 6.3.1 General implications

The final model, as depicted in Exhibit 5-1 has several practical implications. This section first discusses the practical implications for organizations in general. These implications can be of use for any organization that attempts to involve their suppliers in their NPD processes. Hereafter, the managerial implications tailored to the research context, Philips MCC, are discussed.

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 buyer are crucial here. By actively managing the supplier relationship, organizations can improve the knowledge transfer and accommodate the transfer of relevant knowledge.
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.

Organizations have to make, preferably, the project leader responsible for the informal relationship with the supplier. The purchaser should be responsible for the formal relationship. In order to manage the relationship with a supplier, an organization has to pay attention to constructs acting on an individual and organizational level. Moreover, there are three construct that have an indirect influence on the quality of a relationship. These constructs will be discussed hereafter, with examples on how to operationalize these constructs (e.g. behaviors that contribute to these constructs).

Within the project and in communicating with the supplier, the organizations need to be transparent. This increases the sense of trust and help creating commitment at the supplier. Behaviors that are regarded as transparent are for instance discussing uncertainties regarding the project and discussing future plans. An organization needs to be flexible in the collaboration. Additionally, there needs to be focus on soft skills in the supplier selection process and supplier assessment. The research has shown that these are essential for the quality of the relationship.

More attention has to be paid to the attractiveness as a customer or supplier. The research has showed that being attractive can strongly increase the commitment, trust and communication, resulting in a relationship of higher quality. Also, organizations should take the constructs: satisfaction; loyalty; reputation; and relationship-specific adaptations and investments into account. An organization has to make sure to behave trustful and honest. The agreements between two organizations should result in a win-win situation and be fair, preferably with mutual goals. This increases the alignment and cooperation within a relationship.

Most importantly, organizations need to actively manage the relationship within the project team. Even though organizations have to display certain behaviors and have certain characteristics, within a project team the quality of the relationship is decisive for the performance of the NPD project. In order to ensure the quality of the relationship the organization, project team has to make sure to perform regarding the following constructs: trust; communication; information and knowledge sharing; cooperation and coordination; and commitment. These constructs are closely linked to each other and should be treated as such.

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. Management needs to keep this in mind when composing the project team. The project team needs to make sure to visit the supplier often. These face-to-face meetings create a sense of trust and facilitate tacit knowledge transfer. One way to increase trust in the relationship is to trust the supplier. This is done by, for instance, sharing responsibilities and by limiting the interference with their processes. The case studies have shown that the best way to induce trust at the supplier is to display trustful behavior yourself (e.g. delivering what is promised, on time). The project leader has to be in the lead regarding this relationship build-up. For the build-up of trust, communication is vital.

Communication is crucial for information sharing and coordination and cooperation as well. It is important to set up a communication structure that suits the needs of both organizations. Communication helps to keep the project teams aligned and have current insight in the progress of the project. Also, communication face-to-face allows for the transfer of tacit knowledge. Without face-to-face communication, this transfer will be very limited. Organizations need to allocate extra resources in case there is a language
barrier present. These extra resources need to be focused on the communication with the supplier. Contributing to trust in the relationship, it is important to be responsive.

Having effective and efficient communication within the relationship improves the quality and quantity of knowledge sharing. The presence of trust also contributes to this sharing of information. This will in turn contribute to the performance of the NPD project. The project leader should make sure to coordinate the relationship from the start of the project. This should be done in consultation with the supplier in order to agree on an appropriate way of working. Being considerate towards the counterpart’s way of working will contribute to a feeling of trust and commitment. Actively coordinating the collaboration increases the alignment within the project. This also includes making agreements on the division of responsibilities and the proposed timeline of the project. Displaying behavior of cooperation, such as thinking along, increases the quality of the relationship.

Lastly, both organizations need to be and remain committed to the project. This means that pulling resources from the project has to be avoided. The case studies have shown that providing training to the supplier strongly increases the sense of commitment. Commitment can also be shown, for example, by delivering what is promised and on time.

