



## MASTER THESIS

DELFT UNIVERSITY OF TECHNOLOGY  
TECHNOLOGY, POLICY AND MANAGEMENT  
MSC MANAGEMENT OF TECHNOLOGY

---

# Collaboration Framework for Developed and Emerging Market Multinational Enterprises in the Context of Reverse Innovation: Cases from Medical Devices

---

*Coen van Kleef (4395042, C.L.H.vanKleef@student.tudelft.nl)*

To be defended in public on November 18, 2020

### Graduation Committee:

Chairman	Prof.dr. C.P. (Cees) van Beers	Values, Technology and Innovation
First Supervisor	Dr.ir. Z. (Zenlin) Roosenboom-Kwee	Values, Technology and Innovation
Second Supervisor	Dr. U. (Udo) Pesch	Values, Technology and Innovation
Advisor	Dr. S.M. (Samantha) Copeland	Values, Technology and Innovation

November 4, 2020

## Preface

I hope the value of this master thesis will be recognized by managers of developed market multinational enterprises and emerging market multinational enterprises to ensure collaboration between such enterprises in the context of reverse innovation of medical devices. I sincerely hope that the provided collaboration framework is of value to alliances causing reverse innovations that improve the healthcare quality in emerging markets and that reduce healthcare costs in developed markets.

I would especially like to thank my first supervisor Zenlin Roosenboom-Kwee, who was extremely committed to the research project. She always had time to discuss the interim results, the progress of the research project and the interim versions of this master thesis. She was an extra motivation to achieve this end result of the study. Her experience in research and knowledge about the topic was of great value to ensure a smooth research process.

Another person I would like to thank is the chairman of my graduation committee, Cees van Beers. His experience in the field of economic development in emerging markets made that he contributed to the research with a critical view, which improved the quality of the study. The third person I specifically want to thank is Samantha Copeland, her feedback during the research process and advice in appropriate literature for the study was of value to improve the quality of the research.

Last but not least I would like to thank the interviewees for their time and their in-depth knowledge about alliances which was needed to develop the resulting collaboration framework. Their input was essential to develop a collaboration framework which can be used by managers to stimulate reverse innovation which can be beneficial for healthcare quality in emerging markets and to reduce healthcare costs in developed markets. These effects are probably desired by everyone globally.

C.L.H. van Kleef  
Schipluiden, November 2020

## Executive Summary

Traditionally innovations are developed and introduced in developed markets and later introduced in emerging markets, currently this process is reversed more often and known as reverse innovation. The potential impact of reverse innovation is relatively high in healthcare markets as more than a third of total expenditure worldwide is on healthcare. Multinational enterprises need to master the traditional innovation approach as well as the low-cost innovation approach to serve respectively developed and emerging healthcare markets. A low-cost innovation can become a reverse innovation in the developed healthcare markets. However, conflicts exist between the traditional innovation approach and the low-cost innovation approach. Developed market multinational enterprises (DMNEs) master the traditional innovation approach and emerging market multinational enterprises (EMNEs) master the low-cost innovation approach. Multinational enterprises can serve developed and emerging markets via a strategic alliance. However, currently there is a knowledge gap in the scientific literature when it comes to the alliance strategy and the alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices.

The objective of this study is to provide a collaboration framework for manager of multinational enterprises to stimulate reverse innovation of medical devices. Alliance dynamics are identified which managers should manage to stimulate collaboration between a DMNE and an EMNE to, in turn, stimulate innovation of low-cost medical devices which have the potential to become reverse innovations. The main research question is therefore as follows: *What kind of collaboration framework can ensure collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices?*

The literature review provides the basis for developing a conceptual framework. This conceptual framework is developed using data gathered from the literature review about reverse innovation in general, alliances in reverse innovation, alliances in healthcare markets and the dynamics of strategic alliances. The literature suggests that a joint venture is an appropriate type of alliance strategy to stimulate collaboration. Four key alliance dynamics are identified in the literature on which an alliance has a relatively high impact on: *symmetry, strategic positioning, bilateral learning* and *balanced contribution*. The conceptual framework is adjusted and validated using interview data from two selected cases. The first selected case for this study is the brief alliance between Philips Healthcare and Neusoft Medical which lasted from 2004 until 2013; Philips Healthcare sold its stake to Neusoft Medical and established their own development and manufacturing department. The second case is the long-lasting alliance between GE Healthcare and Wipro Limited which still exists for more than thirty years. This alliance is known in the literature for its successful low-cost medical devices of which several became reverse innovations.

Analysis of the interviews validated that a joint venture is an appropriate type of alliance strategy to ensure collaboration. The analysis validated also that strategic positioning and bilateral learning are key alliance dynamics for managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. In an alliance between a DMNE and an EMNE it seems plausible that an imbalance in monetized contribution is unavoidable given the difference in capital. However, a balanced contribution in employees is considered as necessary to balance the loyalty of the employees to the joint venture and the loyalty to the parent companies, this alliance dynamic caused friction in the PNMS case. Symmetry in dependency is in the literature considered as important as it encourages equal bargaining power for both enterprises which is beneficial in the consultation about the strategic positioning of the collaboration. Moreover, an equal bargaining power prevents the strategic positioning from being in favour of one of the parent companies. Symmetry in dependency of the enterprises in the collaboration was less important in the two cases. An insight from the Wipro-GE Healthcare case is that value alignment is a key alliance dynamic, at least for the long-lasting collaboration between Wipro Limited and GE Healthcare.

This study found that relationships at the senior level of the enterprises and the joint venture is a key means of continuously aligning the values and strategic positioning of the enterprises. The parent companies and the joint venture should exchange senior employees across the organizations to stimulate the formation of these relationships. Moreover, managers should take into account the capabilities of a job candidate to maintain relationships. In addition, managers should create an organizational culture that stimulates alignment of strategy and values, managers should formulate non-financial objectives to reduce the impact of market volatility on the alliance dynamics of the joint venture. Managers should ensure a balanced loyalty to the joint venture and to the parent companies by restructuring the teams in these organizations. Managers should hire people from the enterprise whose organizational culture is in minority in the joint venture or hire people with no history at one of the enterprises. The alliance dynamic symmetry should be managed via a balanced monetized contribution and via stimulation of bilateral learning by both enterprises. Enterprises should invest equally in the joint venture to ensure a balanced monetized contribution, this should ensure an equal interest the joint venture by the enterprises. Bilateral learning should be stimulated by managers through the promotion of an organizational culture that stimulates knowledge management and knowledge sharing via collaborations between teams in the joint venture and teams in the parent companies. Managers should also ensure these collaborations to stimulate the creation of relationships between employees in the joint venture and the parent companies. These relationships, especially at the senior level, ensure solid agreements about the strategy of the joint venture, which ensures that both enterprises can achieve their goals and objectives. A shared knowledge management system is another means for managers to ensure bilateral learning for the organizations. A knowledge management system is suggested as a digital solution to ensure knowledge sharing between employees.

This study contributes to scientific literature in the field of reverse innovation, medical devices, alliance strategy and alliance dynamics. The study found that a joint venture as type of alliance strategy is an appropriate basis for a collaboration between multinational enterprises to stimulate reverse innovation of medical devices. The study also found that four key alliance dynamics can be used by managers to stimulate collaboration: strategic positioning, value alignment, balanced loyalty and bilateral learning, this finding fills the knowledge gap about how managers of DMNEs and EMNEs should ensure collaboration to stimulate reverse innovation of medical devices.

# Table of Content

<b>Preface</b>	<b>i</b>
<b>Summary</b>	<b>iii</b>
<b>List of Tables</b>	<b>vii</b>
<b>List of Figures</b>	<b>viii</b>
<b>List of Abbreviations</b>	<b>ix</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Research Background . . . . .	1
1.2 Research Problem . . . . .	1
1.3 Research Focus . . . . .	2
1.4 Research Objectives . . . . .	3
1.5 Research Questions . . . . .	3
1.6 Thesis Outline . . . . .	3
<b>2 Research Methods</b>	<b>5</b>
2.1 Research Strategy . . . . .	5
2.2 Data Collection . . . . .	6
2.3 Sampling . . . . .	7
2.4 Interview Strategy . . . . .	8
2.5 Data Analysis . . . . .	10
2.5.1 Coding . . . . .	11
2.5.2 Triangulation . . . . .	11
2.6 Conclusion . . . . .	11
<b>3 Literature Review</b>	<b>13</b>
3.1 Reverse Innovation . . . . .	15
3.2 Alliances in Reverse Innovation . . . . .	16
3.3 Alliances in Healthcare . . . . .	19
3.4 Dynamics of Strategic Alliances . . . . .	19
3.5 Conceptual Framework . . . . .	20
3.6 Conclusion . . . . .	22
<b>4 Case Descriptions</b>	<b>23</b>
4.1 Philips & Neusoft Medical Systems . . . . .	23
4.1.1 Royal Philips Healthcare . . . . .	23
4.1.2 Neusoft Medical . . . . .	25
4.1.3 Reverse Innovation PNMS . . . . .	25
4.2 Wipro-GE Healthcare . . . . .	26
4.2.1 General Electric Healthcare . . . . .	27
4.2.2 Wipro Limited . . . . .	28
4.2.3 Reverse Innovation Wipro-GE Healthcare . . . . .	28
4.3 Key Characteristics . . . . .	29
4.4 Conclusion: Comparison between Cases . . . . .	30

<b>5</b>	<b>Case Analysis</b>	<b>31</b>
5.1	Philips & Neusoft Medical Systems . . . . .	31
5.1.1	Establishment of Alliance . . . . .	31
5.1.2	Strategic Positioning . . . . .	32
5.1.3	Balanced Contribution . . . . .	33
5.1.4	Symmetry . . . . .	33
5.1.5	Bilateral Learning . . . . .	34
5.1.6	Additional Insights . . . . .	35
5.1.7	Consequences for Conceptual Framework . . . . .	36
5.2	Wipro-GE Healthcare . . . . .	38
5.2.1	Establishment of Alliance . . . . .	38
5.2.2	Strategic Positioning . . . . .	38
5.2.3	Balanced Contribution . . . . .	39
5.2.4	Symmetry . . . . .	39
5.2.5	Bilateral Learning . . . . .	40
5.2.6	Additional Insights . . . . .	40
5.2.7	Consequences for Conceptual Framework . . . . .	41
5.3	Conclusion: Comparison between Cases . . . . .	43
<b>6</b>	<b>Validation of Collaboration Framework</b>	<b>46</b>
6.1	Representation of Collaboration Framework . . . . .	46
6.2	Joint Venture . . . . .	47
6.3	Strategic Positioning . . . . .	48
6.4	Balanced Contribution . . . . .	48
6.5	Symmetry . . . . .	49
6.6	Bilateral Learning . . . . .	49
6.7	Value Alignment . . . . .	49
6.8	Balanced Loyalty . . . . .	50
6.9	Conclusion . . . . .	50
<b>7</b>	<b>Conclusion</b>	<b>51</b>
7.1	Key Findings . . . . .	51
7.2	Managerial Implications . . . . .	53
7.3	Scientific Contribution to Literature . . . . .	55
7.4	Limitations and Recommendations for Further Research . . . . .	56
7.5	Reflection . . . . .	57
	<b>References</b>	<b>59</b>
<b>A</b>	<b>Introduction to Interview</b>	<b>I</b>
<b>B</b>	<b>Interview Questions</b>	<b>II</b>
B.1	Interview questions to Philips Healthcare . . . . .	II
B.2	Interview questions to Neusoft . . . . .	II
B.3	Interview questions to Wipro - GE Healthcare . . . . .	II
B.4	General interview questions to Philips <u>and</u> Neusoft <u>and</u> Wipro - GE . . . . .	III

<b>C</b>	<b>Interviews</b>	<b>V</b>
C.1	Wipro-GE Healthcare . . . . .	V
C.2	Philips Healthcare (1) . . . . .	X
C.3	Philips Healthcare (2) . . . . .	XVI
C.4	Philips Healthcare (3) . . . . .	XXIII
C.5	Neusoft Medical . . . . .	XXV

## List of Tables

1	Thesis Outline . . . . .	4
2	Methods to Answer the Research Questions . . . . .	5
3	Requirements for the Interviewees . . . . .	7
4	Selected Cases . . . . .	7
5	Interview Procedure . . . . .	8
6	Interviewees PNMS Case . . . . .	9
7	Interviewee Wipro-GE Healthcare Case . . . . .	9
8	Interview Protocol . . . . .	10
9	Results per Search Strings . . . . .	13
10	Results Literature Review . . . . .	14
11	Distinction between Reverse Innovation and Glocalization . . . . .	15
12	Types of Innovation Compatible with Reverse Innovation . . . . .	16
13	Information about PNMS . . . . .	23
14	Information about Wipro-GE Healthcare . . . . .	26
15	Distribution of Codes . . . . .	31
16	Comparison between PNMS and Wipro-GE Healthcare . . . . .	45
17	Key Findings . . . . .	53
18	Key Takeaways for Managers . . . . .	55



## List of Figures

1	Research Flow, author's own illustration . . . . .	6
2	Five Phases of Analysis and their Interactions, adapted from Yin (2015) . . . . .	11
3	Corporate-NGO Collaboration for Developing Market Business Models, adapted from Dahan, Doh, Oetzel, and Yaziji (2010) . . . . .	17
4	Four Strategic Aspects for Corporate-NGO Alliances, adapted from Dahan et al. (2010) .	17
5	Conceptual Framework, author's own illustration . . . . .	22
6	Essenta RAD, adapted from Koninklijke Philips N.V. (2007) . . . . .	26
7	Lullaby Warmer, adapted from GE Healthcare (n.d.) . . . . .	29
8	Comparison of Initial Conceptual Framework with Validated Collaboration Framework . .	47

## List of Abbreviations

CT	Computed tomography
CV	Cardiovascular
ECG	Electrocardiogram
DMNE	Developed market multinational enterprise
EMNE	Emerging market multinational enterprise
GDP	Gross domestic product
GE	General Electric
IT	Information technology
MRI	Magnetic resonance imaging
MRQ	Main research question
NPO	Non-profit organization
PNMS	Philips & Neusoft Medical Systems
SME	Small and medium-sized enterprise
SQ	Sub question
USA	United States of America

# 1 Introduction

The first section of this chapter provides a definition of reverse innovation and a context about reverse innovation of medical devices. In the second section the challenges concerning reverse innovation of medical devices are described. This chapter also describes the focus and objectives of this study and provides the main research question and sub research questions which are needed to achieve the objectives of this study. The final section of this chapter provides an outline of this study.

## 1.1 Research Background

Traditionally innovations are developed and introduced in developed markets and later introduced in emerging markets, currently this process is reversed more often and known as reverse innovation. Reverse innovation is “the case where an innovation is adopted first in poor (emerging) economies before ‘trickling up’ to rich countries.” (Govindarajan & Ramamurti, 2011, p.191) Reverse innovation emerges because of growing economies in emerging markets, their ability to contribute to innovation is increasing.

The potential impact of reverse innovation is relatively high in healthcare markets as health expenditure was 9.9% of GDP worldwide in 2017 (Bank, 2017a) while total expenditure was 26.8% of GDP worldwide in 2017 (Bank, 2017b), more than a third of total expenditure worldwide is on healthcare. The American enterprise General Electric Healthcare (GE Healthcare) formed a joint venture with the Indian enterprise Wipro Limited in 1990. The long-lasting joint venture is known in the scientific literature by the development of several reverse innovations of medical devices. The joint venture developed, among other reverse innovations, a portable electrocardiogram (ECG) to serve rural areas in emerging markets with an affordable price for the local population (Govindarajan & Trimble, 2012b). The development team determined an affordable price and developed a device from scratch through an innovative combination of existing resources and technologies, resulting in a low-cost device (Mukerjee, 2012; Tallman, Luo, & Buckley, 2017). After a successful introduction in emerging markets the ECG was successfully introduced in European markets as well, as a result this medical device became a reverse innovation (Govindarajan & Trimble, 2012b).

In another case, the Dutch enterprise Philips Healthcare formed a joint venture with the Chinese enterprise Neusoft Medical in 2004. The joint venture was focusing on the development and manufacturing of computed tomography (CT), magnetic resonance imaging (MRI), ultrasound and x-ray devices. The purpose of this joint venture was to compete against GE Healthcare and Siemens Healthineers. This joint venture developed medical devices, some of the devices became reverse innovations, especially for the ultrasound portfolio. However, the success lagged behind and in 2013 Philips Healthcare sold its shares of the brief joint venture to Neusoft Medical, both companies continued the development and manufacturing of medical devices separately. (BioSpace, 2013)

## 1.2 Research Problem

Developed market multinational enterprises (DMNEs) can enjoy competitive advantage from reverse innovation, because reverse innovation stimulates innovation and internationalization (Govindarajan & Ramamurti, 2011). In addition, sales in emerging markets has a large potential for multinational enterprises in the healthcare market as about 85% of the people worldwide live in emerging markets, all of whom need access to healthcare. However, an introduction of downgraded medical devices which are initially developed for developed healthcare markets is not sufficient in emerging markets. DMNEs with activities in healthcare markets, like Philips Healthcare and GE Healthcare lack the knowledge to develop medical devices sufficient for local conditions and with an affordable price. Dahan et al. (2010) argue that “DMNEs face a range of challenges when entering developing countries, including the need to adapt their business models to local markets’ cultural, economic, institutional and geographic features. Where they lack the

tangible resources or intangible knowledge needed to address these challenges.” DMNEs need to master the traditional innovation approach -development of high-end products and distribute them around the world- to serve developed healthcare markets as well as the low-cost innovation approach to serve the emerging markets, a low-cost innovation can become a reverse innovation in developed healthcare markets. These approaches need to cooperate, however, conflicts exist between the traditional approach and the low-cost innovation approach. The traditional approach is centralized and has a focus on the product, while the low-cost innovation approach is decentralized and has a focus on the market. Conflicts exist to successfully execute both approaches simultaneously for a DMNE. (Immelt, Govindarajan, & Trimble, 2009)

A DMNE can benefit from both innovation approaches via a strategic alliance with a local organization and can serve both developed markets and emerging markets. A strategic alliance can be formed with a for-profit organization or with a non-profit organization (NPOs) located in an emerging market, they are able to contribute the knowledge required for low-cost innovation which is needed to ensure reverse innovation. The literature suggests that DMNEs form relatively often a strategic alliance with a non-profit organization to gather knowledge about local conditions and local needs to be able to develop low-cost innovations. (Murphy, Perrot, & Rivera-Santos, 2012) However, the inherent differences between for-profit businesses and non-profit organizations in mission, governance, strategy and structure results in alliances with usually opportunistic business models and project-based initiatives, as opposed to fundamental changes at the corporate level that stimulate collaboration as basis for reverse innovation. (Dahan et al., 2010)

A DMNE can also form an alliance with a for-profit multinational enterprise established in an emerging market, so called emerging market multinational enterprise (EMNE). The alignment of the mission, governance, strategy and structure of two for-profit organizations during the establishment of a strategic alliance is easier than of a for-profit organization and a non-profit organization. A collaboration with a DMNE is beneficial for an EMNE as they can gather knowledge about advanced technologies and the best practices in the field of processes and management. In addition, an EMNE can benefit from the globally respected DMNE by an improvement of their brand acceptance because of their alliance with the DMNE. However, currently there is a knowledge gap in the literature when it comes to an appropriate type of alliance strategy and the alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices.

### 1.3 Research Focus

The focus of this study is to identify a type of alliance strategy and alliance dynamics that stimulate collaboration between a DMNE and an EMNE to ensure reverse innovation of medical devices. In this study the assumption is made that the multinational enterprises selected, at the time of the establishment of an alliance, an appropriate partner to collaborate with. This study does therefore not pay attention to the requirements of the partners during the establishment of a strategic alliance.

The external environment of a strategic alliance is out of the scope of this study, although the external environment is important to the success of an alliance. This study focuses on the internal culture of a strategic alliance that stimulates collaboration between the partners, this internal culture is impacted by the behavior of the employees in the parent companies and the employees in the strategic alliance. The external environment is impacted by a wide range of external factors, because of time constraints it is impossible to include them in this research project. In addition, according to Parkhe (1993) there is mounting evidence that the impact of internal dynamics on an alliance is significantly higher than of external dynamics. The external environment becomes a less significant factor once the enterprises invested in dedicated assets in an alliance, the managerial and behavioral impact are significantly higher (Parkhe, 1993).

## 1.4 Research Objectives

The research objectives of this study are economically and socially related. The economic objective of this study is to develop a collaboration framework that managers can use to encourage collaboration between a DMNE and an EMNE to improve sales and knowledge of both enterprises. A collaboration with an EMNE is valuable for a DMNE as it can gather local knowledge to serve the emerging market with products and services that meet the local requirements. As mentioned in section 1.2, about 85% of the people worldwide live in emerging markets, all of whom need access to healthcare. Also mentioned in section 1.2 is that the collaboration is valuable for an EMNE as it can gather knowledge about advanced technologies to improve the functionality of the products and services of the organization, this allows the EMNE to serve a broader market segment.

The social objectives of this study are (1) to improve healthcare quality in emerging markets by the innovation of low-cost medical devices that meet the local requirements and which are affordable for the local people. (2) These low-cost innovations have the potential to trickle up to developed markets, in these markets the low-cost innovations can become reverse innovations and contribute to a more cost-efficient healthcare system. To achieve these objectives a collaboration frame is developed that managers can use to encourage collaboration between multinational enterprises.

Managerial implications of these alliance dynamics are formulated to guide managers of multinational enterprises in the healthcare market in creating an internal environment that stimulates the development and market introduction of low-cost medical devices. Devices that have a potential in developed markets after a successful introduction in emerging markets. These reverse innovations have the ability to reduce healthcare costs in developed markets as these devices are developed with a low-cost innovation approach.

## 1.5 Research Questions

As mentioned in the previous section is the objective of this study to develop a collaboration framework that managers can use to encourage collaboration between a DMNE and an EMNE to ensure reverse innovation of medical devices. The main research question (MRQ) of this study is therefore as follows:

*MRQ      What kind of collaboration framework can ensure collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices?*

To be able to answer the main research question the following sub questions (SQs) are determined:

*SQ1      What are key theories and principles of collaboration in the context of reverse innovation of medical devices?*

*SQ2      Which alliance strategy and alliance dynamics stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices?*

*SQ3      How should managers of multinational enterprises execute identified alliance dynamics to stimulate collaboration in the context of reverse innovation of medical devices?*

## 1.6 Thesis Outline

In the following chapter the research methods are given that are used to answer the sub questions which provide the information needed to answer the main research question. In the third chapter a literature review is done to identify the knowledge gap in the scientific literature. The objective of this study is to contribute literature that fills this knowledge gap. The literature review is done to answer the first sub question and to develop a conceptual framework that guides the subsequent phases of the research.

Primary data is needed to answer sub question 2 and sub question 3, this data is gathered from interviews about two selected cases. Chapter 4 is an elaborate description of the selected alliances and the parent companies. The subsequent chapter is the analysis of the interviews of the two cases, the analysis of the two cases is presented separately, however the analysis process is done jointly. This chapter concludes with a comparison between the cases. The results from the case analysis are used to adjust and validate the conceptual framework, this framework is developed in chapter 3. Adjusting and validating the conceptual framework is done in chapter 6, resulting in a collaboration framework that can be used by managers to stimulate collaboration between enterprises. In the final chapter of this study the research questions are answered and is described how this study contributes to the scientific literature. Table 1 is a concise outline of this study, in the outline is shown in which chapters the sub and main research questions are answered.

**Table 1: Thesis Outline**

Chapter	Content		Summary
2	Research Methods		Overview of research methods used to gather data to develop a collaboration framework.
3	Literature Review	SQ1	Literature review to identify key theories and principles of collaboration in the context of reverse innovation of medical devices.
4	Case Descriptions		Description of the selected cases to provide background information about the activities of parties involved.
5	Case Analysis	SQ2	Analysis of interviews with experts of Philips Healthcare, Neusoft Medical and Wipro-GE Healthcare.
6	Validation of Collaboration Framework	SQ2 & SQ3	Development of the validated collaboration framework, the results from the analysis of the cases is used to adjust and validate the conceptual framework.
7	Conclusion	SQ3 & MRQ	Conclusion of the research project. Argumentation how this study contributes to the scientific literature.