Summarizing, managing supplier relationships leads to a higher quality relationship which will contribute to the performance of NPD projects. Benefits include keeping the project on schedule and within budget and delivering higher quality products. A better quality relationship increases the problem solving capacity of the collaboration and its flexibility. 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.

6.3.2 Managerial Implications

This research is conducted in part to address the difficulty of Philips on how to leverage the knowledge and capabilities of their supplier in their NPD projects. In this section the recommendations specific for Philips MCC are discussed. These recommendations are structured according to the timeline of an NPD project. First is discussed what the implications are for the strategy of Philips MCC, thereafter which adjustments should be made to their supplier selection process. After this, the organization of the project team is discussed. Finally, an integral proposal is given, consisting of several behaviors, on how to manage supplier relationships.

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 buyer are crucial here. By actively managing the supplier relationship, organizations can improve the knowledge transfer and accommodate the transfer of relevant knowledge.

Secondly, Philips needs to remain committed to their sourcing model choice in their NPD projects. It happens too often that Philips is disappointed with the results of ODM- and OEM-projects. As a result, Philips has the tendency to claim back several design and develop responsibilities. This does not only cause a delay of the project, it strongly increases the pressure on Philips’ resources, requires extra investments and damages the relationship with the involved supplier(s).

The consequence of an OEM-OTS project is that a premium market and value proposition is per definition not possible. Philips has to be aware of this, when drafting the business case for a NPD project. The expectation is that Philips will move away from OEM-OTS projects towards ODM project, in which Philips can,
together with the supplier, develop towards a premium product. Philips should allocate their resources accordingly.

Organizations should involve suppliers and members of the project even in the project definition phase (i.e. before the PB-milestone). In this phase the project is scoped and the requirements are set, usually done by the marketing function in collaboration with the innovation lead. By involving not only members of the project team in this phase, but also potential suppliers, both organizations become much more aligned. The valuable input of the supplier can be directly embedded in the project scope and the quality of the supplier-buyer relationship will grow. Furthermore, by doing this the project definition and requirements are less likely to shift during the project.

The research framework can be used by Philips 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.

For Philips MCC it holds that the projects need to be tailored to product and supplier. This increases the alignment within the projects and also helps to keep the projects lean and flexible. This means that Philips has to flexible towards their fixed, and somewhat rigid, processes and procedures and be willing to adjust to the characteristics of the supplier and product. This also implicates that Philips has to limit their extensive specification of future products and to stop increasing the quality demands and specifications for the product during the project. By doing this, Philips displays trust in their supplier, which will improve the quality of the relationship. This behavior (over-specification and continuously increasing demands) can be countered if Philips scopes the project more extensive. Preferably, the supplier is already involved in this process. This way both parties are able to express their concerns and thoughts on the project and more importantly, they both can discuss and agree upon the optimal way to conduct the project and develop the product.

Regarding the selection of the supplier, Philips needs to pay more attention to the soft skills of a supplier, especially when this supplier is to be involved in the development process. Philips should include skills and characteristics as communication; transparency; honesty; responsiveness and possessing the necessary development capabilities in their supplier assessment process.

Philips need to have the right incentives to make sure that these constructs are in place and also need to verify the actual use of these constructs. Here it makes sense that the project leader is made explicitly responsible for managing the supplier relationship regarding the informal aspects and the purchaser is made responsible for managing the supplier relationship regarding the formal aspects. The project leader should be specifically selected for the type of project. Whenever an ODM or OEM project is started, Philips should make sure to select a project leader who is experienced in building relationships with supplier and/or possess a skillset which is required for the effective build-up of a relationship with the supplier.

Philips has to not only focus on the formal aspects when involving suppliers in their NPD projects. Their contractual agreements should be the basis for the collaboration; however, to benefit to the fullest extent from the collaboration with the supplier, Philips should pay attention to managing supplier relationships in a more informal way. On top of this, the attractiveness of Philips as a customer is very much of importance for the quality of the relationship with a supplier and the performance of a NPD project. This attractiveness is not only a reflection of the impact of the brand Philips and the reputation of Philips, but also consists of the behaviors of Philips within the relationship. By displaying honest behavior for example, the supplier is more likely to regard Philips as an attractive customer.
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. Management needs to keep this in mind when composing the project team. Philips need to make sure that the project team meets the supplier face-to-face before the start of the project. This increases trust; communication; helps in aligning both organizations and is regarded as a token of commitment.

During the projects, Philips should take the constructs depicted in Exhibit 5-1 into account. The project leader should set up a communication structure and make clear agreements with the supplier regarding responsibilities. Philips should stimulate visiting the supplier. Depending on the content of the project, the project leader should propose, together with the purchaser, a division of responsibilities. Furthermore, the project leader is responsible to agree with the supplier on a way of working and timeline for the project.

The purchaser should make sure that the future perspective is shared with the supplier. This means, for instance, that product roadmaps and market insights can be shared. The project leader should make sure to listen to the suggestions of the supplier. When Philips is collaborating with a supplier it is typical behavior to impose their way of working onto the supplier; disregarding the characteristics and experience of the supplier. To counter this, the project leader should make sure to listen to and incorporate suggestions of the supplier into the project. This will improve the commitment and trust of the supplier and eventually will lead to a better result.

When Philips takes these constructs into account, the quality of the relation is likely to improve and contribute to the performance of the NPD project. By focusing on the informal relationship with the supplier, projects are more likely to stay within the planned timeframe and budget. Additionally, the quality of the product is likely to improve. The problem solving capacity of the collaboration is improved and more (innovative) ideas and propositions are given by the involved supplier. Lastly, the supplier is more likely to share market insights and other experiences.

By improving the (partly) outsourcing of product development, Philips MCC can focus better on the core products of their product portfolio, resulting in a more efficient innovation process. Furthermore, the input of the suppliers can be used to gain better market insights and adjust the innovation pipeline timely and accordingly.

6.4 Limitations and directions for further research

This research carries several limitations, which are discussed hereafter. Firstly, the case studies selected for this research are all within the context of one company and thus in a very limited of industries.

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. In order to counter this, the interviewer should not be the same person as the coder. However, it would improve the quality of the research to have two or more researchers who code the collected data. After this, this coded data can be compared and processed with minimal bias. This recommendation can be expanded to conducting the interviews by at least two interviewers. The concepts under study are complex phenomena and strongly linked to perception and interpretation. To eliminate bias at interpreting the findings, research would benefit from conducting it with more than one researcher.

The research consists of four case studies. The exploratory nature of the research allows for this in-depth research, however in verifying the conceptual model there is little statistical support. The research would have benefitted from combining case study research with a questionnaire, in order to increase the sample size. The findings from the case studies could serve as a deep-dive into the findings, whereas the findings from the
questionnaire would provide the research with statistical significance. A suggestion for further research is to verify the final model using a questionnaire on a large sample (i.e. N>200), of both supplier and buyers. 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.

The included suppliers in the research are all located in Asia. As cultural and geographical differences have been identified influencing the relationship and NPD performance, further research should verify the role of these differences with regard to NPD performance. The suggestion for further would be to conduct research with a sample including buyers and suppliers from various continents and cultures.

Another limitation is regarding the collection of empirical data. In this research input from the supplier was gathered from a single point of contact. This holds the limitation that these findings are more difficult to generalize, as they represent the view of one interviewee. A recommendation is to design the research in such a way, that both buyer and supplier are represented by multiple data sources (read: interviewees). This will provide the research with a more general and balanced view. This will contribute to the generalizability of the research.

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.

Another limitation is that this research was conducted in the context of the buying organization. This may have introduced a bias in the research. In order to counter this, a suggestion is to study the relationship between a supplier and buyer, with two researchers. One researcher is to be embedded in the buying organization and the other embedded in the supplying organization.