## 2 Research Methods

This chapter provides an overview of the strategy used to answer the main research question and sub research questions of this study which is needed to achieve the research objectives. This chapter describes how data is selected and which cases are used to gather data from. The last two sections of this chapter describe the interview strategy and the strategy that is used to analyse the interview data.

### 2.1 Research Strategy

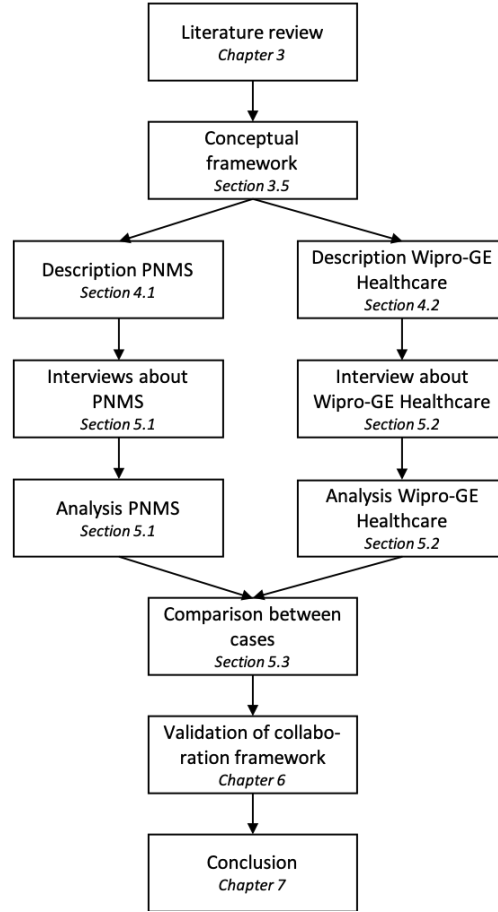
The literature review in chapter 3 is the basis for the development of a conceptual framework for the collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. This conceptual framework contains an appropriate type of alliance strategy for the collaboration between a DMNE and an EMNE and alliance dynamics that encourage collaboration. The objective of the literature review is to identify key theories and principles of collaboration in the context of reverse innovation of medical devices to be able to answer sub question 1.

The conceptual framework is adjusted and validated using the interview data from two selected cases. In one case a DMNE and an EMNE collaborate since 1990 successfully with each other in the healthcare market, the collaboration is still in business after 30 years. In the second case a DMNE and an EMNE did collaborate with each other in the healthcare market for only about 10 years. The purpose of this comparative analysis is to understand the similarities and differences in the alliance strategy and alliance dynamics. The objective of the analysis of the two cases is to identify an alliance strategy and alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. The objective of this analysis is also to identify how multinational should execute these alliance dynamics to stimulate collaboration. This answers sub question 2 and sub question 3.

Knowledge about the alliance dynamics in the collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices is not present in the literature. Primary data for this study is gathered via interviews with experts with knowledge about the alliance dynamics of selected alliances. The answers on the three sub questions made it possible to develop a collaboration framework for managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. Providing this collaboration framework is the answer on the main research question of this study. In table 2 the research methods to answer the research questions are given in a concise overview.

**Table 2: Methods to Answer the Research Questions**

Research question	Method	Chapter
SQ1	Literature review	3
SQ2	Case study	5 & 6
SQ3	Case study	6 & 7
MRQ	Literature review & Case study	7



**Figure 1: Research Flow, author's own illustration**

## 2.2 Data Collection

Secondary data is collected to develop a conceptual framework for the collaboration between a DMNE and an EMNE in the context of reverse innovation. This conceptual framework is developed using data about reverse innovation in general, alliances in reverse innovation, alliances in the healthcare market and alliance dynamics in strategic alliances. This data is collected using the electronic databases Google Scholar and Scopus.

Primary data is gathered via interviews to adjust and validate the conceptual framework. These interviews are conducted with people with in-depth knowledge about the alliance dynamics of the selected cases. A requirement for an interviewee is at least 10 years of business experience to be able to provide valuable information about the alliance strategy and alliance dynamics. Another requirement is that the interviewee is employed by the alliance or is employed by one of the parent companies. The interviewee did closely cooperate with people in the joint venture if the interviewee was employed by a parent company. It is a requirement that the interviewee had a senior position in the enterprise. Connections with these people was made via LinkedIn and referrals. Via email are online video meetings scheduled to conduct interviews. Table 3 provides a concise overview of the requirements for the interviewees.



**Table 3: Requirements for the Interviewees**

<b>Years of experience</b>	10 +
<b>Knowledge about</b>	Alliance strategy and alliance dynamics
<b>Relation with alliance</b>	Employee of the alliance and/or a parent company
<b>Role in enterprise</b>	Senior position in management and/or strategy

In the analysis of the interview data the similarities and differences in alliance dynamics are identified to investigate how alliance dynamics have to be executed to stimulate collaboration between a DMNE and an EMNE.

The number of interviews is the result of time constraints and the result of the response from potential interviewees. The quality of the conducted interview is as desired, in the Wipro-GE Healthcare case the interview is conducted with the CEO of the collaboration and in the PNMS case the interviews are conducted with a president of the EMNE and three senior employees with a point of view from the DMNE.

## 2.3 Sampling

The purposive sampling method is used to select the cases and interviewees needed to answer the research questions of the study. The first selected case for this study is the alliance between Philips Healthcare and Neusoft Medical which lasted from 2004 until 2013, Philips Healthcare sold its stake to Neusoft Medical and established their own development and manufacturing department in an emerging market for the development of medical devices. This case is valuable and relevant for this study to identify the dynamics that are different from a long-term alliance. The differences in dynamics could be an explanation for the termination of the alliance. The second case is the alliance between GE Healthcare and Wipro Limited which still exists for more than thirty years. This alliance is known in the scientific literature for its low-cost medical devices of which several became reverse innovations. This case is valuable and relevant for this study to identify the dynamics that stimulate the collaboration between the enterprises and how they differ from the dynamics of the alliance between Philips Healthcare and Neusoft Medical. The cases are briefly described in table 4.

**Table 4: Selected Cases**

<b>Case</b>	<b>Parent companies</b>	<b>Status</b>	<b>Reason for selection</b>
Philips & Neusoft Medical Systems (PNMS)	Philips Healthcare and Neusoft Medical	Terminated	Alliance ended already within 10 years
Wipro-GE Healthcare	Wipro Limited and GE Healthcare	In Business	Alliance is known for its reverse innovations of medical devices

The two cases have similarities, in both alliances a DMNE with business in healthcare markets and an EMNE with business in information technology (IT) markets collaborate with each other to develop medical devices. Both alliances innovated medical devices for emerging markets, and introduced them in developed markets to achieve reverse innovation. Because of the similarities in the two cases a comparative study is done between the two alliances.

Both GE Healthcare and Philips Healthcare formed joint ventures with various enterprises around the world. They formed joint ventures with both DMNEs and EMNEs active in a wide range of markets. The

joint ventures of Philips Healthcare with Neusoft Medical and GE Healthcare with Wipro Limited were active in the same period of time and established with a minor difference in the division of the shares (The Hindu, 2009; Neusoft Corporation, 2020c). Therefore these joint ventures are a starting point for the study into the type of alliance strategy and alliance dynamics of collaborations.

The purposive sampling method is also used for the selection of interviewees, in section 2.2 were the requirements for the interviewees mentioned: more than 10 years of experience, knowledge about the type of alliance strategy and alliance dynamics, employee of the alliance and/or a parent company and a senior role in management and/or strategy. These requirements have been examined and confirmed via email and/or video calls before the interview. Purposive sampling was needed to reach appropriate interviewees to gain in-depth knowledge about this topic.

## 2.4 Interview Strategy

The purpose of the interviews is to gather qualitative data to adjust and validate the conceptual framework. As mentioned in the previous section is the purpose sampling method used to select the interviewees. The interviewees received an introduction to the interview prior to the video meeting, an example introduction is given in appendix A, this introduction is enterprise specific. The introduction to the interview described the findings of the literature review and described the purpose, the duration and the procedure of the interview. The procedure of the interview is given in table 5. The interview questions are also enterprise specific, the interview questions per enterprise are given in appendix B.

**Table 5: Interview Procedure**

<b>Purpose</b>	Gather knowledge to adjust and validate the conceptual framework
<b>Duration</b>	About one hour
<b>Sampling technique</b>	Judgement sampling
<b>Data type</b>	Qualitative data
<b>Setting</b>	Video meeting (Skype or Microsoft Teams)
<b>Recording</b>	Audio
<b>Verification</b>	Transcript

To gather data about the PNMS joint venture contact has been made with employees of Philips via LinkedIn and via referrals, this resulted in three interview with people with a Philips point of view on the alliance dynamics in the PNMS joint venture. Via LinkedIn contact has been made with one Neusoft employee, who did close cooperate with the joint venture teams. He answered the interview questions with a Neusoft point of view on the disentangled PNMS joint venture. Information about the interviewees for the PNMS case, such as their role in the joint venture and years of experience is given in table 6. This selection is based on the requirements mentioned in table 3. The transcripts of the interviews can be found respectively in appendix C.2, appendix C.3, appendix C.4 and appendix C.5.

**Table 6: Interviewees PNMS Case**

<b>Enterprise</b>	<b>Functional background</b>	<b>Role in enterprise</b>	<b>Role in joint venture</b>	<b>Years of experience</b>
Philips	Senior manager and vice president	Senior positions	Executive	30 +
Philips	Director and vice president	Strategy, M&A and Partnerships	Member of disentanglement team <sup>a</sup>	30 +
Philips	Software developer	Director XUS (x-ray and ultrasound) program	Project manager of x-ray and ultrasound	30 +
Neusoft	Account manager and president	President and strategy officer	Cooperation with joint venture teams	25 +

<sup>a</sup>Philips did set up a team to review the possibilities to end the collaboration.

To gather data about the Wipro-GE Healthcare case contact has been made with one interviewee via LinkedIn who is the CEO, president and managing director of Wipro-GE Healthcare. Information about the interviewee, such as his role in the alliance and years of experience is given in table 7. The interviewee meets the requirements mentioned in table 3. The answers given in this interview are from both the Wipro Limited and the GE Healthcare point of view as no division in points of view exist since the alliance is an entity itself since 1990. Employees of the alliance do not have a Wipro Limited or GE Healthcare point of view on the joint venture as current employees are not contributed by one of the enterprises, but hired by Wipro-GE Healthcare as independent entity. The transcript of the interview about the Wipro-GE Healthcare case can be found in appendix C.1.

**Table 7: Interviewee Wipro-GE Healthcare Case**

<b>Enterprise</b>	<b>Functional background</b>	<b>Role in alliance</b>	<b>Years of experience</b>
Wipro-GE Healthcare	Managing director	CEO, president & managing director	15 +

Multiple questions about the same element are used to validate the answers given by the interviewees, the questions are formulated differently and divided over the interview. Analysing the data turned out that there was no contradiction in the answers given by the interviewees, the answers verified each other in the interviews.

The interview consists of three parts, the first part is about the drivers to collaborate, the second part is about the alliance dynamics identified in the literature review and the last part is about the relationship between the alliance dynamics discussed in the interview and the drivers for the continuation or termination of the collaboration. The questions of part one and two were the same for all interviewees, in part three the subsequent interviews were used as opportunity to confirm, clarify and build on information given in the previous interviews. The protocol of the interview is given in table 8.

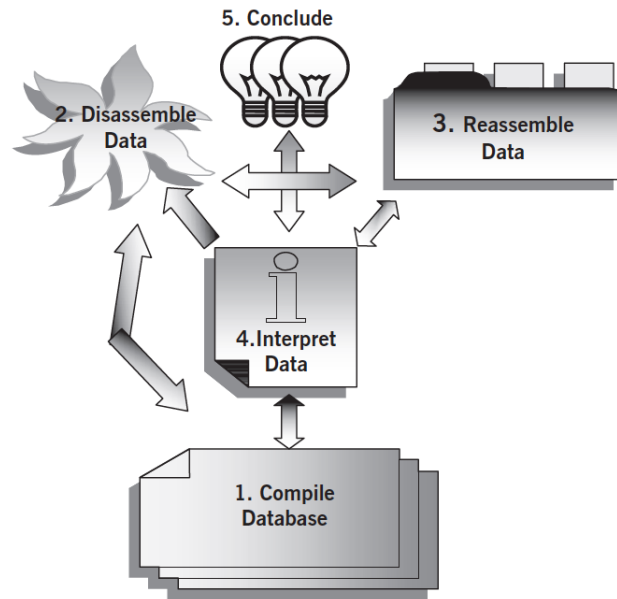
**Table 8: Interview Protocol**

<b>Introduction</b>	Explanation of the purpose of the study and the interview. Announcement that the interview will be recorded and a transcript will be made for verification. Question whether the interviewee wants to remain anonymous.
<b>Subject part 1</b>	Questions about the establishment, and the type of alliance strategy of the collaboration. Question about which reverse innovations the collaboration developed.
<b>Subject part 2</b>	Questions about the alliance dynamics identified in the literature review.
<b>Subject part 3</b>	Questions about the relationship between the alliance dynamics and the drivers for how the alliance went.
<b>Conclusion</b>	Thanks to the interviewee and announcement that this research will be shared with the interviewee once it is completed.

## 2.5 Data Analysis

The interview data about the alliance between Wipro Limited and GE Healthcare and about the alliance between Philips Healthcare and Neusoft Medical is analyzed using Atlas.ti. In the analysis of the interview data are the similarities and differences between the two cases identified. The differences in alliance dynamics can be used to clarify the difference in duration of both collaborations. The analysis of the interview data results in adjustments and validations in the conceptual framework, developed in section 3.5, which then results in the collaboration framework.

In figure 2 the five phases of data analysis in qualitative research and their interactions are shown, the phases are identified by Yin (2015). This model indicates that the analysis process is a non-linear process. The first phase of the data analysis of this study is conducting interviews, this compiled the database for the following phases. In the second phase the interview data is disassembled using codes in Atlas.ti, coding is repeated to improve completeness and accuracy. In the third phase the codes are organized in clusters in Atlas.ti, in this phase the second phase is reviewed and adjustments are made to improve completeness and accuracy of the coding process. The results of the processes of phase one to phase three are given in section 5.1 and section 5.2. The codes and clusters of codes are interpreted in the fourth phase of the analysis process, during this phase the initial data is reviewed again, as well as the codes and clusters of codes to ensure an accurate interpretation of the interview data. This interpretation, done in phase four, is given in section 5.1.7, section 5.2.7, and section 5.3. In the final phase the consequences for the conceptual framework are determined by concluding the interpretation of the interview data, this is given in chapter 6.



**Figure 2: Five Phases of Analysis and their Interactions, adapted from Yin (2015)**

### 2.5.1 Coding

Before each interview there was an agreement with the interviewee to make an audio recording of the interview to make a transcript for verification and for codification of the data. These transcripts are manually written because of insufficient results when using transcription software. For transcription the clean verbatim type of transcription is used, which means that distracting elements are stripped and the transcript is still an accurate representation of the conversation. The files with the transcripts are uploaded in Atlas.ti to conduct open coding, the codes are created based on the qualitative data, to improve completeness and accuracy the initial codes are reviewed and refined after the first round of coding. The interviews are reviewed again to assign added codes to the transcripts of the interviews.

### 2.5.2 Triangulation

Triangulation is achieved by the examination of the conceptual framework which is based on secondary data gathered in the literature review in chapter 3. The data of the interviews is used to adjust and validate the alliance strategy and alliance dynamics in the conceptual framework. Triangulation of the interview data is achieved by conducting interviews with multiple experts in the same case study with a different job position.

## 2.6 Conclusion

A literature review is the basis for the development of a conceptual framework with a type of alliance strategy and alliance dynamics that that can be used by managers to encourage collaboration to stimulate reverse innovation. The key theories and principles which are identified in the literature review form the conceptual framework and answer sub question 1. Analysis of two cases provide data to adjust and validate the conceptual framework, resulting in a validated collaboration framework. This analysis identifies also how managers of multinational enterprise should execute identified alliance dynamics to stimulate collaboration and provides the answers on sub question 2 and sub question 3. The validated collaboration framework and the managerial implications answer the main research question.

Electronic data bases provide data to develop a conceptual framework, interviews with experts with in-depth knowledge about the alliance dynamics of the selected cases provide data to adjust and validate this framework. The two selected cases are: the brief alliance PNMS of Philips Healthcare and Neusoft Medical and the long-lasting alliance Wipro-GE Healthcare of Wipro Limited and GE Healthcare. The purposive sampling method is used to select appropriate people that can provide information about the alliance strategy and alliance dynamics of alliance.

Audio recordings were made of the interviews for a clean verbatim transcript for verification and for data analysis in Atlas.ti. The open coding process is done in multiple rounds to improve completeness and accuracy. The analysis of the cases is the basis for adjustments to and verification of the conceptual framework.

### 3 Literature Review

In this chapter a literature review is done to answer sub question 1. The literature review identified the key theories and principles of collaboration in the context of reverse innovation of medical devices. The objective is to identify an alliance strategy and alliance dynamics that stimulate the collaboration between a DMNE and an EMNE. The search process into scientific publications is given in the first section of this chapter, the amount of search results per search string is given in table 9. The subsequent sections discuss the relevant topics within this research field. The following topics are included in the literature review to identify a knowledge gap in the literature in the context of strategic alliances in the context of medical devices: reverse innovation of medical devices and strategic alliances in reverse innovation. In section 3.5 a conceptual framework is derived from the findings of the literature review, this framework is adjusted and validated in the subsequent chapters. This framework can be used by managers to stimulate the collaboration between multinational enterprises in the context of reverse innovation of medical devices.

**Table 9: Results per Search Strings**

Database	Search string	Results
Google Scholar	"strategic alliances" AND "innovation" AND "multinational" OR "multinationals" AND "medical devices" OR "medical equipment"	1750
Scopus	TITLE-ABS-KEY ( "strategic alliances" AND "innovation" AND "multinational" OR "multinationals" AND "medical devices" OR "medical equipment" )	0
Google Scholar	"reverse innovation" AND "medical devices" OR "medical equipment"	406
Scopus	TITLE-ABS-KEY ( "reverse innovation" AND "medical devices" OR "medical equipment" )	1
Google Scholar	"strategic alliances" AND "reverse innovation" AND "multinational" OR "multinationals"	235
Scopus	TITLE-ABS-KEY ( "strategic alliances" AND "reverse innovation" AND "multinational" OR "multinationals" )	0
Google Scholar	"strategic alliances" AND "reverse innovation" AND "multinational" OR "multinationals" AND "medical devices" OR "medical equipment"	22
Scopus	TITLE-ABS-KEY ( "strategic alliances" AND "reverse innovation" AND "multinational" OR "multinationals" AND "medical devices" OR "medical equipment" )	0

Table 9 shows that a relatively high amount of research is done into strategic alliances of multinational enterprises in the context of innovation of medical devices. Also relatively much research is done into reverse innovation of medical devices and strategic alliances of multinational enterprises in the context of reverse innovation. However, in Google Scholar only 22 results were offered using the search string *"strategic alliances" AND "reverse innovation" AND "multinational" OR "multinationals" AND "medical devices" OR "medical equipment"*, 10 of them were accessible scientific publications. In Scopus offered no results using this string. The 10 accessible publications of Google Scholar are reviewed to identify the current state of the scientific literature about research into alliance dynamics between multinational enterprises in the context of reverse innovation of medical devices. These 10 publications are reviewed whether they are appropriate for managers of multinational enterprises to guide them to encourage collaborations which are beneficial for reverse innovation of medical devices. This review is given in table 10.

**Table 10: Results Literature Review**

Authors	Title	Appropriate	Description
(Han & Liu, 2020)	Research on the Path of Reverse Innovation: A Case Study of High-tech Industry Latecomer Firms in China	No	This research studies the three internal stages in the reverse innovation success path of three representative high-tech companies in China. The study has no focus on strategic alliances and the healthcare market.
(Filippov & Settles, 2011)	Innovation strategies of emerging Russian multinational companies	No	Exploration of innovation strategies and processes of technology-intensive Russian multinationals. Study has no focus on reverse innovation and the healthcare market.
(Buse & Tiwari, 2014)	Global innovation strategies of German hidden champions in key emerging markets	No	Study about the strategies of mid-sized German companies, they discovered that the majority of these companies market their high-end products in emerging markets and run the risk of ignoring large costumers groups that seek more affordable products. Study has no focus on strategic alliances, reverse innovation and the healthcare market.
(Laperche & Lefebvre, 2012)	The globalization of Research & Development in industrial corporations: Towards “reverse innovation”?	No	Research into the stages of R&D globalization and the comparison between GE, which first applied reverse innovation, and Renault, which focuses initially in engineering in emerging countries. Study has no focus on strategic alliances and the healthcare market.
(Khalil, 2019)	Expansion of SMEs into Emerging Markets	No	Research to develop, validate and disseminate tools and models for SMEs to select and access appropriate networks and local partners in emerging markets to develop alliance models. Study has no focus on the dynamics that ensure collaboration, multinational enterprises and the healthcare market.
(Rottig, Muscarella & Oliveira, 2019)	Managing formal institutional challenges when entering Cuba	No	Study analyses the formal political, legal and economic challenges for (US-based) multinationals that attempt to enter the Cuban market. The study discusses strategies to manage these challenges. Study has no focus on strategic alliances, reverse innovation and the healthcare market.
(Adari & Lakshmi-pathy, 2015)	Frugal Innovation in Smaller Firms in the West:” How do smaller firms in the West use Frugal Innovation which in its nature best suited for emerging markets, having no subsidiaries in the local markets essential to develop frugal solutions for those emerging markets?	No	This research developed a theoretical framework which includes the stages for smaller enterprises to enter emerging markets with frugal innovations. Study has no focus on strategic alliances, multinational enterprises and the healthcare market.
(Frenkel et al. 2011)	Policy Incentives for the Creation of Knowledge: Methods and Evidence (Demand Driven Innovation)	No	An essay with an integrative review of studies that studied innovation policies. Study has no focus on strategic alliances and the healthcare market.
(Bell et al., 2014)	Securing Australia’s future: The role of science, research and technology in lifting Australian productivity	No	Research into how investments in and application of research, science and technology can enhance creativity and productivity in Australia. Study has no focus on strategic alliances, multinational enterprises, reverse innovation and the healthcare market.



(Munivenkatesh & Islam, n-d)	Managing business risks in nanotechnology. Recent trends, emerging issues and future directions	No	Research into the guideline for businesses to manage, consider and evaluate risks in the nanotechnology business. Study has no focus on strategic alliances, multinational enterprises, reverse innovation and the healthcare market.
------------------------------	---	----	---

Table 10 points out that the 10 listed publications are inappropriate for managers of multinational enterprises to guide them to improve collaborations which are beneficial for reverse innovation of medical devices. A tool to improve collaborations is valuable for managers of enterprises as the potential impact of reverse innovation is relatively high in the healthcare market as health expenditure worldwide is about a third of total expenditure worldwide. In addition, reverse innovation can improve healthcare quality in emerging markets as DMNEs can contribute advanced technical knowledge from developed healthcare markets. The objective of this study is to fill this knowledge gap with the development of a collaboration framework for managers of multinational enterprises to stimulate collaboration between them to stimulate reverse innovation.