Lastly, the research was conducted within the context of one organization. This may limit the findings and conclusions to organizations within the same industry or even only organizations with the same characteristics. To increase the generalizability and value for the theoretical domain, this research should be conducted across several organizations, representing varying industries.
7 Bibliography


8 Appendices

8.1 Organization chart Philips
8.2 Organization chart MCC
8.3 Purchasing at MCC

The main activities for strategic purchasing are:

i) Scouting/market intelligence and technology intelligence;

ii) Developing sourcing strategies;

iii) Supplier management, which consist of;
   a. (Re)evaluation, audit, selection & phase out;
   b. Risk management;
   c. Supplier performance management;

iv) Differentiated relationship management;

v) Contract management;

vi) Spend management, e.g.;
   a. Leverage;
   b. Negotiation
   c. Etc.

Strategic purchasing aims to outline the generic guidelines and the policy that is applicable to purchasing of finished goods and bill of material (BoM) related components and materials. The initial purchasing function is about executing the purchasing strategy and consists of following main activities:

i) Supplier allocation;

ii) Supplier risk assessment;

iii) Early supplier involvement;

iv) Request for quotation (RFQ) and request for information (RFI);

v) Cost improvement;

vi) Capacity management;

vii) Quality management in project.
8.4 SOURCING MODELS OF MCC

Outsourced development with in-house industrialization

- Philips is responsible for the product requirements;
- The product development is done jointly or solely by the outsource party, following Philips design rules;
- The production is done in Philips sites and may include Local-for-Local factories.

CM (Contract Manufacturer)

- Philips is responsible for the product requirements and does the product development;
- Using Philips Technical Product Data, the CM provides at least manufacturing and optionally related product support services;
- Initial purchasing responsibility is shared between Philips and the CM, where the CM controls the contracting of non-key components.

ODM – DTC (Original design manufacturer – design to technical concept)

- Besides providing manufacturing and related product support services, the CM engages also in the technical design of the product;
- Philips is responsible for the product requirements, key components and product concepts.

ODM – DPT (Design to specification using Philips Technology)

- A company that partly uses our technology to specify, design and manufacture products and offers them to Philips;
- The product esthetics (full industrial design) is done by Philips;
- Part of the Function/Technology is by Philips, where the company specifies, design and tests the rest of the technology inside the product and implements Philips industrial design.

ODM – DTS (Design to specification)

- A company that specifies, designs and manufactures products based on our external design;
- Philips is responsible for the product esthetics (full industrial design) and possible the User Interface;
- The company specifies designs and tests the technology inside the product and it implements Philips’ look and feel.

OEM – OTS (Original equipment manufacturer – off the shelf)

- The third-party company specifies, designs and manufactures entire products and offers their range to Philips;
- Besides commercial requirements, Philips does not provide any technical/detailed inputs;
- Philips is responsible for the selection of predefined options, color or external make-up for Philips Brand identity compliance.
Outsourcing Model Variants of Philips and responsibilities

Outsource Development with in-house industrialization

CM (Contract Manufacturer – Build to Print) – using our technical product data

ODM - DTC – Design to Technical Concept (Joint Development with CMS)

ODM - DPT – Design to Specification using Philips Technology

ODM - DTS – Design to Specification

OEM or OTS – Buying “off the shelf” Choosing from the catalogue and selecting the color
## 8.5 List of Interviewees

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purchasing Director MCC</td>
</tr>
<tr>
<td></td>
<td>Integral Project Lead</td>
</tr>
<tr>
<td></td>
<td>Integral Project Lead</td>
</tr>
<tr>
<td></td>
<td>Strategic Buyer</td>
</tr>
<tr>
<td></td>
<td>Integral Project Lead</td>
</tr>
<tr>
<td></td>
<td>Integral Project Lead</td>
</tr>
<tr>
<td></td>
<td>Integral Project Lead</td>
</tr>
<tr>
<td></td>
<td>Connectivity Researcher</td>
</tr>
<tr>
<td></td>
<td>Value Sourcing Specialist &amp; High Impact Innovation Purchasing Manager</td>
</tr>
</tbody>
</table>

## 8.6 List of Consulted Documents of Philips

<table>
<thead>
<tr>
<th>Number</th>
<th>Document title</th>
<th>Source</th>
<th>Owner</th>
<th>Date of consultation (last)</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Philips Intranet</td>
<td>Philips</td>
<td>January 15th, 2013</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Philips Intranet</td>
<td>Philips</td>
<td>January 15th, 2013</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Philips Intranet</td>
<td>Philips</td>
<td>January 11th, 2013</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Philips Intranet</td>
<td>Philips</td>
<td>January 11th, 2013</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Philips Intranet</td>
<td>Philips</td>
<td>May 13th, 2013</td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>Product development lead</td>
<td>Philips</td>
<td>May 13th, 2013</td>
<td></td>
</tr>
</tbody>
</table>
8.8 Cause and effect flowchart

- **Organization MPR projects**
- **MCC's innovation strategy**
- **Internal capabilities**
- **Supplier selection**
- **SRM**

**Factors contributing to inefficiency**

1. **Lack of trust**
   - Issues take time to be resolved
   - Increased pressure on resources
   - Project delay
   - Additional development cost
   - Inefficiency

2. **Supplier alignment issues**
   - Inappropriate rate of suppliers in NPD
   - Incomplete design

3. **Language barrier**
   - Lack of shared culture and understanding
   - Communication issues

4. **Geographical separation**
   - Late formal agreement
   - Communication issues

5. **Lack of knowledge**
   - Varying communication responsibilities
   - Lack of knowledge

6. **Risk aversion**
   - Suppliers seek traditional manufacturing

7. **Optimistic view on supplier performance**
   - Overestimation of potential

8. **Low site maturity**
   - Lack of organization of collaboration projects
   - Model is selected without clear definition

9. **Lack of insight on impact of sourcing model**
   - Different views on supplier involvement

10. **Demanding Philips/Avnit requirements**
    - Lack of requirement and responsibilities

11. **Time to market pressure**
    - Ad hoc product driven project management

12. **New product development**
    - Private base for project portfolio

13. **Strong growth ambition**
    - Lack of bargaining power

**Root causes**

- **Overestimation of potential**
- **Customer is long term attitude**
- **Lack of requirement and responsibilities**
- **Little effort put in maintaining relationships**
- **Lack of understanding of project intended by supplier**
- **Volume projections shortfall**
- **Increasing pressure on resources**
- **Change in sourcing model**
- **Additional development cost**
- **MCC's new product development performance**

**Inefficiency**
8.9 Descriptive of the Body of Literature

### Table 8-1 Number of Publications per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>5</td>
</tr>
<tr>
<td>1991</td>
<td>4</td>
</tr>
<tr>
<td>1992</td>
<td>12</td>
</tr>
<tr>
<td>1993</td>
<td>6</td>
</tr>
<tr>
<td>1994</td>
<td>8</td>
</tr>
<tr>
<td>1995</td>
<td>10</td>
</tr>
<tr>
<td>1996</td>
<td>8</td>
</tr>
<tr>
<td>1997</td>
<td>12</td>
</tr>
<tr>
<td>1998</td>
<td>5</td>
</tr>
<tr>
<td>1999</td>
<td>7</td>
</tr>
<tr>
<td>2000</td>
<td>11</td>
</tr>
<tr>
<td>2001</td>
<td>8</td>
</tr>
<tr>
<td>2002</td>
<td>6</td>
</tr>
<tr>
<td>2003</td>
<td>7</td>
</tr>
<tr>
<td>2004</td>
<td>4</td>
</tr>
<tr>
<td>2005</td>
<td>4</td>
</tr>
<tr>
<td>2006</td>
<td>9</td>
</tr>
<tr>
<td>2007</td>
<td>8</td>
</tr>
<tr>
<td>2008</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
</tr>
<tr>
<td>2010</td>
<td>4</td>
</tr>
<tr>
<td>2011</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
</tr>
<tr>
<td>2013</td>
<td>2</td>
</tr>
</tbody>
</table>