### 3.1 Reverse Innovation

For decades, DMNEs did follow the traditional innovation approach in which innovations are developed in developed markets, this approach is centralized and product based. These innovations generally have many luxury features and have a relatively high price. DMNEs can downgrade these innovations and introduce them in emerging market, this is called “glocalization”. However, these innovations do often not meet the affordable price point and needs of the local market. Therefore this traditional innovation approach is reversed more often, a reverse innovation is developed by a low-cost innovation approach to ensure an affordable price point for the local market and meets the local infrastructure and cultural constraints. (Govindarajan & Ramamurti, 2011; Hadengue, de Marcellis-Warin, von Zedtwitz, & Warin, 2017) Enterprises can introduce these innovations later in developed markets as well, then the innovation becomes a reverse innovation. Reverse innovation is “the case where an innovation is adopted first in poor (emerging) economies before ‘trickling up’ to rich countries.” (Govindarajan & Ramamurti, 2011, p.191) Adoption is the mechanism that consumers get in touch with an innovation, recognize the functionality of the innovation and start using the innovation (Rogers, 2010). A concise overview of the distinction between the glocalization approach and the reverse innovation approach is given in table 11.

**Table 11: Distinction between Reverse Innovation and Glocalization**

<b>Initial adoption</b>	<b>⇒</b>	<b>Subsequent adoption</b>	<b>Innovation approach</b>	<b>Market approach</b>
Developed market	⇒	Emerging market	Traditional	Glocalization
Emerging market	⇒	Developed market	Low-cost	Reverse innovation

The notion low-cost innovation in the context of reverse innovation can refer to: cost innovation, good-enough innovation or frugal innovation. Cost innovation characterises a product innovation with the original functionality at lower costs, a good-enough innovation is a product innovation with reduced functionality at lower costs and a frugal innovation is a product innovation with new functionality at lower costs (Zeschky, Widenmayer, & Gassmann, 2014). An overview of these types of innovations that can become reverse innovations is given in table 12. Zeschky et al. (2014) argue that a reverse innovation is always innovated by one of these three types of innovations.

**Table 12: Types of Innovation Compatible with Reverse Innovation**

<b>Innovation type</b>	<b>Functionality</b>	<b>Price point</b>
Cost innovation	Original	Reduced
Good-enough innovation	Reduced	Reduced
Frugal innovation	New	Reduced

Based on findings from Zeschky et al. (2014)

A recent publication of the conceptualization of reverse innovation is done by Malodia, Gupta, and Jaiswal (2019), they describe a reverse innovation as a product that is technically superior at low costs, known as a frugal innovation. Their finding is in contrast to Zeschky et al.'s (2014) who argue that a cost innovation and good-enough innovation can become a reverse innovation as well. Malodia et al. (2019) argue that these two approaches contradict to the value innovation theory of Kim and Mauborgne (2005), their theory suggests that innovation strives to super value products. In Malodia et al.'s (2019) view is the frugal innovation approach the only appropriate approach, of the three approaches mentioned by Zeschky et al. (2014), for the reverse innovation market approach.

Multinationals can enjoy competitive advantage from reverse innovation, because reverse innovation stimulates innovation and internationalization (Govindarajan & Ramamurti, 2011). Borini, Costa, Bezerra, and Oliviera (2014) define reverse innovation as a transfer of ideas from emerging markets to developed markets. They see reverse innovation as a market approach not limited to the transfer of innovations but expanded by ideas which have, in contrast to innovations, not created value yet. In addition, multinationals benefit from serving emerging markets as about 85% of the people worldwide live in emerging markets. However, DMNEs master the traditional innovation approach to serve developed markets, in contrast to the low-cost innovation approach which DMNEs need to learn from scratch. (Govindarajan & Ramamurti, 2011; Govindarajan & Trimble, 2012a)

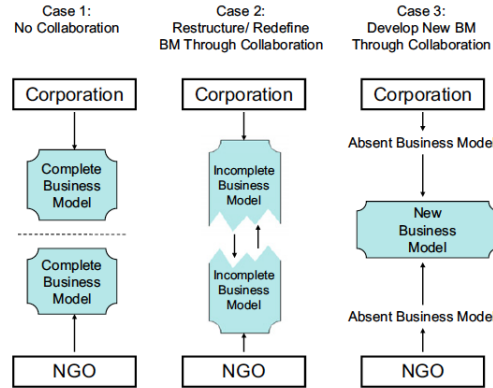
DMNEs need to learn the low-cost innovation approach from scratch as cultural, economic, institutional and geographic features differ in emerging markets as compared to developed markets. DMNEs lack the resources and knowledge to master this approach. (Dahan et al., 2010) Both the traditional as well as the low-cost innovation approach are needed to serve both the developed and the emerging markets. However, it is difficult for a DMNE to master both approaches simultaneously as the traditional innovation approach is centralized and it has a focus on the product, while low-cost innovation is rather decentralized and has a focus on the market. (Immelt et al., 2009)

A DMNE can gather local resources and local knowledge via an alliance with an EMNE to develop and manufacture products for an affordable price that meet the local needs. The DMNE can achieve its goals by learning the low-cost innovation approach. An EMNE can benefit from an alliance with a DMNE due to access to knowledge about advanced technologies and the best practices in the field of processes, global management and large-scale management. Both enterprises can achieve their individual goals more fully when combining and leveraging their relative strengths in an alliance. (Dahan et al., 2010)

### 3.2 Alliances in Reverse Innovation

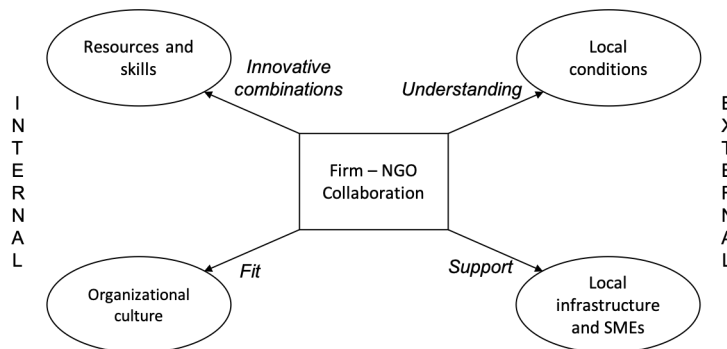
According to Botero Ramírez (2013) are strategic alliances between parties in developed markets and emerging markets a strategic tool to reach higher development levels: alliances ensure expansion of the sales market, create the potential to discover new technologies, create the potential to reduce costs and expand the network of parties. New technologies can improve healthcare quality in both the developed markets and the emerging markets. Dahan et al. (2010) studied the challenges that multinational enterprises face when

they tap into emerging markets and how business models have to be reshaped to local, cultural, economic, institutional and geographic features. They describe two scenarios how an enterprise can collaborate with a NGO to serve the emerging market, the first scenario is that the two parties restructure their incomplete business model, the second scenario is that the two parties develop a new business model, see figure 3. They argue that the development of a new business model from scratch, to serve both the developed market as the emerging market, is the best scenario to achieve success in both markets. It is likely that the development of a new business model is also the best scenario for collaborations between two for-profit firms as governance, strategy, and structure of the enterprises are likely to differ. The enterprises can consult about the governance, strategy and structure for their collaboration.



**Figure 3: Corporate-NGO Collaboration for Developing Market Business Models, adapted from Dahan et al. (2010)**

Dahan et al. (2010) identified in the same study four aspects that need to be aligned between organizations to collaborate, which probably also apply to the collaboration between a DMNE and an EMNE, see figure 4. The two aspects shown at the left side of the model are *resources and skills* and *organizational culture*, organizations have a relatively large impact on these internal aspects. The aspects shown at the right side of the model are *local conditions* and *'local infrastructure and SMEs'*, organizations have a relatively low impact on these external aspects. The influence of organizations on internal aspects is significantly higher than on external aspects as internal aspects are impacted by the behavior of the employees in the parent companies and the employees in the collaboration, while the external aspects are impacted by a wide range of external factors.



**Figure 4: Four Strategic Aspects for Corporate-NGO Alliances, adapted from Dahan et al. (2010)**

- Resources and skills, an alliance is built upon the relative strengths of both parties involved. The resources and skills of the parties are complementary to each other, both parties bring the resources and skills in the business model of the alliance the other party is missing. The purpose is that the alliance is an innovative combination of resources and skills. Therefore is the relationship, indicated by an arrow, between the collaboration itself and the strategic aspect *resources and skills* indicated with the term *innovative combinations*.
- Organizational fit, cultural compatibility and trust are critical factors to success for an ongoing and comprehensive alliance. A new business model for a new joint venture is an appropriate basis to achieve an organizational fit. Collaborating enterprises consult about the organizational characteristics they both perceive. The relationship between the collaboration and the aspect *organizational culture* is therefore indicated with the term *fit*.
- ‘Local infrastructure and SMEs’ are important to understand for an alliance. The parties in the alliance must be aware that “infrastructures, marketing media, distribution channels, financing services” are different in emerging markets compared to developed markets. The alliance should recognize the value of local enterprises to identify potential competitors and suppliers. Local suppliers can be strong partners because of their local market knowledge. It is therefore in the self-interest of the alliance to support development in the local market and help local suppliers to improve the quality of their products, resulting in improved quality of the products of the alliance. The relationship between the collaboration and the aspect *‘local infrastructure and SMEs’* is therefore indicated with the term *support* as support of ‘local infrastructure and SMEs’ is identified by Dahan et al. (2010) as an essential factor for a collaboration.
- Knowledge about local conditions is key for a successful alliance. The dynamics of a market is key to develop innovative business models to serve that particular market. The behavior of consumers and producers may differ substantially between emerging and developed markets. These behaviors are complex and may counter-intuitive to experts, an enterprise can only understand the complexity of doing business in a different environment by experience. This is an argument that DMNEs and EMNEs have to collaborate to achieve success in the other market than their home market. Therefore the relationship between the collaboration and the strategic aspect *local conditions* is indicated with the term *understanding*.

## Learning Theory

Cohen and Levinthal (1990) developed a concept to explain why differences exist in the learning and innovation capabilities of firms, this absorptive capacity concept is defined as the “ability to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (p.128). A DMNE can improve learning and innovation capabilities to recognize new and external knowledge, assimilate this knowledge to its own knowledge base and apply it to commercial ends. By reverse innovation the purpose of the DMNE is to serve developed markets and emerging markets. The DMNE needs to gather knowledge about the affordable price point of an innovation and knowledge about the local needs. This knowledge is needed by the DMNE to be able to successfully apply their innovation capabilities to low-cost innovations for the emerging markets. This knowledge can be recognized in an EMNE, both parties need to assimilate the knowledge from the collaboration in their own knowledge management system.

As mentioned in paragraph 3.1 it is difficult for DMNE to execute both the traditional innovation approach as well as the low-cost innovation approach. Therefore a DMNE can start a strategic alliance with an EMNE, to gather local market knowledge and resources. This alliance is part of the network of an enterprise, this network is created by talent, capital and ideas from wherever in the world. These elements are found to build new levers for value creation, this phenomenon is known as polycentric innovation.

### 3.3 Alliances in Healthcare

Pratono and Ratih (2019) studied, by a case study in Indonesia, international alliance strategies to enter emerging markets for enterprises that develop medical device, they determined four types of strategies.

- Wholly owned subsidiary, in this approach a DMNE controls a subsidiary in an emerging market. “In this model, the global companies prefer to take a lead for global integration in operations being uniform.” A DMNE can take the acquisition of local enterprises to form a wholly owned subsidiary, which is not a collaboration with a separate and independent entity (Motohashi, 2015).
- Joint venture, a strategic alliance characterized by shared ownership, shared governance and shared performance. This strategy, known as equity alliance, is mainly attractive for for-profit firms (Kim & Mauborgne, 2005). For DMNEs it is practical to choose for a joint venture as type of alliance strategy to expand global operations, the DMNE can benefit from local employees, local distribution channels and regulatory approval for operations (Lebedev, Peng, Xie, & Stevens, 2015). It is beneficial for a DMNE to establish a joint venture with an EMNE as it improves brand acceptance by local customers and by local stakeholders. The DMNE can also benefit from the local network of the EMNE (Tarnovskaya & Biedenbach, 2016).
- License agreement is agreement between enterprises to sell the products or services from the other party in their home market, no new business is formed in this approach. The license is paid by a percentage of the revenue of the product or service. Both enterprises operate separately, the learning mechanism, which is mentioned in section 3.2, does not take place. No products or services will be developed based on the other market, no reverse innovation takes place.
- ‘Subcontracting and outsourcing’ is used to outsource some phases of product development to another enterprise. The client does not gain technical knowledge from the other enterprise, but “local sales necessitate the creation of customer relationships and retail and distribution channels, which can be difficult without support from local partners” (Young, Tsai, Wang, Liu, & Ahlstrom, 2014). Also in this approach the learning mechanism and reverse innovation does not take place.

According to the study of Dahan et al. is a joint venture an appropriate type of alliance strategy for a DMNE and an EMNE to penetrate developed and emerging markets. This is an appropriate type of alliance strategy as a new business model can be created that contains the characteristics to serve both markets. Hossain, Simula, and Halme (2016) add to the literature that “a joint venture may be useful when high investment is necessary”. This argument also applies to enterprises developing medical devices, since their investments in R&D and manufacturing facilities are relatively high.

### 3.4 Dynamics of Strategic Alliances

Park and Ungson (2001) studied the dynamics in strategic alliances to identify failures of alliances, because empirical research shows that more than half of them fail. They studied these dynamics across different disciplines. The research shows that during an alliance between two enterprises four main dynamics are important to maintain an alliance.

- Balanced contribution, an alliance provides “access to the other firms’ proprietary know-how, assets, human resource needs, market access needs, government and political needs, and knowledge needs”.

A requirement for a stable alliance is that each party perceive the contribution to be balanced and equitable (Porter & Fuller, 1985). To maintain a balanced contribution the contribution of both parties should be monitored, however, monitoring is costly and difficult, therefore, parties attempt to reduce their contribution. Over time, the contribution ratio may change between collaborating firms because one of the parties developed desired capabilities to execute their business separately. The perception of equity in an alliance is a critical factor for a stable and sustainable cooperative structure.

- Symmetry, over time a collaboration is vulnerable for asymmetry in the collaboration, one party may become more dependent on the alliance than the other (Hamel, Doz, & Prahalad, 1989). The disadvantaged party contributes more and more to maintain the benefits of the collaboration. The advantaged party becomes more vulnerable to actions of the more disadvantaged party, asymmetry may cause opportunistic behavior from the more disadvantaged partner. Over time, the disadvantaged party may initiate renegotiation of the contractual terms to maintain the collaboration beneficial. However, the equity becomes unbalanced which is a vulnerability for a collaboration. Shifts in contractual terms and internal policies of the alliance is also a vulnerability to strategic alliances, the management of the alliance is then often divided.
- Bilateral learning, Park and Ungson (2001) argue that the learning capability of alliance partners is perhaps the key process variable in alliance management. Alliances provide an important learning mechanism for firms to gather knowledge and learn skills. Learning from combined and leveraged strengths of the parties involved in an alliance improves the innovation capabilities of the parties involved (Dahan et al., 2010; Cohen & Levinthal, 1990).
- Strategic positioning, an alliance is stable and sustainable as long as the strategy of the alliance is in line with the intended strategy of collaborating parties. The strategy of the alliance results from the consultation by both parties about the mission, governance, strategy, and structure. Elmuti and Kathawala (2001) argue similarly, they argue that the goals and objectives of an alliance have to be clearly defined and shared by both parties.
- External environment, changing conditions in the external environment is a vulnerability for an alliance as it affects the competitive advantage of the alliance. However, in the scientific literature is mounting evidence that external factors like changing economic conditions, changes in technological structure, slackened demand for the product, and opposition of government agencies have less impact than the behavioral and managerial factors on the alliance, which are internal (Parkhe, 1993).

### 3.5 Conceptual Framework

This section provides a conceptual collaboration framework in the context of reverse innovation of medical devices based on the literature review in the previous sections. This conceptual framework is developed to represent the current state of the scientific literature about collaborations between a DMNE and an EMNE in the context of reverse innovation of medical devices. This framework is adjusted and validated in the analysis of interview data from two cases, which is done later in this study, resulting in a validated collaboration framework.

As described in section 3.3, the establishment of a joint venture is an appropriate type of alliance strategy for a DMNE to benefit from emerging markets. A joint venture with an EMNE is beneficial as it is difficult for a DMNE to master both the traditional innovation approach and low-cost innovation approach simultaneously. An EMNE can complement lacking resources and knowledge about emerging markets to the alliance, while the DMNE can complement resources and knowledge about developed markets. An EMNE can benefit from an alliance with a DMNE due to access to knowledge about advanced technologies

and the best practices in the field of processes, global management and large-scale management. A joint venture is also an appropriate type of alliance strategy as both enterprises can contribute to the relatively high investments, which are necessary in the medical device market (Hossain et al., 2016). In figure 5 the center of the conceptual framework is the establishment of a joint venture as type of alliance strategy.

This conceptual framework is an advanced version and built upon the model of Dahan et al. (2010), the model is extended by taken into account the key alliance dynamics to encourage collaboration to stimulate reverse innovation of medical devices. These key alliance dynamics are identified by Park and Ungson (2001) and can be distributed over the model of Dahan et al. (2010). In fact, this conceptual framework with alliance dynamics that stimulate collaboration is more specific than the model of Dahan et al. (2010).

The descriptions of the relationships in Dahan et al.'s (2010) model are not adapted by this conceptual framework because the assumption is made, as mentioned in section 1.3, that an appropriate partner has been selected to collaborate with during the establishment of an alliance. This implies that the resources and skills of the enterprises are complementary and innovative combinations. The selection of an appropriate partner also implies that the enterprises were able to agree an organizational culture for the collaboration. The arrows in the conceptual framework point, in contrast to Dahan et al.'s (2010) model, from the strategic aspects to the collaboration as the strategic aspects contribute to the collaboration. The alliance dynamics contribute to the strategic aspects and therefore the direction of the arrows as is showed in the figure 5.

The dynamic *external environment* contributes to both the strategic aspects *local conditions* and '*local infrastructure and SMEs*', this side of the conceptual framework is out of the scope of the study as it contains external aspects that are impacted by a wide range of external factors. There is mounting evidence that the impact of internal dynamics is significantly higher than of external factors. The research method is designed to study the internal dynamics that are impacted by the behavior of the employees in the parent companies and the employees in the strategic alliance.

Symmetry in dependency between the enterprises can be controlled by managers in the alliance, a symmetric dependency stimulates an appropriate organizational culture in the joint venture. In addition, an alignment in strategic positioning stimulates an organizational culture in the joint venture as intended by the enterprises. Knowledge sharing between the alliance and the parent companies is necessary to ensure bilateral learning which contributes to the organizational culture. Therefore the alliance dynamics: *symmetry*, *strategic positioning*, and *bilateral learning* are appointed to the *organizational culture* aspect.

*Balanced contribution* is appointed to the *resources and skills* aspect. The scientific literature suggests that a balanced contribution should be managed to ensure innovative combinations in resources and skills. Therefore this alliance dynamic is related to the strategic aspect *resources and skills*. The four alliance dynamics: *symmetry*, *strategic positioning*, *bilateral learning* and *balanced contribution* are examined in the two cases of this study to adjust and validate the conceptual framework, resulting in a validated collaboration framework for multinational enterprises.

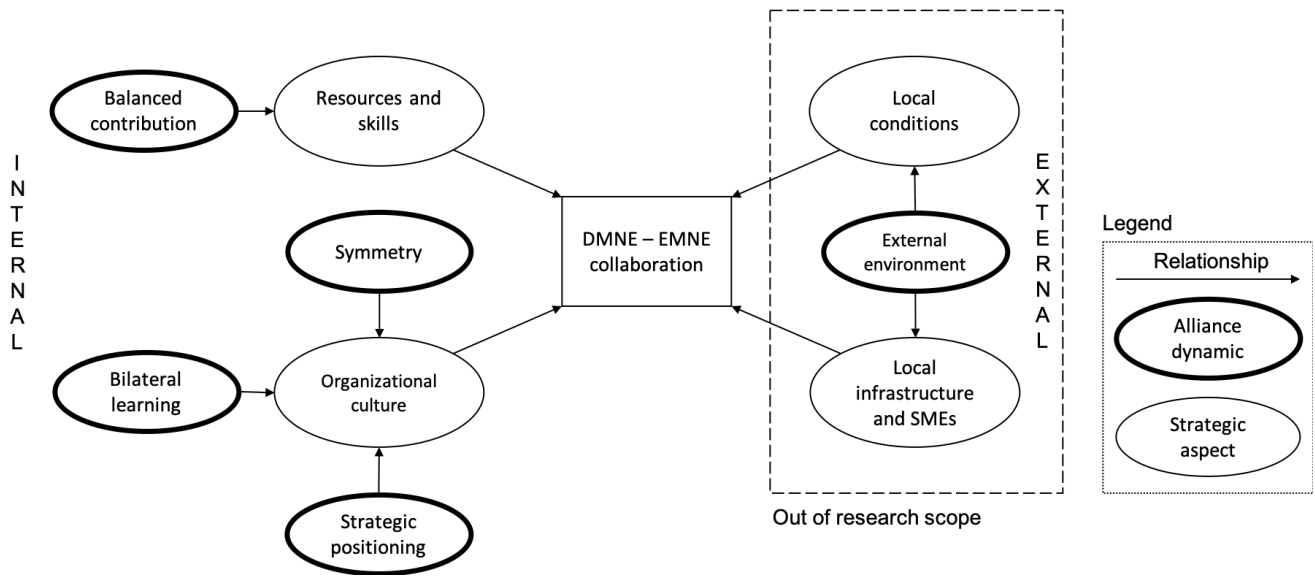


Figure 5: Conceptual Framework, author's own illustration

### 3.6 Conclusion

The literature review identified a knowledge gap in the scientific literature about how managers of DMNEs and EMNEs should encourage collaboration to stimulate reverse innovation of medical devices. A reverse innovation is a low-cost innovation which is marketed first in emerging markets and thereafter in developed markets. Emerging markets have a large potential for DMNEs as about 85% of the people worldwide live in emerging markets. Because of conflicts between the traditional innovation approach and the low-cost innovation approach are alliances beneficial for enterprises to stimulate reverse innovation of medical devices. An alliance with a DMNE is beneficial for an EMNE as it has access to knowledge about advanced technologies and the best practices in the field of processes, global management and large-scale management.

The literature suggests that a joint venture is an appropriate type of alliance strategy for a collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. A joint venture can benefit from local employees, local distribution channels, regulatory approval, network formation, brand acceptance and risk sharing. Four key dynamics are identified in the literature that can be used by managers of an alliance to manage the alliance. (1) A symmetric dependency on the alliance by both enterprises, (2) alignment in strategic positioning and (3) bilateral learning are key alliance dynamics that specify the internal strategic aspect *organizational culture*. (4) A balanced contribution is a key alliance dynamic that specifies the internal strategic aspect *resources and skills*.



## 4 Case Descriptions

In this chapter the two cases are described, this description consists of background information about the collaborating enterprises, general information about the alliances and descriptions of some reverse innovations, developed by the alliance. The PNMS case is selected for this analysis as Philips Healthcare sold its stake in the joint venture to Neusoft Medical already after 10 years after the establishment of the joint venture. Philips Healthcare is a Dutch DMNE and Neusoft Medical is a Chinese EMNE. The Wipro-GE Healthcare case is selected for this study as the alliance is known in the scientific literature for its reverse innovations. The joint venture is established in 1990 and still in business. GE Healthcare is an American DMNE and Wipro Limited is an Indian EMNE. Section 4.1 regards the PNMS joint venture and section 4.2 regards the Wipro-GE Healthcare joint venture.

### 4.1 Philips & Neusoft Medical Systems

Philips Healthcare and Neusoft Medical started a joint venture in 2004, that was called Philips & Neusoft Medical Systems (PNMS), Philips Healthcare owned 51% of the shares and Neusoft Medical 49%. Philips sold its shares to Neusoft in 2013. Philips Healthcare and Neusoft Medical agreed to share intellectual property rights and knowledge assets of the joint venture, approximately 100 to 150 employees of the joint venture were taken over by Philips Healthcare. The enterprises announced to maintain partnership through components supply. (Neusoft Corporation, 2020c; Koninklijke Philips N.V., 2013a) Concise information about the PNMS joint venture is given in table 13.

**Table 13: Information about PNMS**

	Philips Healthcare	Neusoft Medical
<b>Alliance strategy</b>	Joint venture	
<b>In business</b>	From 2004 until 2013	
<b>Division in shares</b>	51%	49%
<b>Members in joint venture board<sup>a</sup></b>	4	4
<b>Location of joint venture headquarters<sup>a</sup></b>	Campus of Neusoft Corporation, Shenyang, China	

<sup>a</sup>Finding from interviews

#### 4.1.1 Royal Philips Healthcare

Royal Philips is a multinational enterprise with its headquarters in Amsterdam, the Netherlands, Philips started as an electric light bulb manufacturer in 1891. Philips added x-ray and radio reception to its portfolio in 1918 and started protecting its innovations using patents and established sales organizations in Europe. (Koninklijke Philips N.V., 2020b) Philips announced in 2014 to create two stand-alone enterprises to increase strategic focus, one for healthcare technology and one for lighting (Koninklijke Philips N.V., 2016). Philips Lighting was listed at the Euronext stock exchange as stand-alone enterprise in May 2016 and Philips reduced its stake in Philips Lighting from that moment, with the intent to sell all of its stake in several years (Koninklijke Philips N.V., 2017b). The company name of Philips Lighting changed in May 2018 into Signify (Signify N.V., 2018). Currently, Philips focuses on product and service innovations for the healthcare market, divided into three divisions, diagnosis treatment, connected care and personal health (Koninklijke Philips N.V., 2017b). Philips employed about 81,000 people in more than 100 countries worldwide and their revenue was 19.5 billion euros in 2019 (Koninklijke Philips N.V., 2020a).

Philips considers emerging markets as great importance for both its local presence as well as its local production. The enterprise was already since the 1920s present in the emerging markets as it started at that moment sales in China (Koninklijke Philips N.V., n.d.-c). Philips manages a long-term strategy to serve these markets. Philips is not only active in emerging markets to catering to the local needs, but it also uses knowledge from these activities to developed more cost-efficient products and services for developed markets. The largest emerging markets for Philips are, China, India and Africa in which it also has innovation departments. (Reuters, 2016)

### **Philips in Africa**

Philips launched an innovation hub Kenya in 2014, the hub was located in Nairobi and known as the Research Africa Lab. The Philips Research department collaborated with the Africa Market Organisation to establish the innovation lab. (Koninklijke Philips N.V., 2017b) This innovation lab collaborates with local institutions and local universities to develop innovations in Africa aimed to improve healthcare and healthy living in Africa (Koninklijke Philips N.V., n.d.-d, 2017a). The lab also collaborates with UN bodies, NGOs, incubators and academic research institutions (Koninklijke Philips N.V., n.d.-d). The scientists in the lab of Philips in Africa collaborate with scientists in the lab of Philips in India, Shanghai and its core lab in Eindhoven to enhance the global research portfolio of Philips (Koninklijke Philips N.V., n.d.-d, 2014).

Philips strives to transform healthcare in India and therefore introduced the Community Life Centre platform (CLC). The purpose of the CLCs is to improve primary and community healthcare in India by creating a flexible, open and modular platform and thereby addressing the UN Sustainable Development Goal 3 (Koninklijke Philips N.V., 2017a).

### **Philips in China**

China is the second largest healthcare technology market globally and exhibits continued robust growth with significant potential. The Chinese market was only considered as an export market since the 1920s but since some decades it became a global production market and environment for R&D. (Koninklijke Philips N.V., n.d.-c) Philips Healthcare established a joint venture with Neusoft Medical in 2004 to expand their presence in China and to develop more cost-efficient medical devices for the Chinese and other emerging markets, they named the joint venture Philips & Neusoft Medical Systems (PNMS). Philips Healthcare owned 51% of the shares and contributed a series of asset transfers and capital injection transactions. Neusoft owned 49% of the shares and contributed their manufacturing and R&D capabilities. The joint venture did license know-how from Philips Healthcare. The objective of this joint venture was to deploy its strategy for the Chinese market and to gain a long-term supply of skilled workforce and the R&D capabilities. (Koninklijke Philips N.V., 2005)

However, Philips Healthcare sold its shares to Neusoft in 2013. As part of the sales agreement Philips took over about 100 to 150 engineers and supporting staff to their new development centre in Shenyang. Philips Healthcare and Neusoft Medical continued to be partners by the supply of components and systems. All employees stayed at the joint venture, apart from the 100 to 150 engineers that Philips Healthcare took over. In China Philips also develops medical devices in their manufacturing sites and R&D centres in Suzhou and Shanghai. (Koninklijke Philips N.V., 2013b)

Their R&D centre in Suzhou is in operation since 2012 and is called Suzhou Imaging Systems Industrial Campus, the aim of this campus is to strengthen the imaging systems portfolio of Philips Healthcare. The campus holds a production facility and a R&D centre to tailor the Chinese market for imaging devices that are accessible for all hospitals and clinics, also in rural areas (Koninklijke Philips N.V., 2012). The Philips Innovation Campus Shanghai is established in 2000 and has about 100 employees. The employees

at this campus have extensive collaborations with industrial and academic partners as well as other innovation teams of Philips Healthcare. The aim of this campus is to strengthen the portfolio in chronic disease management, patient monitoring, intelligent clinical IT solutions & services and systems & clinical applications. The campus also focuses on AI relevant technologies and personal health. (Koninklijke Philips N.V., n.d.-e)

## **Philips in India**

Philips established in 1996 the Philips Innovation Campus (PIC) in Bangalore. The aim of the campus is to develop medical devices that can be produced using the local infrastructure. (Koninklijke Philips N.V., 2015) Initially the campus was used for the development of software, nowadays the campus is a broad R&D centre for the development of medical devices with more than 2500 employees (Koninklijke Philips N.V., n.d.-a). The PIC engages with the healthcare market in India to develop medical devices that meet the local needs and devices that are affordable and accessible for users in India and in other emerging markets such as Indonesia and Africa (Philips India Limited, 2017). In Pune is the Philips Healthcare Innovation Centre (HIC) located, this centre develops innovations that can be sold globally. They develop products for image guide therapy systems, mobile diagnostic x-ray and radiography diagnostic x-ray. (Koninklijke Philips N.V., n.d.-b)

### **4.1.2 Neusoft Medical**

Neusoft Medical is a subsidiary of Neusoft Corporation, a multinational enterprise with its headquarters in Shenyang, China, it provides innovative information technology. Neusoft is established in 1991 at North-eastern University in China. Neusoft Medical is a division of Neusoft Corporation. Neusoft Corporation has ten software R&D departments and subsidiaries in the United States, Japan, Europe, the Middle East and South America. Neusoft Corporation has about 20,000 employees worldwide, its revenue was 1.21 billion U.S. dollars in 2019. (Neusoft Corporation, 2020a, 2020b)

Neusoft Medical was established in 1998 after the development of their first scientific CT prototype. In 2004 they established the PMNS joint venture with Philips Healthcare (Neusoft Medical, n.d.-b). Currently they develop clinical solutions and imaging diagnostic solutions, they develop these devices also as MDaaS (Medical Devices & Data as a Service), this is a product using internet, artificial intelligence and big data to improve the ability of medical institutions to diagnose and treat patients. The R&D centres of Neusoft Medical are currently located in Shenyang, Shanghai, Beijing, Guangzhou, Nanjing (China), Seoul (South-Korea) and Houston (US). Neusoft Medical collaborates globally with dedicated scientists and medical institutions to advance the technology used in their medical devices. (Neusoft Medical, n.d.-a)

### **4.1.3 Reverse Innovation PNMS**

- CT-scan product portfolio. Based on information from the interviews with (former) Philips Healthcare employees for this study: the CT-scan portfolio is expanded with low-cost CT-scans developed by the joint venture for the Chinese market. These CT-scans are sold in reasonable numbers worldwide after these devices became successful in the Chinese healthcare market.
- Ultrasound product portfolio. The devices from the ultrasound product portfolio were the most successful devices developed by the joint venture according to the interviewees. The expansion of the portfolio with low-cost devices was initially intended for the Chinese healthcare market and became reverse innovations as a reasonable number of devices are sold worldwide afterwards.
- Essenta RC and Essenta RAD. These two devices are developed for the Chinese healthcare market by the joint venture for the radiography & fluoroscopy product portfolio. According to the interviewees

are these devices are sold in reasonable numbers in America, France and Spain after introduction in the Chinese healthcare market. The device shown in figure 6 is an Essenta RAD developed by the PNMS joint venture.



Figure 6: Essenta RAD, adapted from Koninklijke Philips N.V. (2007)

## 4.2 Wipro-GE Healthcare

GE Healthcare and Wipro started a joint venture in 1990 to gain a larger market share in India, currently GE Healthcare owns 51% of the shares and Wipro Limited 49%. The goal of the joint venture was to produce locally 50-70% of the products that are sold in India. The headquarters of the joint venture is located in Bangalore, India. (The Hindu, 2009) Concise information about the Wipro-GE Healthcare joint venture is given in table 14.

Table 14: Information about Wipro-GE Healthcare

		GE Healthcare	Wipro Limited
<b>Alliance strategy</b>		Joint venture	
<b>In business</b>		From 1990	
<b>Division in shares</b>	Initially <sup>a</sup>	49%	51%
	Currently	51%	49%
<b>Location of joint venture headquarters<sup>a</sup></b>		Independent campus in Bangalore, India	

<sup>a</sup>Finding from interview

#### **4.2.1 General Electric Healthcare**

General Electric (GE) is a multinational enterprise with its headquarters in Boston, the United States. GE is active in the healthcare market for more than 100 years. (General Electric, 2020a) The R&D and production facilities were located in North America until its recognized the opportunities in emerging markets. GE has established, over the past thirty years, R&D and production facilities in emerging markets, with its biggest facility outside the United States in Bangalore. (General Electric, 2020d) The activities of GE Healthcare are divided into four divisions: diagnostic imaging and service, mobile diagnostics and monitoring, IT and digital solutions, and life science (General Electric, 2020c). Currently, GE Healthcare has about 56,000 employees in more than 100 countries worldwide and its revenue was 19.9 billion U.S. dollars in 2019 (General Electric, 2020b).

#### **GE in China**

GE has been doing business in China since 1906, and was considered one of the most active foreign companies in China that time. Their first plant for the lighting division was built in 1908 in Shenyang. GE started its first joint venture in Beijing in 1991, and was called GE Hangwei Medical Systems. GE established the joint venture with two partners (1) the ministry of aeronautics and space industry and (2) ministry of public health and owns 65% of the shares. The joint venture produces CT scanners and ultrasound devices in China, the aim at the time of establishment was to increase sales in China as restrictions did limit imports of CT scanners in China. (General Electric, n.d.-b; Diagnostic Imaging, 1991)

GE established several manufacturing sites, for CT and X-ray devices in Beijing, for ultrasound and patient monitoring in Wuxi, and for MRI in Tianjin. (General Electric, n.d.-a) GE started efforts for localized R&D in China in 2000, they launched a global research centre in Shanghai (General Electric, 2014). The centre was opened in 2003 and called China Technology Centre (CTC), the aim was to “solve the toughest challenges by bridging innovative technologies to the world” (General Electric, n.d.-a). GE established China Innovation Centres (CIC) in Harbin, Xi’an and Chengdu (General Electric, n.d.-a). The aim of the CIC’s is to connect the GE Healthcare engineers and customers to jointly develop primary healthcare devices. GE developed more than 40 medical devices in the period 2010-2014, 70% of these devices were designed for hospitals and clinics for China, also for rural areas (General Electric, 2014).

#### **GE in India**

GE has been doing business in India since 1902, their social objective is to improve healthcare quality in India. They have more than 5,300 technologists working in their research centres in Chennai, Mumbai, Hyderabad and Bangalore who develop innovations for markets worldwide. GE collaborates with multiple companies in India to develop products that meet the needs of the Indian healthcare market. GE is closely engaged with communities in India on environmental and social issues. (General Electric, 2015) GE Healthcare established a joint venture with Wipro Limited in 1990 (The Hindu, 2009). In 2000 the joint venture opened the John F. Welch Technology Centre in Bangalore, this centre is the first and largest global lab outside the US (GE India, n.d.). Initially the main driver for GE to establish R&D centres in India was to reduce research and development costs via a vast amount of engineers at lower costs compared to engineers in developed markets (Leahy, J., 2010). Traditionally GE tried to sell their high-end medical devices in India, however, this proved rather unsuccessful, because the prices were too high and users needed training to be able to use the devices. (Govindarajan & Trimble, 2012b) Therefore, over time, the R&D efforts of GE in India became more focused on product development for emerging markets. Since then their R&D efforts have a double focus, R&D for global and emerging market products. (PwC, 2013c) GE did rethink about their organizational structure as their traditional innovation approach counteracts the reverse innovation approach, they wanted to develop and manufacture

products for developed and emerging markets simultaneously (PwC, 2013b). GE started looking at the characteristics of the Indian healthcare market, such as the labour skills and how much potential customers are able to pay in rural areas. To serve emerging markets GE moved from a centralized and product based approach to a decentralized and market based approach. Products developed for emerging markets have a potential in developed markets, like the market of the USA and Europe, as they can reduce healthcare costs, the products can become reverse innovations in these markets. (PwC, 2013a; Govindarajan & Trimble, 2012b) GE established a global design studio to strengthen their R&D efforts, which is called eCube, the studio is key for immersive research and development of disruptive technologies through collaborations, the partners in eCube are healthcare providers (General Electric, 2015).

#### **4.2.2 Wipro Limited**

Wipro Limited is a multinational enterprise with its headquarters in Bangalore, India, it provides information technology, consulting and business process services. Wipro Limited is established in 1945 in India and has currently about 175,000 employees worldwide. Wipro Limited is active in a wide range of industries, from healthcare to oil & gas (Wipro Limited, 2020). The total revenue of Wipro Limited was 9.0 billion U.S. dollars from March 2019 until March 2020 (Money Control, n.d.).

The enterprise was called Western India Vegetable Products Limited at the time of establishment. The name changed a number of times, in 1982 it changed to its current name Wipro Limited. In 1981 Wipro ventured into the fledgling information technology industry. (Wipro, n.d.-a) Wipro Limited started in 1990 a joint venture with GE Healthcare, called Wipro-GE Healthcare (The Hindu, 2009). Currently Wipro Limited is a leading global IT, business process and consulting service company (Wipro Limited, 2020).

Wipro Limited is in the field of healthcare an expert in the design, development, tests and validation of medical devices for other parties. To serve more than 500 customer globally Wipro Limited currently has more than 18,000 consultants with experience to work with key regulatory agencies in Australia, China, Japan, Europe and the US. They do this with their expertise in mechanical, electronics and software engineering and collaborations with industrial design houses, research institutions, hospitals and biomedical academics. The services of Wipro are new product development, product sustenance services and value engineering. Product sustenance services is a service to add new features to existing and end-of-life cycle products, value engineering is a service to build interoperability, enhance product features, improves quality and reduce costs. They perform these services for their portfolios imaging systems, clinical diagnostics, patient monitoring, surgical systems, implantable devices and medication delivery devices. (Wipro, n.d.-b)

#### **4.2.3 Reverse Innovation Wipro-GE Healthcare**

Since 1990 the Wipro-GE Healthcare joint venture develops products and services which became reverse innovations, some examples are listed below:

- **MAC 400 Electrocardiogram (ECG).** The development of this medical device started in 2005 in the R&D centre of Wipro-GE Healthcare in Bangalore, India. This device is developed for the Indian market, it is a portable electrocardiogram to serve rural areas in India and affordable for the population there. The development team identified the local requirements and the device is built from scratch. (Govindarajan & Trimble, 2012b) The development team determined an affordable price for the device and identified possible solutions for the development of an ECG for the Indian market (Mukerjee, 2012). The MAC 400 ECG is an innovative combination of existing resources and technologies, resulting in a cost-efficient device (Tallman et al., 2017). Subsequently, the MAC 400 became a reverse innovation as it is being sold in the European market (Govindarajan & Trimble, 2012b). The joint venture developed a MAC 800 ECG to serve the requirements for the Chinese market, this device became a reverse innovation in the United States and Canada (Singh, 2011).

- **Lullaby Warmer.** The Lullaby Warmer is introduced in the Indian market in 2009 (Govindarajan & Trimble, 2012b). The device is developed in the R&D centre of Wipro-GE Healthcare in Bangalore, India, this incubator is approximately 70% less expensive compared to incubators developed for developed markets (Govindarajan & Trimble, 2012b; Kannan, 2013; Karti, 2014). The device is aimed to reduce infant mortality rates in India, especially developed for rural areas in India as, for example, the power usage is reduced compared to traditional baby warmers. In addition, this device requires less-skilled and illiterate operators as it contains colour coding and photographic warnings. (Kannan, 2013) Subsequently, the Lullaby Warmer became a reverse innovation as it is being sold in more than 80 countries, including the developed markets of Belgium and Switzerland (General Electric, 2013).
- **Lullaby LED Phototherapy.** In addition to the Lullaby Warmer, the R&D centre developed the Lullaby LED Phototherapy. This device is also developed for the Indian market. This medical device treats neonatal jaundice, after introduction in India the device became a success in the most modern maternity wards of Europe. (General Electric, 2013; Kellner, 2012)



**Figure 7: Lullaby Warmer, adapted from GE Healthcare (n.d.)**

### 4.3 Key Characteristics

Philips Healthcare and Neusoft Medical established a joint venture in Shenyang, China, in 2004 with a division in shares of respectively 51%/49%. Philips Healthcare is a DMNE as it is originally a Dutch multinational enterprise, the healthcare division is a subsidiary of Royal Philips which started as an electric light bulb manufacturer. Neusoft Medical is an EMNE as it is originally a Chinese multinational enterprise, the medical division is a subsidiary of Neusoft Corporation which provides innovative information technology. The headquarters of the joint venture was located at the campus of Neusoft Corporation in Shenyang, China. The interviews pointed out that PNMS was the manufacturer of medical devices that were sold separately by both Philips Healthcare and Neusoft Medical. According to the interviewees the

joint venture did develop some reverse innovations, however, several medical device introductions failed in developed markets as sales were disappointing.

Wipro Limited and GE Healthcare established a joint venture in Bangalore, India, in 1990 with initially a division in shares of respectively 51%/49%, the interviewee pointed out that the division in shares changed, and currently is 49%/51%. Wipro Limited is an EMNE as it is originally an Indian multinational enterprise which provides information technology, consulting and business process services. GE Healthcare is a DMNE as it is originally an American multinational enterprise, the healthcare division is a subsidiary of General Electric which is a conglomerate, active in the healthcare market for more than 100 years. The headquarters of the joint venture is located at an independent campus in Bangalore, India. The interviewee pointed out that the joint venture markets its medical devices as GE Healthcare branded. The joint venture is in the scientific literature known for its successful low-cost medical devices of which several became reverse innovations.

#### **4.4 Conclusion: Comparison between Cases**

In both cases a globally respected DMNE, experienced in the development of medical devices, started an alliance with a less experienced EMNE with core business in information technology. In both cases the division in shares was 51%/49%. The headquarters of the PNMS joint venture of Philips Healthcare and Neusoft Medical was located on the campus of Neusoft Corporation, in contrast to the Wipro-GE Healthcare joint venture of Wipro Limited and GE Healthcare who located their headquarters at an independent location. Both joint ventures did innovate and market medical devices in emerging markets, PNMS in the Chinese healthcare market and Wipro-GE Healthcare in the Indian healthcare market. Both alliances did attempt to market several medical devices in developed markets as reverse innovations. However, according to interviewees, sales of the medical devices from PNMS were disappointing, on the other hand, the medical devices from Wipro-GE Healthcare are currently known in the literature as successful reverse innovations.

The two cases are empirical examples of a brief joint venture which did not market reverse innovations of significant value to healthcare markets. And as the opposite, a long-lasting joint venture which became known in the scientific literature by its reverse innovations that do add value to the healthcare markets in both emerging and developed markets.



## 5 Case Analysis

In this chapter are two cases analyzed to answer sub question 2. The objective of the analysis is to identify which alliance strategy and alliance dynamics stimulate collaboration between the enterprises in the two selected cases. Section 5.1 is the analysis of the PNMS joint venture and section 5.2 is the analysis of the Wipro-GE Healthcare joint venture. This chapter concludes with section 5.3 in which a comparison is made between the two cases. The alliance strategy and alliance dynamics identified in the literature review are used for the analysis and comparison of the two cases.

The two cases in this study are (1) the terminated PNMS joint venture of Philips Healthcare and Neusoft Medical and (2) the in business Wipro-GE Healthcare joint venture of Wipro Limited and GE Healthcare. Four interviews are conducted regarding the PNMS joint venture and one interview is conducted regarding the Wipro-GE Healthcare joint venture. Coding is done in Atlas.ti, the codes are appointed to code groups, per case the distribution of codes is given in table 15. This overview points out that the alliance dynamic *strategic positioning* is discussed relatively extensive in the PNMS case and the code group *balanced loyalty* is introduced in this case. The alliance dynamic *symmetry* is discussed relatively extensive in the Wipro-GE Healthcare case and the code group *value alignment* and *relationships at senior level* are introduced in this case.

**Table 15: Distribution of Codes**

Code group	PNMS		Wipro-GE Healthcare	
Driver collaboration	41	15%	13	13%
Driver joint venture	19	7%	4	4%
Strategic positioning	96	35%	17	18%
Balanced contribution	55	20%	15	16%
Symmetry	41	15%	19	20%
Bilateral learning	13	5%	6	6%
Value alignment	0	0%	11	11%
Balanced loyalty	9	3%	0	0%
Relationships at senior level	1	0%	12	12%
<i>Total</i>	<i>275</i>	<i>100%</i>	<i>97</i>	<i>100%</i>

### Legend

Code groups most identified ( $\geq 16\%$ )

Code groups average identified (10% - 15%)

Code groups least identified ( $\leq 9\%$ )

### 5.1 Philips & Neusoft Medical Systems

#### 5.1.1 Establishment of Alliance

This section provides context about the joint venture of Philips Healthcare and Neusoft Medical, including the key drivers to establish a joint venture as type of alliance strategy. The joint venture is established in 2004 and terminated in 2013. The interviews are conducted with people with in-depth knowledge about the alliance dynamics of the joint venture and form the basis for the following sections.

Philips Healthcare was looking for a collaboration partner in China at the time of the establishment of the PNMS joint venture. GE Healthcare and Siemens had a bigger market share in economy and mid-range healthcare devices in the Chinese market, this market was growing to become the second largest healthcare market after the USA. A reason for this growth was the investments by the Chinese government to reshape the healthcare market. In addition, China was geographically a “natural extension of the industrial network” for Philips Healthcare according to the project manager of x-ray and ultrasound. Neusoft was one of the few candidates to form a strategic alliance with as they were relatively big and had some experience in the healthcare market. Philips could learn the low-cost innovation approach from Neusoft, which could be used to ensure reverse innovation. The collaboration was for Neusoft an opportunity to gather knowledge about advanced healthcare technologies.

The parties established a joint venture with an intended term of 20 years. A major drivers to chose for a joint venture as type of alliance strategy was to avoid regulatory exclusion from the Chinese healthcare market by the Chinese government. Another driver was to avoid tender processes that foreign companies needed to go through. In addition, in a joint venture Philips could require Neusoft to transfer all of their healthcare activities to prevent them from becoming a competitor. Philips also wanted to show growth of their healthcare activities in China via the joint venture.

In the following sections the data from the four conducted interviews about the PNMS joint venture is linked to the alliance dynamics identified in chapter 3.