![Number of publications chart]

### Table 8-2 Number of Publications per Source (Top 10)

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Product Innovation Management</td>
<td>17</td>
</tr>
<tr>
<td>Strategic Management Journal</td>
<td>11</td>
</tr>
<tr>
<td>Industrial Marketing Management</td>
<td>10</td>
</tr>
<tr>
<td>Research Policy</td>
<td>6</td>
</tr>
<tr>
<td>R&amp;D Management</td>
<td>5</td>
</tr>
<tr>
<td>Journal of Marketing</td>
<td>5</td>
</tr>
<tr>
<td>Journal of Operations Management</td>
<td>5</td>
</tr>
<tr>
<td>The Academy of Management Review</td>
<td>5</td>
</tr>
<tr>
<td>Organization Science</td>
<td>4</td>
</tr>
<tr>
<td>Scandinavian Journal of Management</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>72 (of a grand total of 193)</strong></td>
</tr>
<tr>
<td>Methodology</td>
<td>Number of publications</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Empirical - survey/questionnaire</td>
<td>37</td>
</tr>
<tr>
<td>Empirical - interviews</td>
<td>16</td>
</tr>
<tr>
<td>Empirical - variety of methods</td>
<td>25</td>
</tr>
<tr>
<td>Empirical – content analysis</td>
<td>10</td>
</tr>
<tr>
<td>Case studies</td>
<td>49</td>
</tr>
<tr>
<td>Academic Literature review</td>
<td>20</td>
</tr>
<tr>
<td>Discussion paper</td>
<td>12</td>
</tr>
<tr>
<td>Book (section)</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>193</strong></td>
</tr>
</tbody>
</table>

![Bar chart showing the number of publications per methodology.](chart.png)
8.10 Interview protocol

The anchors used in the questions come to a large extent from the paper of Vagias (2006) in which the different response anchors of a Likert-type scale are discussed. The interview questions are to a large extent based on the work of (Morgan & Hunt, 1994; Ellis, 2007; Sivadas & Dwyer, 2000; Walter, 2003; Cannon & Homburg, 2001; Hansen, 1999; Lin & Huang, 2013; Marsh & Stock, 2006)

8.10.1 Introduction

- Introduce myself, the researcher.
- Research motive: I am graduating at the strategic sourcing & supply management faculty group. This is the concluding part of my master Innovation Management. Via my mentor I came into contact with the purchasing director at Philips MCC, the problem owner. According to the purchasing director, Philips MCC did not make enough use of the knowledge and capabilities of their suppliers in their NPD projects. After my analysis of the problem context, my research focuses on the role of supplier relationship management in the performance of NPD projects. This generally focuses on how to manage supplier relationships successfully and how to stimulate knowledge transfer which eventually impacts the performance of NPD projects.
- Research objective: The aim of the study is to increase insights on supplier relationship management and its importance for NPD project performance. With these insights, recommendations can be made to purchasers involved in NPD project on to involve supplier successfully in NPD projects.
- Interview objective: First, to learn about the strategy and vision of the organization towards supplier relationship and supplier involvement in NPD projects. Secondly, to learn how the organization manages relationships with supplier involved in the NPD project under study. Lastly, to have an open-ended discussion about experiences and insights of the interviewee regarding the topics.
- Interview procedure: Ask the interviewee questions about the topic, which are defined earlier. These questions will provide the interview with structure, however elaboration and digression to some extent is permitted and sought after.
- Ask permission to record the interview and explain the level of confidentiality of this research.
- Ask the interviewee to introduce him-/herself.