### 5.1.2 Strategic Positioning

Both parties agreed during the negotiation to develop and manufacture low-cost medical devices, which Neusoft would sell in the Chinese market and Philips would sell worldwide and in the Chinese market as well. However, discussions took place short after the establishment between the enterprises about the type of devices that the joint venture would develop and manufacture. Neusoft wanted to develop and manufacture devices with the advanced technologies of Philips instead of low-cost devices since they already knew how to develop low-cost devices. The businesses of Philips were reluctant to share this knowledge and technologies with the joint venture as they were afraid about losing the knowledge and technologies to Neusoft. In addition, the intended goals and objectives of Philips were to develop low-cost devices instead of advanced medical devices.

The brand name for the devices from the joint venture was a sensitive topic, Philips wanted to sell Philips branded devices and Neusoft wanted Neusoft branded devices. As a result the joint venture manufactured devices for both brands, a label at the back indicated that the particular device is produced by the joint venture. Both enterprises did brand, market and sell the devices under their own brand names.

Soon after the establishment of the joint venture it became apparent that there was a strategic mismatch between both parties. The goals and objectives turned out to be further apart than was evident at the time of establishment of the joint venture. Neusoft wanted to grow a big healthcare enterprise with a wide range product portfolio, from low-end to high-end. The strategic mismatch is emphasised in one of the interviews:

*“There was a great strategic mismatch already from the start of the joint venture, Neusoft was limited by an exclusivity clause and Philips felt a threat, in hindsight this was a set-up to fail.”  
(Interview with member of disentanglement team, August 26, 2020)*

### 5.1.3 Balanced Contribution

After a long negotiation both parties decided to form a joint venture with a small majority of the shares for Philips, the division in shares was 51%/49%. Philips invested 49 million euros to obtain 51% of the shares of PNMS, Philips wanted the majority of the shares to consolidate the amounts in their financial statement. Neusoft and Philips had both four votes in the board, which meant that a consensus model had to be made at every decision in the board. Therefore no firm decisions could be made in the board because no majority could be obtained by either party in the board.

Neusoft contributed the activities they had in the healthcare market, the quality of the devices from these activities were overrated by Philips, as well as the knowledge and skills of the Neusoft employees. Philips faced acceptance problems with devices developed and manufactured by the joint venture as quality and service as not up to the level of Philips. Neusoft contributed at the time of establishment of the joint venture about 500 employees, while Philips contributed only about 5 employees, this “was a gigantic imbalance in workforce.” (Interview with member of disentanglement team, August 26, 2020) On paper it looked like Philips was in charge of the joint venture, but in reality it was not, although one of the employees was the director of PNMS and the others had managerial positions as well. “Qualitatively the ratio in the joint venture was 80% to 90% knowledge of Philips, many employees from Philips went regularly for about two weeks to the joint venture to transfer knowledge, Neusoft absorbed that like a sponge.” (Interview with member of disentanglement team, August 26, 2020)

Soon the Philips business became reluctant to share knowledge and technologies with the joint venture and the joint venture should cost no longer any money. The Philips businesses did not cooperate optimal with the joint venture businesses to achieve the desired growth. The friction caused by the perceived contribution of both enterprises is explained in this way in one of the interviews:

*“It has always been Philips that had to contribute knowledge and not Neusoft, they did not feel called to do so. They saw their contribution in people and facilities, such as buildings and factories, as sufficient. The knowledge had to come from Philips, especially knowledge that Philips did not want to share.” (Interview with former executive PNMS, August 24, 2020)*

### 5.1.4 Symmetry

Neusoft signed an exclusivity clause for the first five years of the joint venture, they were not allowed to develop and manufacture medical devices separate from the joint venture. The activities they had in the healthcare market were brought into the joint venture. For Philips, on the other hand, were the products from the joint venture “a drop in a bucket” (Interview with member of disentanglement team, August 26, 2020), they had many other manufacturing plants globally to offer a wide range of medical devices. “After five years the exclusivity clause ended, which further deteriorated the viability of the joint venture.” (Interview with member of disentanglement team, August 26, 2020) Neusoft noticed in the first five years that they would not achieve their own goals and objectives and established, when the exclusivity clause ended, their own healthcare division in Shenyang to develop and manufacture medical devices. Neusoft took over intelligent employees from the joint venture for their own healthcare division, Philips assumed that also knowledge leaked via these employees to the division of Neusoft, but Philips could not prove this. This act of Neusoft caused friction between the enterprises and was for Philips a reason to investigate how they could get out of the joint venture. Only after leaving the joint venture Philips could operate independently in Chinese healthcare market because of contractual terms. Violating these contractual terms was not possible as Neusoft could easily block all the activities of Philips in China via their connections with the national government. “There was a risk that Philips in general would be blacklisted in China in case of a quarrel with Neusoft.” (Interview with former executive PNMS, August 24, 2020) The bargaining position of Philips was weak, the termination of the

joint venture did cost Philips a lot of effort and money. To achieve their goals and objectives for low-costs medical devices Philips established their own development and manufacturing departments in Suzhou.

At the start of the joint venture the dependency of both enterprises in the joint venture was more or less equal, Philips wanted to develop, manufacture and sell low-cost medical devices in China and Neusoft could only sell devices from the joint venture because of the exclusivity clause. However, the interest of Philips in the joint venture soon decreased and five years after the establishment also the interest of Neusoft in the joint venture decreased. Philips was at the end stage of the joint venture more interested in and focused on a proper disentanglement of the joint venture.

### 5.1.5 Bilateral Learning

An extensive intellectual property clause was formed during the establishment of the joint venture in which was stated that knowledge and skills contributed by one of the parties continued to belong to that particular party. The joint venture paid royalties for the use of the intellectual property. Neusoft and Philips agreed that knowledge created by the joint venture could be used by both parties after the termination of the joint venture.

Within two years the transfer of knowledge became one of the first main challenges of the joint venture. Both enterprises did brand, market and sell medical devices apart from each other and became competitors, this created friction between them. Therefore, Philips became reluctant to share advanced technologies to prevent Neusoft from becoming a competitor. Although Dahan et al. (2010) and Cohen and Levinthal (1990) argue that the transfer of knowledge between the parties is important to improve the innovation skills of the parties involved as parties learn from combined and leveraged strengths.

On the management level of both parties a process to document and share knowledge was missing to ensure bilateral learning, acquired knowledge was quickly lost by both parties. While Park and Ungson (2001) argue that the learning capability of alliance partners is perhaps the key process variable in alliance management. The lack of a process to ensure knowledge sharing is mentioned in one of the interviews:

*“Knowledge at the management level is difficult to document, there was no process to record and transfer the knowledge from the joint venture to the Philips organization.” (Interview with former executive PNMS, August 24, 2020)*

In the last five years of the joint venture a post-mortem study was done to document knowledge for generations to come, this knowledge included what was done, what went wrong and what could have been done better in the joint venture. This was a formal project of Philips with the aim to learn from this knowledge.

Section 5.1.3 mentioned that the quality of the knowledge and skills contributed in the joint venture by Neusoft were overrated by Philips. However, Philips did learn from the activities of the joint venture how to establish a development and manufacturing department in China. They applied this knowledge and skills to establish their own organization in Suzhou, a Chinese city close to Shanghai, during the disentanglement of the joint venture.

As mentioned before, Neusoft did eagerly absorb the product development knowledge which was contributed by Philips to develop and manufacture medical devices for a higher healthcare segment. At the same time was Philips dissatisfied about the supplier base and quality of the products from the joint venture. The main reason was that the people of Philips had in mind the standards of the Shanghai region (Suzhou included), while the standards in Shenyang were less developed. In the Shenyang region was the technological knowledge less developed compared to the technological knowledge in the Shanghai region. In the Shenyang

region were also less top talents and the products from the suppliers were of lower quality. The PNMS joint venture was located on the Neusoft campus in Shenyang and used the local supplier base and infrastructure.

### 5.1.6 Additional Insights

In this section are additional insights from the interviews about the PNMS joint venture given, these insights are also used to adjust and validate the conceptual framework.

During the establishment of the joint venture Philips Healthcare had no development and manufacturing departments in China, while their main global competitors GE Healthcare and Siemens did have these departments in China. The establishment of the joint venture was a matter of prestige, “the senior leadership of Philips was eager to show success, therefore they established a joint venture fairly quickly and ill-considered.” (Interview with member of disentanglement team, August 26, 2020) In addition, the senior leadership was convinced that the people in China did know better than the European people how to develop and manufacture low-cost medical devices. The senior leadership was convinced that the contribution of European people was therefore not necessary. Another reason to not contribute European employees was the costs to move European expats and their families; this resulted in a “gigantic imbalance in workforce.” (Interview with member of disentanglement team, August 26, 2020)

There was no realistic and economic basis for the establishment of the joint venture, therefore the Philips businesses were reluctant to collaborate and share knowledge with the people in the joint venture. The creation of the joint venture was pushed through the Philips processes by the senior leadership, which was an unstable start for the joint venture. They did not manage to create trust between the development teams in the developed markets and the development teams of the joint venture in China. The lack of a realistic and economic basis is shown in the quotation of one of the interviews:

*“The forced establishment of a joint venture should not just be, by coincidence, the wish of a senior management.” (Interview with former executive PNMS, August 26, 2020)*

Another negative effect was that employees contributed in the joint venture by Neusoft remained very loyal to Neusoft. For example, they kept their e-mail addresses from their time at Neusoft Medical. The location of the facilities of the joint venture on the Neusoft campus stimulated this loyalty, because the employees did work and live on the campus. These employees were not loyal to the joint venture, this was also applicable to the board members on both the Neusoft and the Philips side. The board members were loyal to their parent company who put them in the particular positions of the joint venture. Therefore, as mentioned in section 5.1.3, a consensus model had to be made at every decision in the board. As a result, no firm decisions could be made to ensure improvement of the alliance dynamics which were necessary to find solutions for hard topics like the quality of the joint venture products and which products had to be developed and manufactured by the joint venture.

Neusoft and Philips had an opposite approach regarding product development, Neusoft developed devices as quickly as possible to introduce them in the market, mainly in Shenyang and the rest of China. They took the risk of device failure, in case of failures the development and manufacturing teams learned from these failures and came quickly with solutions. Philips had the opposite approach and developed devices in which the risk of failures was minimized, their product development process took more resources, but “Philips did not want to sell devices with the risk of failure, because that would damage the brand image.” (Interview with former executive PNMS, August 24, 2020) This topic resulted also in endless discussions in the joint venture. This quotation in one of the interviews is a brief but powerful description about the course of the joint venture:

*“This joint venture was almost a textbook example of how to not do it, it went wrong on many points, ultimately it was a painful learning lesson.” (Interview with member of disentanglement*

### 5.1.7 Consequences for Conceptual Framework

In this section is the conceptual framework, given in chapter 3, examined based on the interview data about the PNMS joint venture.

In section 3.3 of the literature review is concluded that a joint venture with an EMNE is an appropriate alliance strategy for a DMNE to tap into emerging markets. The interviews about the PNMS joint venture verified that finding, Philips took advantage via the joint venture to avoid regulatory exclusion and to avoid tender processes to sell medical devices in the Chinese healthcare market. A joint venture made it also possible for Philips to take maximum advantage of the network of Neusoft, local employees, local distribution and local suppliers. Neusoft could gather more advanced knowledge about medical devices via the joint venture from Philips.

As mentioned in section 3.4, Park and Ungson (2001) argue that an alliance is stable and sustainable as long as the strategic positioning of the alliance is as intended by collaborating enterprises. Already short after the establishment of the PNMS joint venture discussions took place about which devices to develop and the brand name of the devices developed and manufactured by the joint venture. The interviewees concluded that soon after the establishment of the joint venture it became apparent that there was a strategic mismatch, which was in hindsight a set-up to fail. The interviews pointed out that an aligned strategic positioning is the main key driver to encourage collaboration between the enterprises. The impact of strategic alignment on a collaboration is emphasised in one of the interviewees:

*“Both enterprises have to be fully aligned strategically to define goals jointly and to contribute the resources needed to achieve these goals. If the strategic positioning fails, because one party turns left and the other right, nothing gets done.” (Interview with former executive PNMS, August 24, 2020)*

The contribution of both enterprises was balanced at the time of the establishment of the joint venture, the parties agreed a 51% ownership for Philips. They agreed an equal amount of votes in the board of the joint venture. They also agreed that Neusoft would contribute about 500 employees, while Philips would contribute only about 5 employees. Both the quality of the contributed healthcare activities by Neusoft and the knowledge and skills of the contributed Neusoft employees were overrated by Philips. The healthcare activities were overrated as the medical devices were developed as quickly as possible with the risk of failure, the employees used a trial and error approach and therefore lacked in-depth knowledge about the devices. As a result, Philips perceived that they contributed 80% to 90% of the knowledge in the joint venture. Philips perceived that the contribution was unbalanced and not equitable, while a perceived balanced contribution stimulates collaboration according to Porter and Fuller (1985), mentioned in 3.4. A consequence was that the businesses of Philips became reluctant to share knowledge and technologies and to invest money which was needed to improve the quality of the devices from the joint venture and to achieve the intended growth. Neusoft perceived this reluctance as unjustified.

The ratio in contribution became even more unbalanced according to Neusoft when Philips gathered sufficient knowledge to establish their own organization in Suzhou, similar to the view of Park and Ungson (2001) who argue that the ratio may change between collaborating firms because one of the parties developed desired capabilities to execute their business separately. The same was true for Neusoft, that established their own healthcare division when the exclusivity clause expired, they started to develop medical devices with knowledge from the joint venture. The failure to manage a balanced contribution became a key driver for the termination of the joint venture.

The symmetry between Neusoft and Philips had a relatively small share in the unsuccessful behavior of the joint venture. The dependency of both enterprises was about equal, in the first five years Philips was dependent on the joint venture to gain market access and to gather knowledge about the development of low-cost medical devices. Neusoft, on the other hand, was dependent on the production of the joint venture as they signed an exclusivity clause. In the second five years this dependency on the joint venture decreased for both parties, the exclusivity clause for Neusoft expired and Philips established their own healthcare department in Suzhou.

Park and Ungson (2001) argue that bilateral learning is perhaps the key process variable in alliance management. Analysis of the interview data points out that bilateral learning is just one of the alliance dynamics in the conceptual framework. Philips overrated the knowledge they could gather from the healthcare activities and employees contributed by Neusoft, in addition, no processes were in place to “record and transfer this knowledge from the joint venture to the Philips organization.” (Interview with former executive PNMS, August 24, 2020) However, Philips gained market access and were able to establish their own healthcare division in Suzhou. Neusoft did eagerly absorb the knowledge contributed by Philips to develop devices for a higher healthcare market segment, although Philips became reluctant over time to share knowledge. Neusoft has nowadays a wide range product portfolio of medical devices (Neusoft Medical, n.d.-c).

From the interviews about the PNMS joint venture became clear that employees loyal to the joint venture is an alliance dynamic to stimulate collaboration. In the PNMS joint venture a lack of loyalty to the joint venture made that no firm decisions could be made in the board to improve the alliance dynamics in the joint venture. Firm decisions could not be made as the board members were loyal to their parent companies, and because both enterprises contributed an equal number of board members to the joint venture. Loyalty could be an alliance dynamic of the organizational culture aspect in the collaboration framework.

## 5.2 Wipro-GE Healthcare

### 5.2.1 Establishment of Alliance

This section provides context about the joint venture of GE Healthcare and Wipro Limited, including the key drivers to establish a joint venture as type of alliance strategy. The joint venture is established in 1990 and today known for its reverse innovations of medical devices. The interview is conducted with the CEO of the joint venture, he is, as managing director of Wipro-GE Healthcare, an appropriate person to interview about the alliance dynamics of the joint venture. This interview forms the basis for following sections.

Jack Welsh, the CEO at that time of global General Electric, saw the potential in the Indian healthcare market to sell medical devices. However, GE noted that they had insufficient knowledge about the market conditions and were therefore looking for a partner “to help them with their market access and market knowledge.” (Interview with the CEO, July 22, 2020) GE also noted that local knowledge was needed to operate as a foreign enterprise on a large scale in the Indian market. The requirements for a collaboration partner is mentioned in the interview:

*“They were also looking at partners that had a very similar mindset as GE had, compliance and ethics was a big consideration for GE as we are still extremely careful for that.” (Interview with the CEO, July 22, 2020)*

Another consideration for GE was that they wanted to partner with an enterprise with a long-term view on the business, like GE Healthcare had, “not just a short-term view to make a bit of money.” (Interview with the CEO, July 22, 2020) Mister Premji, the chairman of Wipro Limited, was an important factor in the partner selection, “he had a joint vision with GE Healthcare in India, he shared the passion to collaborate on the long term.” (Interview with the CEO, July 22, 2020) Wipro Limited was keen to work with a globally respected multinational partner to gather knowledge about business development. Wipro Limited was primarily an enterprise specialised in the IT market, which was not necessarily a driver for the collaboration.

A joint venture was established as type of alliance strategy to structure a businesses that could successfully serve the local market. The joint venture made GE almost a local enterprise in India, as a result it was easier for GE to realise their goals and objectives and to increase their manufacturing capacity. The main driver to choose for a joint venture as type of alliance strategy was to build trust in the India market and to share the risk of the business.

In the following sections is the data from the interview with the CEO linked to the alliance dynamics, which are identified in chapter 3.

### 5.2.2 Strategic Positioning

As mentioned in the previous section were both parties strategically aligned since GE specifically aimed to partner with an enterprise with a similar mindset as they had. They had the same mindset “to collaborate for the long term and to transform the healthcare system [in India]. Wipro wanted to be seen as a partner in the development of the Indian healthcare system.” (Interview with the CEO, July 22, 2020) The joint venture would develop and innovate medical devices to transform the Indian healthcare system, which could also be introduced in other emerging markets and developed markets, in developed markets these devices would become reverse innovations.

The internal policies of the joint venture are mainly a reflection of the policies of GE, the enterprises agreed on this policy strategy as these policies were related to the healthcare market, in which GE is more specialized than Wipro. The medical devices from the joint venture are branded as GE Healthcare,



because of intellectual properties and taxation considerations. In addition, at the time of establishment of the joint venture “the difference in Wipro and GE was a 100/200 times, GE was a 300 billion-dollar company.” (Interview with the CEO, July 22, 2020) Moreover, GE Healthcare branded devices would be sold better because of their global healthcare activities.

Initially the division in shares was 51% Wipro and 49% GE. Later, from a corporate goals perspective, GE wanted to be the major shareholder in the joint venture. It was an open and mutually taken decision between the partners to change the division in shares to 51% GE and 49% Wipro. These decisions are dependent on the goals and objectives of the enterprises in that point of time. A solid agreement will be achieved by the senior management of the enterprises if changes in the strategy of the joint venture are desired. A key driver for achieving a solid agreement is mentioned in the interview:

*“I think one of the biggest reasons why we are successful in doing that, is the relationships at the highest level of both sides.” (Interview with the CEO, July 22, 2020)*

Such decisions are mostly taken as equal partners, calls are made by the senior management to explain intended strategical changes and how it could impact the joint venture. To “instantly align their mission, governance, strategy and structure” the joint venture has a “very strong and highly pro-active board which meets every quarter” (Interview with the CEO, July 22, 2020).

### **5.2.3 Balanced Contribution**

As mentioned in the previous section was the division in shares a strategic consideration for the joint venture, initially the majority of the shares was for Wipro Limited, later for GE Healthcare. To establish the joint venture the knowledge and assets came to a large extent from GE Healthcare, the joint venture is a healthcare business and GE Healthcare had the expertise in this market. Expressed in value the majority of the investments came from GE Healthcare as it was a multi-billion dollar company and Wipro a 1 or 1.5 billion dollar company. In other words, the monetized contribution of GE Healthcare was higher than of Wipro Limited. The majority of the management capabilities, processes and talent was contributed by GE Healthcare as they were known for it.

However, the local knowledge in terms of the tax structure, the best way to structure a manufacturing facility and the benefits the joint venture could get from the Indian government was contributed by Wipro. Wipro contributed more in governance, compliance and strategy, instead of capital.

The Wipro-GE Healthcare joint venture is an entity itself, the investments are done by the joint venture after a discussion in the board meeting. Investments made after the establishment of the joint venture are never seen as an investment of one of the enterprises. The joint venture makes contributions back to the parent companies as talent developed in the joint venture went to both GE Healthcare and Wipro Limited. For example, a former employee of Wipro-GE Healthcare became CFO of global GE Healthcare and a CEO of Wipro Limited came also from the joint venture. This contribution back is the result of a strong mechanism that the partners and the joint venture have in place.

### **5.2.4 Symmetry**

The dependency of GE Healthcare on the joint venture is relatively high, the joint venture is for GE Healthcare an innovation source to develop and innovate medical devices for other emerging markets and developed markets. Global GE Healthcare introduces the medical devices that are developed and innovated by the joint venture separately from the joint venture in other healthcare markets. In developed markets these medical devices become reverse innovations. There is an agreement on the transfer price of the medical devices from the joint venture that global GE Healthcare sells worldwide, this agreement is

managed and monitored by the CEOs from both sides.

The dependency of Wipro Limited on the joint venture is relatively low, in the beginning they were very keen to “understand and learn from a very large organization like GE about the processes, systems and culture” (Interview with the CEO, July 22, 2020). Over time Wipro became even less dependent on the knowledge from the joint venture, since they nowadays did grow to a multi-billion dollar company as well (MarcoTrends, n.d.). The collaboration of the partners is “a very asymmetric relationship” (Interview with the CEO, July 22, 2020), however, both enterprises have an equal passion and interest in transforming the healthcare system in India. The asymmetry in dependency between the parent companies is emphasised in the interview:

*“By definition, the dependency of GE on the joint venture is much higher given that we are in the healthcare business. ... The dependency on the Wipro side is quite low, they are not in the healthcare business outside of this joint venture.” (Interview with the CEO, July 22, 2020)*

### 5.2.5 Bilateral Learning

The Indian healthcare market “is a very unique market, it is a low-cost market with highly competitive prices.” A medical device developed and designed “in India for the local market, means that it can be brought to the markets in Africa, Latin America, and other markets with similar challenges in healthcare perspective” (Interview with the CEO, July 22, 2020). Therefore, as mentioned in section 5.2.4, is the joint venture for GE Healthcare a source of knowledge about innovation for emerging markets. Besides the low-cost innovation approach are the devices also developed with specific capabilities to serve emerging markets. However, GE Healthcare introduced several devices later also in developed markets and became there successful as well, via this way the medical devices became reverse innovations.

Both enterprises had a very different skill-set, Wipro wanted to learn from GE Healthcare to grow as organization from a 1 or 1.5 billion dollar company to a multi-billion company, they were very keen to “understand and learn from a very large organization like GE about the processes, systems and culture” (Interview with the CEO, July 22, 2020), which is also mention in the previous section. Wipro Limited succeeded to grow to a multi-billion company with knowledge from GE Healthcare about the best practices in the field of processes, systems and culture. The enterprises gathered valuable information from each other and the joint venture, although both enterprises have put no process in place to recognize, assimilate and apply knowledge throughout the enterprises. Gathering knowledge by the enterprises is mentioned in the interview:

*“There is no specific focus at learning from each other, we do not look at it in that way. It is really an organic process, there is no specific way how we do that.” (Interview with the CEO, July 22, 2020)*

GE Healthcare is attentive to what knowledge from the joint venture can be used for global GE, because “the joint venture is a pretty good source to learn from.” (Interview with the CEO, July 22, 2020) This knowledge can relatively easy be assimilated by global GE as GE Healthcare is “seamlessly integrated in the GE knowledge pool” (Interview with the CEO, July 22, 2020).

### 5.2.6 Additional Insights

In this section are additional insight from the interview about the Wipro-GE Healthcare joint venture given, these insights are also used to adjust and validate the conceptual framework.

A key dynamic for the alliance between GE Healthcare and Wipro Limited is the value match between both enterprises. A value match between GE Healthcare and Wipro Limited is that both enterprises are fundamentally committed that their mission is to collaborate on the long-term to transform the Indian healthcare system and that they do not collaborate for short-term profits. A long-term vision and long-term investments are essential as the emerging Indian market is a very volatile system. The challenges for the joint venture are unavoidable in this market but can be managed if the values are shared and the partners committed to long-term investments. As mentioned earlier, there is no symmetric dependency on the joint venture between GE Healthcare and Wipro Limited, the other three identified alliance dynamics are very well applicable to their collaboration. However, value alignment is an additional key driver for this alliance which lasts more than 30 years. The importance of value alignment in a collaboration is emphasised in the interview:

*“You could have all these factors you said, but if they do not have the value-match between the collaboration partners, you have a problem.” (Interview with the CEO, July 22, 2020)*

The senior leadership of both enterprises is involved in the joint venture to maintain these shared values. For example, the global CEO of GE Healthcare was always in the board of the joint venture. Secondly, as already mentioned in 5.2.3, do employees from within the joint venture grow into leadership positions of the parent companies and will later become board members in the joint venture. These board members stay for a relatively long time, often up to 20 years, in the joint venture board.

This mechanism of exchange of employees between the enterprises and the joint venture is accompanied by relationships between the people at senior levels and the board members. These relationships are mentioned briefly in section 5.2.2 as they contribute to solid agreements when changes are desired in the strategy of the joint venture. The relationships at the senior level of the joint venture are a key means of maintaining the long-lasting collaboration. This combination of exchanging employees and relationships ensures that the value alignment between the parties continues. The importance of sharing values and relationships at the senior level is emphasised in the interview:

*“The same values and the relationships between the CEOs and board members are the two most important key drivers.” (Interview with the CEO, July 22, 2020)*

An example how the enterprises ensure a long-lasting alliance is that GE Healthcare made an acquisition outside India and would like to introduce the devices from this acquisition in the Indian market. GE Healthcare was convinced that these devices were in line with the strategy of the joint venture and would therefore add these devices to the product portfolio of the joint venture. Long negotiations at the senior levels took place before there was an agreement that these medical devices would be brought into the joint venture. Both parties were convinced from the start of the negotiations that they would achieve a solid agreement as they ensure that both enterprises can achieve their goals and objective through the joint venture.

### **5.2.7 Consequences for Conceptual Framework**

In this section is the conceptual framework, given in chapter 3, examined based on the interview with the CEO of Wipro-GE Healthcare who has both a GE Healthcare and a Wipro Limited point of view on the joint venture.

As mentioned in section 5.2.1, the main drivers for GE Healthcare to choose a joint venture as type of alliance strategy were to build trust in India and to share the risk of the business. This is in line with Tarnovskaya and Biedenbach (2016), who argue that the establishment of a joint venture with an EMNE is beneficial for a DMNE to improve brand acceptance with customers and stakeholders. The joint venture

made GE almost a local enterprise which was beneficial to realise their goals and objectives and to increase their manufacturing capacity.

Shared goals and objectives was an important consideration for GE when they were looking for a collaboration partner. GE Healthcare and Wipro Limited had aligned goals and objectives, namely the shared vision to collaborate on the long-term to transform the healthcare market in India. The shared goals and objectives were clearly defined as this were requirements for GE to collaborate, Elmuti and Kathawala (2001) agree with Park and Ungson (2001) that shared and clearly defined goals and objectives is a requirement for a stable and sustainable alliance. Both parties continuously align their intended strategic positioning for the joint venture to achieve their goals and objectives.

The knowledge and assets came to a large extent from GE; the monetized contribution of GE was higher than of Wipro. Wipro contributed more in governance, compliance and strategy. For GE it was no issue to contribute more than Wipro in terms of capital, they perceived this as logical because of the difference in capital between the enterprises. After the establishment of the joint venture the enterprises never saw investments made by the joint venture as contributions made by one of the enterprises separately. A balanced contribution was for both enterprises not a key dynamic for the strategic alliance. Nowadays the joint venture contributes employees back to the parent companies, employees who have grown their career within the joint venture.

Both parties are not equally dependent on the joint venture, but this asymmetry never had a negative effect on the alliance dynamics. GE Healthcare was more dependent on the joint venture than Wipro, whereas GE Healthcare had a straight one-to-one connection to the healthcare market, while Wipro Limited had no connection with the healthcare market. This asymmetry was known beforehand by both parties and did not result in major issues. The senior leadership kept instantly aligned via the relationships and close contact between the people and via the board meetings every quarter. Symmetry is in this case not a dynamic that stimulates collaboration, which is in contrast to the findings of Park and Ungson (2001) and Hamel et al. (1989), their arguments are mentioned in section 3.4. The asymmetry in dependency on the joint venture is mentioned in the interview:

*“I would not say there is symmetry between both of them, they are not equally dependent.”*  
(Interview with the CEO, July 22, 2020)

For both parties of the joint venture is bilateral learning a major driver for the success of the collaboration. GE Healthcare was specifically looking for a local company with local knowledge to develop and manufacture low-cost medical devices that had specific capabilities to serve the unique Indian market. The evidence that GE Healthcare succeeded in finding this knowledge is the introduction of several low-cost devices in several emerging markets and even reverse innovations in developed healthcare markets. GE Healthcare learned from the combined and leveraged strengths and so did Wipro, they succeeded in growing to a multi-million dollar company by learning the best practices of GE Healthcare in the field of processes, systems and culture. This is the result of bilateral learning by both enterprises, which is according to Park and Ungson (2001), Dahan et al. (2010) and Cohen and Levinthal (1990) a key dynamic to improve the innovations skills of both parties, which is a key dynamic for successful alliances. Neither party has a specific process in place to record and transfer knowledge from the joint venture to their organization, it is for them an organic process to learn from each other.

The value alignment of the collaboration between GE Healthcare and Wipro is an additional insight from the interview about Wipro-GE Healthcare. Managers of both enterprises and managers of the joint venture itself realize that a continuation of value alignment is a key dynamic to ensure continuation of their successful collaboration. Both parties still share the passion to transform the Indian healthcare market

and realize that collaboration on the long-term is needed to overcome the challenges in this volatile market. Both parties prevent that a strategic switch results in short-term profits. The role of value alignment in the provided conceptual framework is explained in the interview:

*“If you want to stick to this framework, the strategic positioning could probably be expanded by adding the values part.” (Interview with the CEO, July 22, 2020)*

Both parties prevent such strategic switches by transferring the values via exchange of employees and via relationships between the employees at the senior level. Exchange of employees is also a contribution back from the joint venture to the parent companies, several positions at senior levels of the parent companies are filled by employees that did grow their career in the Wipro-GE Healthcare joint venture. The relationships between people at the senior level started at the establishment of the joint venture, as mentioned in section 5.2.1. At that time mister J. Welch, the CEO of global GE, had a strong relationship with the chairman of Wipro Limited, mister Premji. Mister J. Immelt took over this relationship after mister J. Welch for the next 15 years and J.L. Flannery continued this relationship even further. In addition, J.L. Flannery is also an example of the exchange of an employee, he was the CEO of the joint venture before he went to global GE Healthcare, later he became the CEO and chairman of global GE. The importance of relationships at the senior level of the joint venture and the parent companies is emphasised by the interviewee:

*“Those connections are very critical, because as long as you have that relationship at the highest level and you align what you want to achieve together, the rest of the teams will figure out how the transactions happens in the rest of the organization.” (Interview with the CEO, July 22, 2020)*

### 5.3 Conclusion: Comparison between Cases

The key takeaways from this chapter are listed in table 16, which is a comparison of the type of alliance strategy and alliance dynamics between the PNMS joint venture and the Wipro-GE Healthcare joint venture. In both cases a joint venture is established as type of alliance strategy with a minor difference in the division of shares. In the PNMS case a joint venture is established as Philips could market medical devices in the Chinese market by avoiding regulatory exclusion and tender processes. Neusoft could learn from the advanced technological knowledge contributed by Philips in the joint venture. In the Wipro-GE Healthcare case a joint venture is established to improve brand acceptance and to share the risk of the business.

From the establishment of the joint venture there was a strategic mismatch between the parent companies of the PNMS joint venture, Neusoft wanted to develop and manufacture medical devices with the advanced technologies of Philips while Philips wanted to develop and manufacture low-cost devices. This strategic mismatch was a set-up to fail. In the other case, GE Healthcare and Wipro Limited continuously align their strategic positioning, people at the senior level ensure that the goals and objectives, concerning the joint venture, of both enterprises can be achieved at any time.

The perceived contribution of the enterprises caused friction in the PNMS joint venture as the skills and knowledge of Neusoft were overrated by Philips Healthcare. However, Philips became at their turn reluctant to share advanced knowledge, Neusoft perceived this reluctance as unjustified. In the other case, GE Healthcare perceived a major contribution in Wipro-GE Healthcare as logical because of the difference in capital between the parent companies. In their joint venture an imbalance in monetized contribution was not a relevant topic.

The symmetry in dependency of the parent companies on the PNMS joint venture was perceived as balanced, in the first five years the dependency was relatively high and in the last five years it decreased for both parties. The opposite is the case in the Wipro-GE Healthcare joint venture, the dependency of GE Healthcare on the joint venture is significantly higher than of Wipro, this asymmetry has no negative effect on the collaboration.

Bilateral learning is a key alliance dynamic in both cases, Philips Healthcare learned how to establish their own healthcare businesses in the Chinese market and Neusoft learned how to develop a wide range product portfolio of medical devices. In the Wipro-GE Healthcare joint venture bilateral learning is a key alliance dynamic as global GE used low-cost innovation knowledge from the joint venture to innovate for other markets. Moreover, the different businesses of global GE are seamlessly integrated in a knowledge pool, which stimulates knowledge sharing. Wipro Limited learned how to grow to a multi-billion dollar company using knowledge of GE about the best practices in the field of processes, systems and culture.

An additional insight from the PNMS case is that an imbalance in loyalty to the joint venture caused that no firm decisions could be made to ensure improvement in the alliance dynamics of the joint venture. This imbalance is not recognized in the Wipro-GE Healthcare case. An additional insight in the Wipro-GE Healthcare joint venture is that value alignment stimulates a long-lasting collaboration, a key means of encouraging value alignment is to ensure relationships at the senior level of the enterprises. These relationships ensure solid agreements when changes in the strategy of the joint venture are desired by one of the enterprises to achieve its goals and objectives, this is in contrast to the PNMS joint venture where no firm decisions could be made.

**Table 16: Comparison between PNMS and Wipro-GE Healthcare**

	<b>PNMS</b>	<b>Wipro-GE Healthcare</b>
Establishment of joint venture	Via a joint venture as type of alliance strategy Philips could take advantage of regulation and Neusoft of advanced knowledge.	GE Healthcare and Wipro established a joint venture to improve brand acceptance and to share the risk of the business.
Strategic positioning	Strategic mismatch became apparent soon after the establishment, “this was a set-up to fail.”	Continuous alignment of strategic positioning to achieve intended goals and objectives.
Balanced contribution	Imbalanced contribution caused friction, the skills and knowledge of Neusoft were overrated by Philips and Philips became reluctant to share advanced knowledge.	GE Healthcare perceived an imbalanced contribution as logical because of the difference in capital between both enterprises.
Symmetry	Symmetry in dependency of both enterprises was about equal, in the first five years relatively high, in the last five years it decreased.	An asymmetry between both enterprises has no negative effect, enterprises realise that GE Healthcare has a stronger connection with the healthcare market than Wipro Limited has.
Bilateral learning	Philips gained knowledge from the joint venture to establish their own healthcare business in China and Neusoft gained knowledge to develop a wide range product portfolio.	GE Healthcare gained knowledge to introduce low-cost devices in emerging and developed markets, Wipro Limited learned best practices in the field of processes, systems and culture of GE and did grow to a multi-billion dollar company.
Additional insights	Imbalanced loyalty to the joint venture of employees from the joint venture and employees from the parent company.	Continuous value alignment between the enterprises, this is achieved by relationships at the senior level, these relationships contribute also to the continuous alignment of the strategic positioning.

## 6 Validation of Collaboration Framework

This chapter finalizes the answer on sub question 2 as it adjusts and validates the conceptual framework, given in figure 8a. To adjust and validate the conceptual framework the statements of section 5.1.7, section 5.2.7 and section 5.3 are analyzed. In figure 8b the identified alliance strategy and alliance dynamics are shown, the subsequent sections describe the alliance strategy and alliance dynamics that can be used by managers to stimulate collaboration in more detail. These descriptions answer sub question 3, by the identification of how multinational enterprises should execute the identified alliance dynamics to stimulate collaboration.

### 6.1 Representation of Collaboration Framework

Section 3.5 contains a representation of the conceptual framework which is derived from the literature study about alliance dynamics in the context of reverse innovation of medical devices. Five alliance dynamics were distributed over four strategic aspects, four of these alliance dynamics are examined in this study: *strategic positioning*, *balanced contribution*, *symmetry* and *bilateral learning*. The fifth, *external environment* was excluded as multinational enterprises have relatively low impact on this dynamic. In this section the elements of the collaboration framework are briefly described, the subsequent sections describe the elements in more detail.

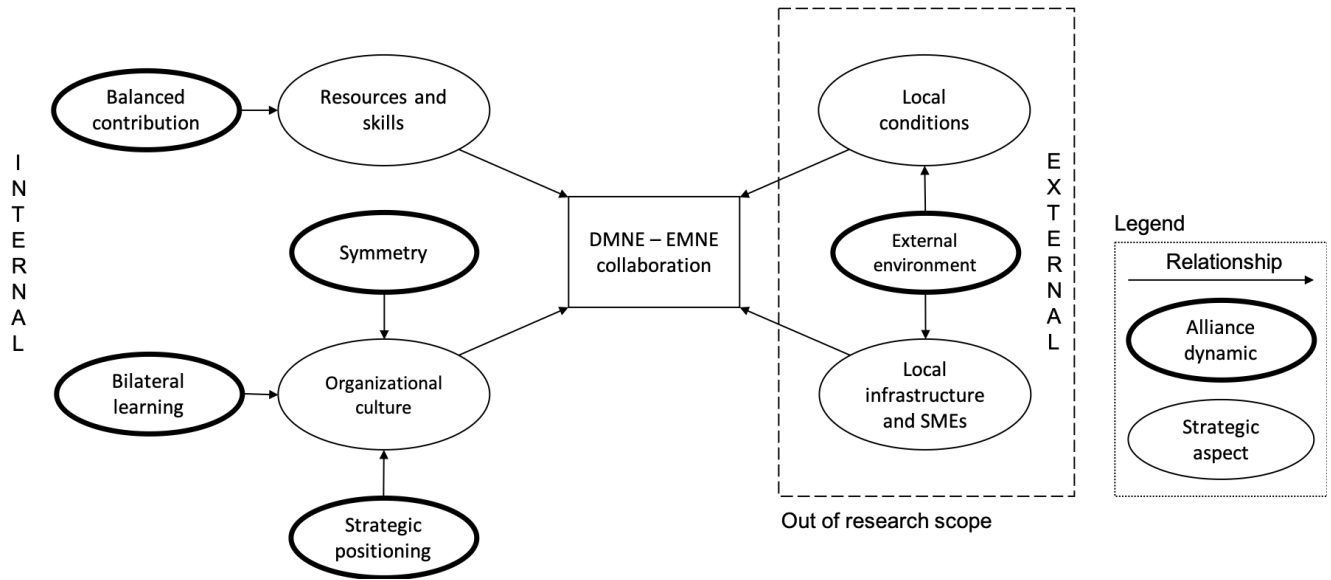
Analysis of the interviews pointed out that a joint venture is an appropriate alliance strategy to stimulate collaboration. The analysis also pointed out that *strategic positioning* and *bilateral learning* are key alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. The alliance dynamics *strategic positioning* and *bilateral learning* are verified and therefore taken over from the conceptual framework to the validated collaboration framework, as shown in figure 8.

A symmetric dependency by both parties on the joint venture is not proven to be an alliance dynamic in a collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. However, it is likely that symmetry has a significant impact in several other collaborations between a DMNE and an EMNE, symmetry is considered as context dependent. Therefore, symmetry is taken over to the validated collaboration framework but represented with a dotted line.

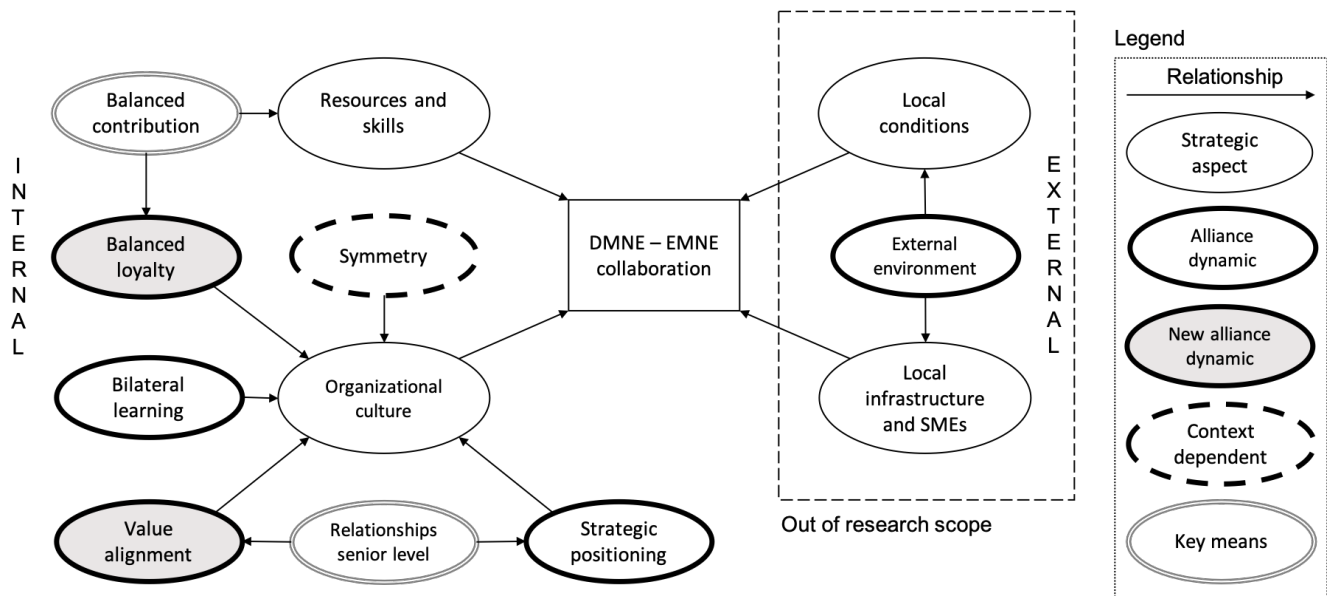
In an alliance between a DMNE and an EMNE it seems plausible that an imbalance is unavoidable given the difference in capital of the enterprises, a monetized imbalance does not necessarily result in friction between partners as the Wipro-GE Healthcare joint venture proves. A balanced contribution in employees can be necessary to balance the loyalty of the employees to the joint venture and to the parent companies. Loyalty turned out to be a key alliance dynamic in the PNMS joint venture and is added to the strategic aspect *organizational culture* in the validated collaboration framework. A balanced contribution became a key means of ensuring a balanced loyalty instead of being an alliance dynamic itself. Balanced contribution as means is therefore presented in the validated collaboration framework with two lines and balanced loyalty, as additional alliance dynamic, is filled grey presented.

An insight from the Wipro-GE Healthcare case is that value alignment is the main key driver for the long-lasting collaboration between Wipro Limited and GE Healthcare. In the interview became clear that the key means for this continuous alignment is the relationships at the senior level of parties involved, these relationships are also of great value to align the strategic positioning of the joint venture. The relationships at the senior level are continuously taken over by successors at this level. Value alignment is an additional alliance dynamic to the conceptual framework and therefore presented in filled grey in the validated collaboration framework, relationships at the senior level is, as a key means, presented in the framework with two lines.





(a) Initial Conceptual Framework, adapted from section 3.5, figure 5



(b) Validated Collaboration Framework (author's own illustration)

Figure 8: Comparison of Initial Conceptual Framework with Validated Collaboration Framework

## 6.2 Joint Venture

As mentioned in section 3.3 Pratono and Ratih (2019) determined four types of alliance strategies for enterprises that develop medical devices to enter emerging markets, wholly owned subsidiary, joint venture, license agreement and 'subcontracting and outsourcing'. A wholly owned subsidiary by a DMNE is out of the scope of this study as no collaboration with an EMNE takes place. As argued in section 3.3 are licences agreement and 'subcontracting and outsourcing' insufficient strategies to ensure reverse innovation

of medical devices as no learning from local conditions takes place during product development.

Both cases pointed out that the formation of a joint venture is an appropriate alliance strategy to ensure collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. Although the PNMS joint venture soon turned out to be unsustainable, the choice for a joint venture was not in question. Philips took advantage via the joint venture to avoid regulatory exclusion and to avoid tender processes to sell medical devices in the Chinese healthcare market. In addition, the joint venture was beneficial for Philips to take advantage of the local knowledge of Neusoft and Neusoft could gather advanced technological knowledge about medical devices from Philips. In the other case, the Wipro-GE Healthcare joint venture ensured that GE almost became a local enterprise which was beneficial for their brand acceptance. Another main driver to form a joint venture was risk sharing, as investments in the healthcare market are relatively high. This is in line with Hossain (2013) who argue, as mentioned in section 3.3, that “a joint venture may be useful when high investment is necessary.” Therefore it can be concluded that a joint venture is an appropriate alliance strategy to ensure collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices, a joint venture as type of alliance strategy is proven to be the basis of the collaboration framework.

### **6.3 Strategic Positioning**

The strategic positioning is in both cases a key dynamic in how the collaboration ultimately went. Already short after the establishment of the PNMS joint venture it became apparent that there was a strategic mismatch between Philips and Neusoft. This mismatch was a set-up to fail as nothing gets done if one party turns left and the other party turns right. The opposite is the case for the Wipro-GE Healthcare joint venture, the requirement for GE Healthcare was to partner with an EMNE that had shared goals and objectives, both parties are therefore able to continuously align their strategic positioning. Relationships at the senior level stimulate this continuous alignment.

### **6.4 Balanced Contribution**

A balanced contribution was for Philips and Neusoft an issue from the start of their collaboration, Philips perceived the contribution in knowledge and skills of Neusoft as lower quality than agreed at the time of the establishment. As a result, Philips became reluctant to share knowledge and skills with Neusoft, therefore Neusoft perceived the contribution of Philips as imbalanced. The enterprises failed to manage a balanced contribution, this became even more difficult over time as both enterprises no longer felt the need to invest in the joint venture. A reason for this was that both parties established their own development and manufacturing departments and were therefore no longer dependent on the products and knowledge from the joint venture. An imbalanced contribution was also reflected in the difference in contributed employees by Neusoft and by Philips, the organization was more loyal to Neusoft as the vast majority of the employees was contributed by Neusoft.

However, the contribution in the Wipro-GE Healthcare joint venture was imbalanced as well. GE Healthcare perceived it as logical to contribute more to the establishment of the joint venture than Wipro Limited because of the difference in capital between the enterprises. Investments made for the joint venture after the establishment are only made by the joint venture as an entity itself and therefore never seen as investments made by one of the enterprises. A balanced contribution is for this collaboration not a key dynamic.

It is plausible that a DMNE must be willing to contribute more to a joint venture than an EMNE to ensure a partnership. An imbalance in the contribution of monetized resources seems logical as the difference in capital between the enterprises can vary considerably between a DMNE and an EMNE. GE Healthcare

was aware of this difference and consciously made the choice to collaborate with Wipro Limited. In the other case, Philips required the same contribution from Neusoft, which resulted in friction between the partners. Analysis of the PNMS case pointed out that a balanced contribution of employees is probably needed to balance the loyalty to the joint venture and to the parent companies.