8.10.2 Mini Questionnaire (Focal Firm)

Constructs and relationship quality

- How would you grade the relationship with the supplier (grade 1 to 10)
- How would you grade your firm on supplier relationship management (grade 1 to 10)
- How close was the working relationship between the project team and the supplier (5-point Likert-scale with 1 = very close, like being in the same project team, 3 = somewhat close, like discussing and solving issues together, 5 = distant, like an arm’s-length delivery of input)
- Extent of good overall relationship with supplier (5-point Likert-scale with 1 = very little/no extent, 5 = very great extent)
- We have a trustful relationship with the supplier (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
- The communication (in all its form) with the supplier is sufficient for the project (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
- For this project, sufficient information is shared within the relationship (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• The relationship displays a high degree of cooperation and coordination (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• To what extent did your firm make relationship-specific adaptations and investments (5-point Likert-scale with 1 = none, 5 = to a large extent)
• To what extent does your firm show commitment to the relationship with the supplier (5-point Likert-scale with 1 = none, 5 = to a large extent)
• Your firm is satisfied with the relationship with the supplier (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• The relationship is balanced in term of power and dependency (5-point Likert-scale with 1 = strongly disagree, the supplier is more powerful, 3 = agree, 5 = strongly disagree, our firm is more powerful)
• The supplier adapts and is flexible to your firm (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• The supplier enjoys a positive reputation (5-point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• The supplier displays loyalty to the relationship (5-point Likert-scale with 1 = none, 5 = to a large extent)
• For how long did your firm have a relationship with the supplier (in years and months)

Knowledge transfer

• How would you grade the amount of knowledge sharing with the supplier (grade 1 to 10)
• How would you grade the quality of the knowledge shared (i.e. the value the knowledge had for the project) (grade 1 to 10)
• How well documented was the knowledge that your team leveraged from the supplier? Please consider all knowledge (5-point Likert-scale with 1 = it was very well documented, 5 = it was not well documented)
• Was all this knowledge sufficiently explained to your team (5-point Likert-scale with 1 = all of it was, 5 = some of it was)
• What type of knowledge came from the supplier (5-point Likert-scale with 1 = mainly reports, manuals, documents, etc., 3 = half know-how and half reports/documents, 5 = mainly personal and practical know-how)

NPD performance

• The project remained within budget (5 point Likert-scale with 1 = budget was strongly overrun, 3 = project was completed on budget, 7 = project was cheaper than budgeted)
• The project was completed on time and the product was released on time (5 point Likert-scale with 1 = heavily delayed, 3 = as planned, 5 = much earlier than planned)
• The collaboration with the supplier resulted in a higher quality product (5 point Likert-scale with 1 = product quality lower than expected, 3 = product quality on par, 5 = product quality higher than expected)
• The objectives set for the project and the product were all met (5 point Likert-scale with 1 = strongly disagree, 5 = strongly agree)
• The product met sales and profit projections (5 point Likert-scale with 1 = disagree; lower than projections, 3 = agree, 5 = disagree, higher than projections)

8.10.3 Interview (Focal Firm)

Note: some concepts and the purpose of the research might require some further explanation. Ask the interviewee if he/she understands the purpose and the main concepts used.
The project and general question

- Could you describe the (aim of the) project?
- Could you describe the course of the project?
- Was the team always complete during the project?
- In what way were you involved in the project and what were your responsibilities?
- What role did the purchasing department play regarding the collaboration with the supplier?
- What role did the project team play regarding the collaboration with the supplier?
- What role did management play regarding the collaboration with the supplier?