## 6.5 Symmetry

In both cases the symmetry in dependency of both enterprises had a relatively small share in the alliance dynamics. Philips and Neusoft were more or less equally dependent on the joint venture but this symmetry did not result in a long-lasting collaboration. In addition, in the Wipro-GE Healthcare joint venture the parties were not equally dependent on the joint venture, they did know this beforehand and this asymmetry did not become a barrier for a long-lasting collaboration.

This finding is the opposite of what is found in the literature review, which can be found in section 3.4. It is however unlikely that asymmetry as an alliance dynamic stimulates collaboration between enterprises. A balanced contribution between the partners and bilateral learning by both partners have a contribution to stimulate the symmetry between the parties. This study noted that bilateral learning is a key alliance dynamic in strategic alliances, while the impact of a balanced monetized contribution is minimized. Consequently, the impact of symmetry on the collaboration is minimized in the PNMS and Wipro-GE Healthcare joint ventures. However, it is likely that symmetry has a significant impact in several other collaborations between and DMNE and an EMNE, therefore symmetry is considered as context dependent. A significant impact of symmetry on the collaboration is likely as the bargaining power of the more dependent enterprise decreases in case of an asymmetry, which perhaps causes an opportunistic behavior of the more independent partner. Bargaining power is important for the parent companies of a joint venture to determine a strategic positioning and to determine the value alignment for the joint venture which is agreed by both enterprises. In case of an asymmetry the dependent enterprise becomes probably vulnerable to the activities of the joint venture and can propose renegotiation of the contractual terms to gain more control over the alliance, or the enterprise decides to leave the alliance (Park & Ungson, 2001).

## 6.6 Bilateral Learning

Bilateral learning was a key element that caused friction in the PNMS joint venture, Philips overrated the knowledge and skills they could gather from Neusoft and Neusoft perceived the reluctance of Philips to share knowledge as unjustified. In addition, in the Philips organization no processes were in place to record and transfer knowledge from the joint venture to global Philips.

In the Wipro-GE Healthcare case there are also no processes in place to record and transfer knowledge from the joint venture, however, for them bilateral learning is an organic process. Both parties applied knowledge from the joint venture successfully in their global organizations. Wipro Limited did grow to a multi-billion dollar company by learning the best practices of GE Healthcare and GE Healthcare succeeded in introducing several low-cost devices in several emerging markets and even reverse innovation for developed markets. Bilateral learning is a major dynamic for the success of the joint venture, this is in line with the findings of Park and Ungson (2001), Dahan et al. (2010) and Cohen and Levinthal (1990).

## 6.7 Value Alignment

Analysis of the interviews of both cases pointed out that an alignment between the partners about the strategic positioning of the joint venture is a key dynamic to ensure collaboration. Another key dynamic is the value alignment between collaborating enterprises, Wipro Limited and GE Healthcare

attach great importance to this alignment. Value alignment was not mentioned in the PNMS interviews. As a result, the value alignment is an additional alliance dynamic to the conceptual framework given in section 3.5, this key dynamic is classified under the strategic aspect *organizational culture*. The Wipro-GE Healthcare case made clear that relationships at the senior level of the collaborating parties and the joint venture are a key means of continuously aligning the values. These relationships are also beneficial for the parties involved to continuously align the strategic positioning of the joint venture.

## 6.8 Balanced Loyalty

From the PNMS case it became apparent that an imbalanced loyalty caused friction in the organizational culture of the joint venture. The vast majority of the joint venture employees were contributed by Neusoft, as a result the organization was more loyal to Neusoft and not to the joint venture as separate entity. A managed and monitored contribution of employees can avoid an imbalance in organizational loyalty. In the other case, a lack of loyalty to the joint venture is not mentioned by the interviewee, the exchange of employees by the joint venture and the parent companies is a means to balance the loyalty to the parties involved. To conclude, balanced loyalty is an additional alliance dynamic to the conceptual framework given in section 3.5, and classified to the strategic aspect *organizational culture*. A means of ensuring loyalty by the employees of the joint venture and of the parent companies to the joint venture is balancing the contribution of employees, therefore a relationship exists between a balanced contribution and balanced loyalty. The ratio of about 5 Philips employees to about 500 Neusoft employees turned out to be a cause for friction for the employees in the joint venture as well as for the employees of global Philips Healthcare who had to collaborate with the joint venture employees.

## 6.9 Conclusion

Analysis of the data about the PNMS joint venture and Wipro-GE Healthcare joint venture validated the finding that a joint venture is an appropriate type of alliance strategy as a basis for collaboration in the context of reverse innovation of medical devices. The validated framework consists of four key alliance dynamics: *strategic positioning*, *value alignment*, *bilateral learning* and *balanced loyalty*. Symmetry is included in the validated collaboration framework as a context dependent alliance dynamic, symmetry is in the literature about alliance dynamics considered as important while it was less important in the two cases. Balanced contribution is changed to a key means of balancing loyalty to the joint venture and to the parent companies. Another key means in the validated collaboration framework is the relationships at the senior level, these relationships stimulate an alignment in strategic positioning and values.

## 7 Conclusion

The first section of this chapter summarizes the key findings of this study, including the answers on the sub questions. The main research question of this study is answered in section 7.2 and in figure 8b in section 6.1. This chapter also describes the contribution of this study to the scientific literature, the limitations of this study and a recommendation for further research. The last section of this chapter is a reflection of the research process and why this study is seamlessly connected to the Management of Technology master.

### 7.1 Key Findings

*SQ1 What are key theories and principles of collaboration in the context of reverse innovation of medical devices?*

In chapter 3 are key theories and principles of collaboration in the context of reverse innovation of medical devices identified, which answered sub question 1. According to the literature, there are four potential types of alliance strategies for enterprises in the healthcare market: wholly owned subsidiary, joint venture, license agreement and ‘subcontracting and outsourcing’. A wholly owned subsidiary is identified as an inappropriate alliance strategy as no collaboration with an EMNE takes place. The strategies license agreement and ‘subcontracting and outsourcing’ are identified as insufficient as no learning from local conditions takes place and therefore reverse innovation will not occur. A joint venture is perceived as an appropriate type of alliance strategy to benefit from local regulation, optimizing brand acceptance and sharing risk.

Four strategic aspects are identified for alliances in the context of reverse innovation of medical devices. Two of these strategic aspects are external and therefore out of the scope of this study: local conditions and ‘local infrastructure and SMEs’. These external aspects are impacted by a wide range of factors, because of time constraints it was impossible to include them in this research project. In addition, there is mounting evidence that the impact of the internal aspects on the alliance is significantly higher than of the external aspects. *Organizational culture* and *resources and skills* are the two internal strategic aspects, these aspects can be managed via alliance dynamics by managers of the parties involved as they are impacted by the behavior of the employees in the parent companies and employees in the alliance. An additional reason why the external aspects are excluded is the volatility of emerging markets, a collaboration has no influence on this volatility.

According to the literature the managers of the joint venture and the parent companies can manage these two internal aspects by ensuring a balanced contribution, maintain symmetry, ensure bilateral learning and align their strategic positioning. These four alliance dynamics are key to stimulate collaboration between enterprises. No study has yet been conducted that combines the literature about alliances in the healthcare market with alliances in reverse innovation.

*SQ2 Which alliance strategy and alliance dynamics stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices?*

In chapter 5 and chapter 6 the alliance strategy and the alliance dynamics for a collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices are examined by analysis of two cases, which answered sub question 2. The cases proved that a joint venture is an appropriate type of alliance strategy. Analysis of the interviews pointed out that strategic positioning and bilateral learning are key alliance dynamics for an alliance between a DMNE and an EMNE. Already shortly after the establishment of the PNMS joint venture it became apparent that there was a strategic mismatch between Philips and Neusoft. On the other hand, GE Healthcare and Wipro continuously align their goals and objectives to maintain an aligned strategic positioning. Lack of bilateral learning caused friction in

the PNMS joint venture, Philips overrated the knowledge and skills of Neusoft and Neusoft perceived the reaction of Philips to become reluctant in sharing knowledge with Neusoft as unjustified. In the other case, Wipro did learn the best practices in the field of processes, global management and large-scale management of GE Healthcare and global GE succeeded to apply low-cost innovation knowledge in other markets.

Symmetry in dependency between the enterprises on the joint venture had a relatively small share in both cases, however, it is likely that symmetry has a significant impact in several similar collaborations. This is likely as symmetry stimulates an equal bargaining power for the parent companies, which is needed to make agreements about the strategic positioning and value alignment for the collaboration. A balanced monetized contribution stimulates symmetry in dependency on the collaboration between the enterprises. However, an impact of a balanced monetized contribution on the duration of a joint venture is not noted in the analysis of the cases. On the other hand, a balanced contribution in culture is identified as a means of balancing the loyalty of the employees in the joint venture to the parent companies and the employees in the parent companies to the joint venture. Since balanced loyalty is identified as an additional alliance dynamics to the validated collaboration framework.

Value alignment is also an additional alliance dynamic, analysis of the interview pointed out that this is a main key dynamic in the long-lasting Wipro-GE Healthcare joint venture. This dynamic is not noted in the analysis of the interviews about the brief PNMS joint venture.

*SQ3            How should managers of multinational enterprises execute identified alliance dynamics to stimulate collaboration in the context of reverse innovation of medical devices?*

Sub question 3 is answered in chapter 6 and discussed in more detail in section 7.2. In figure 8b a collaboration framework for multinational enterprises is provided, recommending an alliance strategy and alliance dynamics that can be used by managers to stimulate collaboration in the context of reverse innovation of medical devices. Managers of multinational enterprises can manage continuous alignment of the values and strategic positioning via relationships at the senior level of the parties involved. Exchange of employees is also a means to align values and the strategic positioning, this exchange is also beneficial to ensure relationships.

Managers can achieve a balanced loyalty when they restructure teams in case of an imbalance, the teams of the parent companies have to be loyal to the joint venture and the teams of the joint venture have to be loyal to both parent companies. The teams in the joint venture can be balanced by hiring independent people without no history at one of the parent companies or hire people from the enterprise of which culture is in minority.

Symmetry in dependency should be managed via a balanced contribution and bilateral learning. This study noted that symmetry is not a necessary alliance dynamic to ensure collaboration between a DMNE and an EMNE. Namely, the symmetry in the PNMS joint venture was about equal, while the symmetry in the Wipro-GE Healthcare has never been equal.

Bilateral learning is in the Wipro-GE Healthcare joint venture an organic and not prescribed process. However, managers of the parties should promote a culture in the organization that stimulates knowledge sharing between employees of the joint venture and the parent companies and that stimulates the recording and transfer of knowledge. This encourages bilateral learning by the joint venture and the parent companies.

*MRQ            What kind of collaboration framework can ensure collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices?*

Mentioned findings result in the answer on the main research question of this study, a collaboration framework that recommends an alliance strategy and alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE. A graphical representation of this framework is given in figure 8b. A joint venture as type of alliance strategy is an appropriate basis for collaboration, the alliance dynamics are: strategic positioning, value alignment, balanced loyalty and bilateral learning. A balanced contribution in employees is a key means of managing a balanced loyalty. Relationship at the senior level is a key means of encouraging strategy and value alignment.

**Table 17: Key Findings**

Literature review	Case analysis
A joint venture is an appropriate type of alliance strategy as basis for collaboration between a DMNE and an EMNE.	A joint venture as type of alliance strategy is proved to be an appropriate basis for collaboration between a DMNE and an EMNE.
Strategic positioning is an alliance dynamic that stimulates collaboration.	Strategic positioning is proved to be an alliance dynamic and ensuring relationships at the senior level is a means.
Balanced contribution is an alliance dynamic that stimulates collaboration.	A balanced monetized contribution is not a necessary alliance dynamic that stimulates collaboration.
Symmetry in dependency is an alliance dynamic that stimulates collaboration.	Symmetry in dependency is considered as context dependent as it had a relatively small share in the cases of this study. Balanced contribution and bilateral learning are a means of managing symmetry.
Bilateral learning is an alliance dynamic that stimulates collaboration.	Bilateral learning is proved to be an alliance dynamic and should be stimulated by an organizational culture and collaboration between teams of the joint venture and of the parent companies.
	Value alignment is an additional alliance dynamic that stimulates collaboration. Relationships at the senior level are a key means of encouraging value alignment.
	A balanced loyalty is an additional alliance dynamic that stimulates collaboration. A balanced contribution in terms of organizational culture is a key means of encouraging a balanced loyalty.

### Legend

Additional to validated collaboration framework

Adjusted in validated collaboration framework

Verified in validated collaboration framework

## 7.2 Managerial Implications

The scope of the study is limited to the two internal strategic aspects which are identified in section 3.2: *resources and skills* and *organizational culture*. Managers of the parties involved can manage these aspects by the alliance dynamics identified in chapter 6: value alignment, strategic positioning, balanced loyalty,

symmetry and bilateral learning. This section outlines the actions to be taken by the highest level of the organizations to manage the identified alliance dynamics.

The study turned out that relationships at the senior level of the enterprises are a key means of continuously aligning the values and strategic positioning of the enterprises. The exchange of employees between the joint venture and the partners is also beneficial for the alignment of the values and strategy. This phenomenon is in Wipro-GE Healthcare an organic process, they have no prescribed process in place to ensure these relationships and exchange of employees. The exchange of employees can be ensured by a prescribed process when no organic process is in place. To stimulate relationships at the senior level the capabilities of a job candidate to maintain relationships should be taken into account. The parent companies and the joint venture should create a culture that stimulates strategy alignment, managers should formulate non-financial objectives to reduce the impact of market volatility on the alliance dynamics of the joint venture. To clarify, from the Wipro-GE Healthcare case became clear that the objective of both enterprises is to transform the healthcare system in India, therefore they agree a long-term vision and long-term investments to overcome the very volatile Indian healthcare system.

Loyalty of employees to the joint venture and to the parent companies can be monitored and managed by the managers of the joint venture and parent companies. An imbalance in loyalty can be restored by restructuring imbalanced teams of the joint venture and parent companies that collaborate with each other. In PNMS joint venture, for example, Philips could transfer employees from the Philips organization to the joint venture to restore the balance in loyalty to the joint venture and to Philips. Another possible measure was to replace former Neusoft employees by people hired from outside the network of Neusoft.

A symmetric dependency between the partners on the joint venture is an outcome of a balanced contribution and bilateral learning. Analysis of the interview data pointed out that symmetry between collaborating parties is not a necessary alliance dynamic to ensure collaboration between a DMNE and an EMNE. However, it is likely that symmetry is a significant alliance dynamic in several other collaborations between a DMNE and an EMNE as it stimulates an equal bargaining power. An equal bargaining power then stimulates strategy and value alignment in the collaboration. To clarify, an equal bargaining power prevents the strategic positioning and value alignment from being in favour of one of the parent companies. A balanced contribution stimulates symmetry as both enterprises invest equally in the joint venture and therefore have an equal interest in the collaboration. And an equal measure of bilateral learning stimulates symmetry as both enterprises benefit about equal from the knowledge and skills of the joint venture.

Bilateral learning is a key dynamic for both partners in a joint venture, explicit knowledge can be shared by the enterprises. However, tacit knowledge is more challenging to transfer between the employees of the joint venture and the parent companies. Managers should therefore promote a culture in the organization to stimulate knowledge sharing and management. Training and workshops should be used to teach employees how to transfer knowledge. Collaborations between teams in the joint venture and also collaborations with the teams of the parent companies stimulate knowledge sharing. An user friendly knowledge management system is a digital solution to ensure knowledge sharing as it stimulates interaction between employees and the processes.

The managerial implications of this section are briefly enumerated in table 18. This overview is a guideline for managers of multinational enterprises to discover which actions have to be taken to improve the alliance dynamics in a joint venture.



**Table 18: Key Takeaways for Managers**

Strategic positioning	Ensure relationships at the senior level of the joint venture and the parent companies. To achieve that, ensure exchange of employees across the organizations to stimulate the formation of relationships. In addition, take into account the capabilities of a job candidate to maintain relationships. Create a culture that stimulates strategy alignment, a means is ensuring non-financial objectives to reduce the impact of market volatility.
Value alignment	Ensure relationships at the senior level of the joint venture and the parent companies. To achieve that, ensure exchange of employees across the organizations to stimulate the formation of relationships. Create an organizational culture that stimulates value alignment.
Balanced loyalty	Monitor and manage the balance in loyalty to the joint venture and to the parent companies. Restructure imbalanced teams of the joint venture and its parent companies to restore the balance in loyalty. A means of balancing loyalty is to hire people from the enterprise whose organizational culture is in minority or people with no history at one of the parent companies.
Symmetry	Symmetry in dependency on the joint venture by both enterprises is context dependent. In the alliance literature symmetry is considered as important, in the two cases symmetry was less important. Symmetry should be managed via a balanced monetized contribution and stimulation of bilateral learning.
Bilateral learning	Promote an organizational culture that stimulates knowledge sharing between employees and that stimulates the recording and transfer of knowledge. Ensure collaborations between teams in joint venture and parent companies. Implement an user friendly knowledge management system.

### 7.3 Scientific Contribution to Literature

Reverse innovation is an ongoing discussion in the scientific literature, however, no study has yet been done on how DMNEs and EMNEs can stimulate collaboration in the context of reverse innovation of medical devices. A medical device introduced to developed markets as a reverse innovation is being innovated as a low-cost medical device, these devices can potentially reduce the healthcare costs in these markets. The potential impact of these devices is relatively high as about a third of the expenses worldwide are expenses in the healthcare market. The advanced technological knowledge contributed by DMNEs in the low-cost medical devices can improve the quality of medical devices and thus the quality of healthcare in emerging markets. Therefore, reverse innovation can have a significant impact in all healthcare markets.

DMNEs face difficulties to master the traditional innovation approach and the low-cost innovation approach simultaneously, which is needed to ensure reverse innovation. Therefore a strategic alliance between a DMNE and an EMNE is beneficial to ensure reverse innovation. The EMNE can complement the alliance with resources and knowledge about the emerging markets, which is necessary to develop low-cost devices that meet the local needs. The DMNE can complement the alliance with resources and knowledge about developed markets, which are necessary for the introduction of low-cost devices in these markets. Despite this relevance, no collaboration framework can be found in the literature to encourage collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices.

This study contributes to the scientific literature in the field of reverse innovation, medical devices, alliance strategy and alliance dynamics. The two cases validated the literature review that a joint venture is an appropriate type of alliance strategy for the collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices. The alliance dynamics identified in the literature are adjusted and validated, resulting in alliance dynamics that can be used by managers to stimulate collaboration between a DMNE and an EMNE in the context of reverse innovation of medical devices, the alliance dynamics are: *strategic positioning*, *value alignment*, *balanced loyalty*, *symmetry* and *bilateral learning*.

The alliance dynamics *strategic positioning* and *bilateral learning* of the conceptual framework are validated by this study. This study recognized the alliance dynamics *value alignment* and *balanced loyalty* as additional alliance dynamics in the scientific literature about collaborations between a DMNE and an EMNE. The alliance dynamic *symmetry* is considered as context dependent. Relationships at the senior level stimulate the alignment of the values of the enterprises, these relationships are also beneficial to stimulate alignment in strategic positioning. A balanced contribution in culture turned out to be a key means of balancing loyalty of employees to the joint venture and to the parent companies.

The validated collaboration framework can be consulted in the scientific literature by managers of enterprises to achieve economic and social goals and objectives. This framework recommends a joint venture as type of alliance strategy for the collaboration between a DMNE and an EMNE. This framework guides managers of the enterprises which alliance dynamics they have to manage to stimulate collaboration and how they have to manage these alliance dynamics. From an economic perspective the framework is valuable to increase sales for a DMNE and valuable for an EMNE to improve the quality of products and services with advanced technological knowledge from the collaboration. From a social perspective the framework is valuable for the enterprises to improve healthcare quality in emerging markets with affordable and qualitative medical devices. When these medical devices trickle up to developed markets they ensure social value in these markets as they contribute to a more cost-efficient healthcare system.

#### **7.4 Limitations and Recommendations for Further Research**

At the start of the study is the assumption made that collaborating enterprises made a considered choice about their intended alliance partner. However, the PNMS case pointed out that Philips and Neusoft forced the establishment of the joint venture, already from the establishment there was a strategic mismatch between the parties. It is concluded that the management were not able to ensure a successful collaboration between the enterprises on the basis of the mentioned alliance dynamics. Further research should develop a partner selection framework for multinational enterprises to ensure proper partner selection.

Five high quality interviews are conducted with people with knowledge about the PNMS joint venture or the Wipro-GE Healthcare joint venture. Four interviews were conducted about the PNMS joint venture and one interview about the Wipro-GE Healthcare joint venture. This limitation is caused by time constraints, connecting with appropriate people within these global organizations is time-consuming. The single interview about the Wipro-GE Healthcare joint venture is justified as it turned out that people with in-depth knowledge about the alliance dynamics of the Wipro-GE Healthcare joint venture are employed by the joint venture and therefore do not have point of view from GE Healthcare or Wipro Limited. The interviewee is the CEO of the Wipro-GE Healthcare joint venture and therefore an appropriate source for in-depth knowledge about the joint venture. The connection process for this study started on time, however, it turned out to be challenging to connect with people with in-depth knowledge about the alliance dynamics. In addition, Wipro-GE Healthcare is established more than 30 years ago and PNMS ended more than 7 years ago, which made it even more difficult to connect with interviewees. Additional interviews about the Wipro-GE Healthcare joint venture would enrich the study with more independent insights in

the alliance dynamics of this joint venture. Additional interviews from a Neusoft point of view on the PNMS joint venture would also enrich the study.

## Generalizability

The scope of this study is joint ventures established by a DMNE and an EMNE in the healthcare market, however, multiple findings of this study are generalizable to joint ventures established by a DMNE and an EMNE in other markets. An alignment in strategic positioning, bilateral learning, value alignment and balanced loyalty are probably also key alliance dynamics in joint ventures with business in other markets.

Symmetry in dependency is assumed to be context dependent and applicable to a joint venture which is established by enterprises that already did business in the same market. An asymmetry can result in more bargaining power for one of the enterprises which can result in an opportunistic behavior of that enterprises. Opportunistic behavior is a risk for enterprises with business in the same market while this behavior has lower impact on an enterprise that has business in another market than that of the joint venture.

For a joint venture established by a DMNE and an EMNE where high investments are necessary, is an imbalanced monetized contribution probably insurmountable if there is a significant difference in capital between the parent companies. The healthcare market is an example of a market where high investments are necessary for the development and production of medical devices. This finding of the study may not be generalizable to markets where high investments are not necessary or collaborations between enterprises with a comparable capital.

The alliance dynamics in the validated collaboration framework are partly applicable to other types of alliances strategies mentioned, in section 3.3. In a license agreement, in the context of reverse innovation, is assumed that the relevant alliance dynamics are: strategic positioning, value alignment and symmetry. Both enterprises should align their strategic positioning and values to ensure that the intended goals and objectives related to the respective product can be achieved. A symmetry in dependency on the agreement is necessary to ensure that both enterprises contribute the necessary efforts to achieve the intended goals and objectives.

For ‘*subcontracting and outsourcing*’, in the context of reverse innovation, is assumed that value alignment is a relevant alliance dynamic. Collaborating parties should align their values to develop and/or manufacture products with the desired quality and in time. The supplier of the development or manufacturing process of a product should share the values of the client to ensure a qualitative contribution which is in time.

Further research should identify in which context the alliance dynamic *symmetry* has a significant impact, since symmetry is considered as important in the literature, but not recognized in the two cases of this study. Further research in markets where high investments are not necessary should give an understanding whether a balanced monetized contribution is an alliance dynamics for enterprises in these markets. Further research should also identify the impact of a balanced monetized contribution in a collaboration between a DMNE and an EMNE with comparable capital.