Supplier relationship quality

- Could you describe the relationship with the supplier in question?
- **Discuss**: the grade of the relationship with the supplier. How do you perceive the quality of the relationship with the supplier in question?
- How did you go about and manage the relationship with the supplier?
- **Discuss**: the grade of the supplier relationship management of your firm.
- Do you feel instructed/backed by Philips/management on how to manage the relationship with the supplier? Why or why not?
- To your opinion, what are the three most important constructs that contribute to the quality of the relationship?
- Could you indicate how you go about and ensure that these constructs are present within the relationship? Which practical actions do you undertake?
- To your opinion, which of these constructs receive too little attention? Show list of twelve constructs
- Do you agree that the more constructs present in the relationship, the more successful the relationship is? Why or why not?
- Do you agree that the more successful the collaboration is with the supplier, the better the performance of the NPD project? Why or why not?
- How would you describe the supplier in question? (e.g. as a development partner, as a manufacturer)
- **Discuss**: how do the different constructs manifest themselves within the relationship
- How did the relationship with the supplier evolve during the project?
- Did you or your project team had any learning experiences with this supplier in this project? Can you provide an example?
- What were the reasons to involve this supplier in the project?
  - What criteria does Philips use to determine the sourcing model?
  - How is decided on the responsibility of the supplier?
  - Are the definite extent of supplier responsibility and the timing communicated to the supplier? In what manner?

Knowledge transfer

- Do you acknowledge the importance of sharing knowledge with the supplier during the project?
- What information is shared with the supplier during the project?
- **Discuss**: the grade of the quality of knowledge shared.
- How did the knowledge transfer take place during the project (e.g. face-to-face meetings, e-mails)?
- What could be improved with respect to the knowledge transfer?
• What were the consequences of (in)effective knowledge transfer?
• How is the communication with the supplier organized?
• Do you think that knowledge will be shared more easily between the project team and the supplier in case you had a better relationship with the supplier?
• Were you satisfied with the technical capabilities and other expertise the supplier brought into the supplier?
• Who is concerned with the communication between Philips, the supplier and its subsuppliers?

NPD performance
• Are you satisfied with the result of the project? Why or why not?
• Discuss: to your opinion, what was the results from collaborating with the supplier?
• Were all project objectives (e.g. quality demands, budget, etc.) achieved within the expected time? If yes, could you identify the reason? If no, could you identify the cause?
• Has the involvement of the supplier influenced the project result?
• In what way did your firm and project benefit from collaborating with the supplier (e.g. cost reduction, better quality products, increase innovativeness and ideas)?
• Do you feel the sourcing model was appropriate regarding the type of project and the supplier involved?
• Could you describe the events that impacted in any way the NPD performance?

Suggestions and out of scope
• Discuss: do you feel that Philips should try and use the expertise of their suppliers or develop in-house?
• Do you think that your understanding and knowledge of the supplier have been improved?
• To your opinion, what ‘ingredients’ are essential for an effective and efficient collaboration with the supplier in a NPD project?
• What suggestions would you have to benefit from the knowledge and capabilities of a supplier to a greater extent?
• To your opinion, do you feel that regarding supplier relationship management there are aspects not yet mentioned?

8.10.4  ENDING
• Thank the interviewee for his/her time, effort and willingness for the interview.
• Discuss whether and how the interview will receive feedback.
• Ask whether the organization and interviewee would like to be anonymous in the report.
• Ask whether the interviewee would like to receive a copy of the final report.

8.10.5  LIST OF CONSTRUCTS

<table>
<thead>
<tr>
<th>Trust</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Dependency and</td>
</tr>
<tr>
<td>Information and knowledge sharing</td>
<td>power</td>
</tr>
<tr>
<td>Cooperation and coordination</td>
<td>Flexibility</td>
</tr>
<tr>
<td>Relationship-specific adaptations and investments</td>
<td>Reputation</td>
</tr>
<tr>
<td>Commitment</td>
<td>Loyalty</td>
</tr>
<tr>
<td></td>
<td>Relationship history</td>
</tr>
</tbody>
</table>
### List of Analyzed Documents

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Document 6</td>
<td>Document 7</td>
<td>Document 8</td>
<td>Document 9</td>
<td>Document 10</td>
</tr>
<tr>
<td>Document 71</td>
<td>Document 72</td>
<td>Document 73</td>
<td>Document 74</td>
<td>Document 75</td>
</tr>
</tbody>
</table>

Page 152