## 7.5 Reflection

Initially the goal was to interview several people with a Philips Healthcare, Neusoft Medical, Wipro Limited and GE Healthcare point of view on the concerning joint venture. Over time, it turned out that people with in-depth knowledge about the alliance dynamics of the Wipro-GE Healthcare joint venture have both a Wipro and GE Healthcare point of view. The joint venture is successful for more than 30 years and operates as a separate entity, therefore no independent people could be interviewed. In both

cases it turned out to be challenging to connect with appropriate interviewees, in the PNMS case the past time of seven years was the main cause. In the Wipro-GE Healthcare case the lack of feedback from potential interviewees was the main cause. Approaching potential interviewees started in the early stages of the research project, it was hardly possible to start earlier.

This study is the final assignment to fulfill the Management of Technology master. The aim of the program is to educate students on how to manage technology to improve products and services of enterprises in a wide range of markets. The purpose of these improvements are to improve the enterprises' productivity, competitiveness and profitability. This study is seamlessly connected to the Management of Technology master as the developed collaboration framework is a tool for multinational enterprises to develop and manufacture low-cost medical devices for emerging and developed healthcare markets. The purpose of the enterprises is to compete in these markets with innovations. This collaboration framework can be used by managers to stimulate collaboration between a DMNE and an EMNE, a collaboration should result in combined and leveraged strengths of both enterprises, this is beneficial for the innovation skills and should result in innovations. DMNEs and EMNEs have different skill-sets and use different development methods, the traditional innovation approach of DMNEs is centralized and product based, while the low-cost innovation approach of EMNEs is decentralized and market based. Sufficient management of these skill-sets and methods in an alliance can result in improved healthcare quality and more cost-efficient medical devices which are still profitable for organizations. The knowledge from this study can be used by Management of Technology alumni to manage the alliance dynamics to take maximum advantage of the combined and leveraged strengths and technologies of both enterprises.

## References

- Bank, T. W. (2017a). *Current health expenditure (% of gdp)*. Retrieved 17-04-2020, from <https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?end=2017&start=2000&view=chart>
- Bank, T. W. (2017b). *Expense (% of gdp)*. Retrieved 17-04-2020, from <https://data.worldbank.org/indicator/GC.XPN.TOTL.GD.ZS>
- BioSpace. (2013, February 5). *Philips to Sell Stake in Philips-Neusoft Medical Systems Joint Venture*. Retrieved August 21, 2020, from <https://www.biospace.com/article/releases/-b-philips-b-to-sell-stake-in-b-philips-neusoft-medical-systems-b-joint-venture-/>
- Borini, F., Costa, S., Bezerra, M., & Oliviera, M. (2014). Reverse innovation as an inducer of centres of excellence in foreign subsidiaries of emerging markets. *International Journal of Business and Emerging Markets*, 6(2), 163–182.
- Botero Ramírez, J. C. (2013). *A model of collaboration between developed and developing clusters of high-tech innovation: benefits and applications* (Unpublished doctoral dissertation). Massachusetts Institute of Technology.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(2-3).
- Dahan, N., Doh, J., Oetzel, J., & Yaziji, M. (2010). Corporate-NGO Collaboration: Co-creating New Business Models for Developing Markets. *Long Range Planning*, 43(2-3), 326-342.
- Diagnostic Imaging. (1991, May 22). *GE joint venture will build scanners in China*. Retrieved August 5, 2020, from <https://www.diagnosticimaging.com/view/ge-joint-venture-will-build-scanners-china>
- Elmuti, D., & Kathawala, Y. (2001). An overview of strategic alliances. *Management decision*, 39(3), 205-217.
- GE Healthcare. (n.d.). *Lullaby Warmer*. Retrieved September 22, 2020, from <https://www.gehealthcare.com.sg/products/lullaby-warmer-sg>
- GE India. (n.d.). *Research and Development (RD)*. Retrieved August 6, 2020, from <https://www.ge.com/in/about-us/research-and-development>
- General Electric. (n.d.-a). *GE in China*. Retrieved August 5, 2020, from <https://www.ge.com/cn/sites/default/files/GE%20in%20China%20EN.pdf>
- General Electric. (n.d.-b). *GE in China Fact Sheet*. Retrieved August 5, 2020, from [https://www.ge.com/cn/sites/www.ge.com.cn/files/GE\\_in\\_China\\_fact\\_sheet\\_EN\\_0811.pdf](https://www.ge.com/cn/sites/www.ge.com.cn/files/GE_in_China_fact_sheet_EN_0811.pdf)
- General Electric. (2013). *GE Healthcare - GE's commitment to addressing maternal and infant health*. Retrieved July 15, 2020, from <http://files.publicaffairs.geblogs.com/files/2014/08/GEs-Commitment-to-Addressing-Maternal-and-Infant-Health.pdf>
- General Electric. (2014). *Innovation Localization Collaboration: 2014 China Sustainability Report*. Retrieved from [https://www.ge.com/cn/sites/default/files/GE%202015%20Report%20\\_EN.pdf](https://www.ge.com/cn/sites/default/files/GE%202015%20Report%20_EN.pdf)
- General Electric. (2015, April 2). *GE Healthcare Strengthens "make In India" Capability For Accessible, Affordable Healthcare*. Retrieved August 6, 2020, from <https://www.ge.com/news/press-releases/ge-healthcare-strengthens-make-india-capability-accessible-affordable-healthcare>
- General Electric. (2020a). *About Us*. Retrieved July 14, 2020, from <https://www.gehealthcare.com/about/about-ge-healthcare-systems>
- General Electric. (2020b, February 24). *Annual Report 2019*. Retrieved July 14, 2020, from [https://www.ge.com/sites/default/files/GE\\_AR19\\_AnnualReport.pdf](https://www.ge.com/sites/default/files/GE_AR19_AnnualReport.pdf)
- General Electric. (2020c, March 11). *Investors Update*. Retrieved July 14, 2020, from [https://www.ge.com/sites/default/files/ge\\_webcast\\_presentation\\_03112016\\_0.pdf](https://www.ge.com/sites/default/files/ge_webcast_presentation_03112016_0.pdf)
- General Electric. (2020d). *R&D Facilities*. Retrieved July 14, 2020, from <https://www.ge.com/research/research-engine/rd-facilities>
- Govindarajan, V., & Ramamurti, R. (2011). Reverse innovation, emerging markets, and global strategy. *Global Strategy Journal*, 1(3–4), 191–205.

- Govindarajan, V., & Trimble, C. (2012a). Reverse innovation: a global growth strategy that could pre-empt disruption at home. *Strategy Leadership*.
- Govindarajan, V., & Trimble, C. (2012b). Reverse innovation: create far from home, win everywhere. *Harvard Business Review Press*.
- Hadengue, M., de Marcellis-Warin, N., von Zedtwitz, M., & Warin, T. (2017). Avoiding the Pitfalls of Reverse Innovation: Lessons Learned from Essilor One company's experiences suggest how the specific challenges of reverse innovation may be anticipated and overcome. *Research-Technology Management*, 60(3), 40-47.
- Hamel, G., Doz, Y., & Prahalad, C. (1989). Collaborate with your competitors and win. *Harvard Business Review*(January-February), 133-139.
- Hossain, M. (2013). Adopting open innovation to stimulate frugal innovation and reverse innovation. *Available at SSRN 2197782*.
- Hossain, M., Simula, H., & Halme, M. (2016). Can frugal go global? Diffusion patterns of frugal innovations. *Technology in Society*, 46, 132-139.
- Immelt, J., Govindarajan, V., & Trimble, C. (2009). How GE is disrupting itself. *Harvard Business Review*, 87(10), 56-65.
- Kannan, S. (2013, August 26). *The low cost technology saving premature babies' lives*. BBC News. Retrieved July 15, 2020, from <http://www.bbc.com/news/business-23817127>
- Karti, K. (2014, May 23). *Perspectives: Spending money, saving lives*. GE Reports. Retrieved July 15, 2020, from <https://www.ge.com/news/reports/spending-money-saving-lives>
- Kellner, K. (2012, April 10). *Forward in reverse: How "reverse innovation" helps win future markets*. GE Reports. Retrieved July 16, 2020, from <https://www.ge.com/news/reports/post/74545042782/forward-in-reverse-how-reverse-innovation-helps/>
- Kim, W. C., & Mauborgne, R. (2005). Value innovation: a leap into the blue ocean. *Journal of business strategy*.
- Koninklijke Philips N.V. (n.d.-a). *About PIC*. Retrieved August 5, 2020, from <https://www.philips.co.in/a-w/about-philips/philips-innovation-center/about-us.html>
- Koninklijke Philips N.V. (n.d.-b). *Health Innovation Campus*. Retrieved August 5, 2020, from <https://www.philips.co.in/a-w/about-philips/healthcare-innovation-campus.html>
- Koninklijke Philips N.V. (n.d.-c). *Philips in Asia — Country Backgrounders*. Retrieved July 14, 2020, from [http://www.newscenter.philips.com/pwc\\_nc/main/shared/assets/Downloadablefile/Philips-in-Asia-Country-Backgrounders-download\(3\)-4029-1660.pdf](http://www.newscenter.philips.com/pwc_nc/main/shared/assets/Downloadablefile/Philips-in-Asia-Country-Backgrounders-download(3)-4029-1660.pdf)
- Koninklijke Philips N.V. (n.d.-d). *Philips Research Africa*. Retrieved August 4, 2020, from <https://www.philips.com/a-w/research/locations/nairobi.html>
- Koninklijke Philips N.V. (n.d.-e). *Philips Research Asia - Shanghai - Our sites - Philips Research*. Retrieved August 5, 2020, from <https://www.philips.com/a-w/research/locations/shanghai.html>
- Koninklijke Philips N.V. (2005, January 27). *Annual Report 2004*. Retrieved August 4, 2020, from [https://www.philips.com/b-dam/corporate/about-philips/investors/financial-results/annual-reports/Philips\\_AnnualReport2004\\_2-13833.pdf](https://www.philips.com/b-dam/corporate/about-philips/investors/financial-results/annual-reports/Philips_AnnualReport2004_2-13833.pdf)
- Koninklijke Philips N.V. (2007). *Essenta RAD*. Retrieved September 22, 2020, from [http://incenter.medical.philips.com/doclib/enc/fetch/2000/4504/577242/577261/577263/670329/670330/5162433/Essenta\\_RAD\\_Leaflet.pdf%3fnodeid%3d5331808%26vernum%3d1](http://incenter.medical.philips.com/doclib/enc/fetch/2000/4504/577242/577261/577263/670329/670330/5162433/Essenta_RAD_Leaflet.pdf%3fnodeid%3d5331808%26vernum%3d1)
- Koninklijke Philips N.V. (2012, July 23). *Q2 2012 results*. Retrieved August 4, 2020, from <https://www.results.philips.com/publications/q212>
- Koninklijke Philips N.V. (2013a, February 5). *Philips intends to sell shareholding in Philips-Neusoft Medical Systems joint venture to Neusoft Medical Systems*. Retrieved July 17, 2020, from <https://www.philips.com/a-w/about/news/archive/standard/news/press/2013/20130205-Philips-intends-sell-shareholding-Philips-Neusoft-to-Neusoft.html>
- Koninklijke Philips N.V. (2013b, February 5). *Philips intends to sell shareholding in Philips-Neusoft Medical Systems joint venture to Neusoft Medical Systems*. Retrieved August 4,

- 2020, from <https://www.philips.com/a-w/about/news/archive/standard/news/press/2013/20130205-Philips-intends-sell-shareholding-Philips-Neusoft-to-Neusoft.html>
- Koninklijke Philips N.V. (2014, March 20). *Philips to establish Research Innovation Hub in Africa*. Retrieved August 4, 2020, from <https://www.philips.com/a-w/about/news/archive/standard/news/press/2014/20140321-Philips-to-establish-Research-and-Innovation-Hub-in-Africa.html>
- Koninklijke Philips N.V. (2015, October 7). *Frost Sullivan Lauds Philips for Boosting Healthcare Delivery in Emerging Markets through its Disruptive Technologies*. Retrieved August 5, 2020, from <https://www.prnewswire.com/news-releases/frost--sullivan-lauds-philips-for-boosting-healthcare-delivery-in-emerging-markets-through-its-disruptive-technologies-300155288.html>
- Koninklijke Philips N.V. (2016, February 23). *Philips Annual Report 2015*. Retrieved July 14, 2020, from <https://www.results.philips.com/publications/ar15#/>
- Koninklijke Philips N.V. (2017a, February 22). *The Community Life Center - A community-driven and holistic platform for strengthening primary healthcare*. Retrieved August 4, 2020, from [https://images.philips.com/is/content/PhilipsConsumer/Campaigns/CA20150326\\_CO\\_001/CA20172102\\_CO\\_001-AAA-en-AA-Community-Life-Center-brochure-feb-22-2017.pdf](https://images.philips.com/is/content/PhilipsConsumer/Campaigns/CA20150326_CO_001/CA20172102_CO_001-AAA-en-AA-Community-Life-Center-brochure-feb-22-2017.pdf)
- Koninklijke Philips N.V. (2017b, February 21). *Philips Annual Report 2016*. Retrieved July 14, 2020, from <https://www.results.philips.com/publications/ar16#/downloads>
- Koninklijke Philips N.V. (2020a). *Company*. Retrieved July 14, 2020, from <https://www.philips.com/a-w/about/company.html>
- Koninklijke Philips N.V. (2020b). *Our heritage*. Retrieved July 14, 2020, from <https://www.philips.com/a-w/about/company/our-heritage.html>
- Leahy, J. (2010, January 10). *Financial Times India: A nation develops*. Retrieved August 6, 2020, from <https://www.ft.com/content/445586ac-fe13-11de-9340-00144feab49a>
- Lebedev, S., Peng, M., Xie, E., & Stevens, C. (2015). Mergers and acquisitions in and out of emerging economies. *Journal of World Business*, 50(4), 651-662.
- Malodia, S., Gupta, S., & Jaiswal, A. K. (2019). Reverse innovation: a conceptual framework. *Journal of the Academy of Marketing Science*, 1-21.
- MarcoTrends. (n.d.). *Wipro Total Assets 2006-2020 — WIT*. Retrieved September 9, 2020, from <https://www.macrotrends.net/stocks/charts/WIT/wipro/total-assets>
- Money Control. (n.d.). *Forward in reverse: How "reverse innovation" helps win future markets*. Retrieved July 17, 2020, from <https://www.moneycontrol.com/financials/wipro/consolidated-profit-lossVI/W>
- Motohashi, K. (2015). Global business strategy: Multinational corporations venturing into emerging markets. *Academy of management journal*.
- Mukerjee, K. (2012). Frugal Innovation: The key to penetrating emerging markets. *Ivey Business Journal*, 76(4).
- Murphy, M., Perrot, F., & Rivera-Santos, M. (2012). New perspectives on learning and innovation in cross-sector collaborations. *Journal of Business Research*, 65(12), 1700-1709.
- Neusoft Corporation. (2020a). *About Neusoft*. Retrieved July 14, 2020, from <https://www.neusoft.com/about/>
- Neusoft Corporation. (2020b). *Annual Report 2019*. Retrieved July 14, 2020, from <https://www.neusoft.com/upload/files/20200430/1588231782257.pdf>
- Neusoft Corporation. (2020c, July 5). *Neusoft Medical Signed Transfer Agreement with Philips to Acquire 25% Equities in Philips-Neusoft Medical Systems Joint Venture*. Retrieved July 14, 2020, from <https://www.neusoft.com/news/html/20130705/2474143227.html>
- Neusoft Medical. (n.d.-a). *About Us*. Retrieved August 7, 2020, from <http://www.neusoftmedical.com/en/about/jxjs/>

- Neusoft Medical. (n.d.-b). *Milestones*. Retrieved August 7, 2020, from <http://www.neusoftmedical.com/en/about/jxlc/>
- Neusoft Medical. (n.d.-c). *Products & Solutions*. Retrieved September 9, 2020, from <http://www.neusoftmedical.com/en/cpyjjfa/>
- Park, S., & Ungson, G. (2001). Interfirm rivalry and managerial complexity: A conceptual framework of alliance failure. *Organization science*, 12(1), 37-53.
- Parkhe, A. (1993). The structuring of strategic alliances: A gametheoretic and transaction-cost examination of interfirm cooperation. *Academy of Management Journal*, 36(4), 794-829.
- Philips India Limited. (2017, July 18). *Annual Report 2016-17*. Retrieved August 5, 2020, from <http://images.philips.com/is/content/PhilipsConsumer/documents/PIL-Annual-Report-2016-17.pdf>
- Porter, M., & Fuller, M. (1985). Coalitions and global strategy. In *Competition in Global Industries*.
- Pratono, A., & Ratih, R. (2019). International Alliance Strategies: A Case Study of the Indonesian Medical Device Industry. *Globalization and Development*, 27, 381-400.
- PwC. (2013a, April 23). *John flannery on exporting healthcare innovations from India [Video file]*. Retrieved August 6, 2020, from <https://www.youtube.com/watch?v=sowxf0wclJM>
- PwC. (2013b, April 23). *John Flannery on how the global organization changed its structure for India [Video file]*. Retrieved August 6, 2020, from <https://www.youtube.com/watch?v=VREJ057v6tc>
- PwC. (2013c, April 23). *John Flannery on India's strategic importance to GE [Video file]*. Retrieved August 6, 2020, from <https://www.youtube.com/watch?v=DaWRqP04b0I>
- Reuters, T. (2016, January 20). *Philips CEO Frans van Houten on emerging markets*. Youtube. Retrieved July 14, 2020, from <https://www.youtube.com/watch?v=85wGAjkhkJQ>
- Rogers, E. M. (2010). *Diffusion of innovations*. Simon and Schuster.
- Signify N.V. (2018, May 16). *Philips Lighting is now Signify*. Retrieved July 14, 2020, from <https://www.signify.com/global/our-company/news/press-releases/2018/20180516-philips-lighting-is-now-signify>
- Singh, J. (2011). GE Healthcare (A): Innovating for Emerging Markets. [Case 311-048-1]. *INSEAD*, 1-12.
- Tallman, S., Luo, Y., & Buckley, P. (2017). Business models in global competition. *Global Strategy Journal*, 1(1), 1-19.
- Tarnovskaya, V., & Biedenbach, G. (2016). Multiple stakeholders and B2B branding in emerging markets. *Qualitative Market Research*, 19(3), 287-309.
- The Hindu. (2009, October 3). *GE merges healthcare unit with Wipro*. Retrieved July 10, 2020, from <https://www.thehindu.com/business/companies/GE-merges-healthcare-unit-with-Wipro/article16884454.ece>
- Wipro. (n.d.-a). *Company Overview*. Retrieved August 6, 2020, from <https://web.archive.org/web/20170922040551/http://www.wipro.com/about-Wipro/>
- Wipro. (n.d.-b). *RD and Engineering Services*. Retrieved August 7, 2020, from <https://www.wipro.com/medical-devices/r-d-and-engineering-services/>
- Wipro Limited. (2020). *About Wipro*. Retrieved July 14, 2020, from <https://www.wipro.com/about-us/>
- Yin, R. K. (2015). *Qualitative research from start to finish*. Guilford publications.
- Young, M. N., Tsai, T., Wang, X., Liu, S., & Ahlstrom, D. (2014). Strategy in emerging economies and the theory of the firm. *Asia Pacific Journal Management*, 31, 331-354.
- Zeschky, M., Widenmayer, B., & Gassmann, O. (2014). Organising for reverse innovation in western mncs: the role of frugal product innovation capabilities. *International Journal of Technology Management*, 64(2-4), 255-275.



## A Introduction to Interview

Dear Mr [name],

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed market multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. A reverse innovation is an innovation adopted first in emerging markets before 'tickling' up to developed markets. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

In this interview, based on the conceptual framework, I would like to examine the alliance dynamics between [names]. In addition, I will identify how these four key alliance dynamics relate to each other. I selected [name] as they developed many successful medical devices over time which became reverse innovations.

The interview will take about an hour. For your perusal, I enclose here the interview questions. Only with your permission, the interview can be recorded and if preferred, we will keep your profile anonymous. After the interview, the transcript will be sent to you for your verification. I will be pleased to share with you the results of this study once my thesis is completed. Part of the deliverable is a recommendation for managers on how to align these key dynamics to stimulate collaboration in the context of reverse innovation of medical devices.

Kind regards,  
Coen van Kleef  
C.L.H.vanKleef@student.tudelft.nl

## **B Interview Questions**

### **B.1 Interview questions to Philips Healthcare**

- What were the key drivers for Philips Healthcare to start a collaboration with Neusoft in 2004?
- What were the key drivers to choose for a joint venture as type of alliance?
- How did both enterprises consult each other to define the business model for the joint venture?
- Which medical devices became reverse innovations during the joint venture?
- *General interview questions, section B.4*
- Why did Philips sell its stake in the joint venture to Neusoft?

### **B.2 Interview questions to Neusoft**

- What were the key drivers for Neusoft to start a collaboration with Philips Healthcare in 2004?
- What were the key drivers to choose for a joint venture as type of alliance?
- How did both enterprises consult each other to define the business model for the joint venture?
- Which products became reverse innovations during the joint venture?
- *General interview questions, section B.4*
- What were the key drivers for Neusoft to buy Philips' stake in the joint venture?

### **B.3 Interview questions to Wipro - GE Healthcare**

- Why did GE Healthcare and Wipro start a collaboration in 1990?
- What were the key drivers to choose for a joint venture as type of alliance?
- How did both enterprises consult each other to define the business model for the joint venture?
- *General interview questions, section B.4*
- In hindsight, what do you think the key drivers really are for the successful collaboration between GE Healthcare and Wipro?

## **B.4 General interview questions to Philips and Neusoft and Wipro - GE**

### **B.4.1 Strategic Positioning**

- How did both enterprises consult each other to define clear and shared goals and objectives for the joint venture at the time of the establishment of the joint venture?
- To what extent was the consult mission, governance, strategy and structure for the alliance as proposed by both enterprise?
- How did both enterprises consult each other to define new goals and objectives when there were changes made in the individual enterprises?
- What were the similarities and differences in perceived goals and objectives of the enterprises at the time of the establishment of the joint venture?

### **B.4.2 Balanced Contribution**

- What was the ratio in contributed resources and skills (knowledge, assets, human resources) by the establishment of the joint venture?
- How much resources and skills are contributed by the enterprises during the joint venture?
- How did the ratio in contribution by the enterprises in the joint venture evolve over time?
- To what extent did both enterprises review the balance of investments made in the joint venture?
- To what extent did the negotiation about the contribution of resources and skills take place?

### **B.4.3 Symmetry**

- How did the dependency of both enterprises on the joint venture evolve?
- To what extent did renegotiation of the contractual terms of the joint venture take place during the collaboration?
- To what extent did shifts in internal policies of the joint venture take place?
- How did enterprises manage to keep an equal interest (50-50) in the joint venture?

### **B.4.4 Bilateral Learning**

- To what extent did both enterprises recognize new knowledge from the joint venture?
- How did the enterprises assimilate and apply this knowledge beyond the joint venture?
- How did the enterprise manage that new knowledge will be recognized, assimilated and applied throughout the enterprise?
- What has been learned from the collaboration partner?

### **B.4.5 Relationship**

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed market multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

Strategic positioning. To what extent the strategy of the joint venture is in line with the strategy of both enterprises.

Balanced contribution. To what extent the enterprises contribute equally to the joint venture in terms of resources and skills.

Symmetry. To what extent the enterprises are equally dependent on the joint venture.

Bilateral learning. The ability of the enterprises to recognize, assimilate and apply knowledge from the joint venture beyond.

- Based on your experience, how do these four dynamics relate to each other? In other words, what is their relationship in practice?

## C Interviews

### C.1 Wipro-GE Healthcare

Date of online interview: July 22nd, 2020, 8:30 am (CEST)

Interviewee: CEO, president & managing director of Wipro-GE Healthcare Observer: Communications Head Wipro-GE Healthcare

Language: English

Before the start of the interview there is an agreement with the interviewee to record the interview and to make a transcript for verification.

- What were the key drivers for GE Healthcare to start a collaboration with Wipro in 1990?

*I would say there were some hard factors and some soft factors. GE had been in India for quite some time by then, GE entered India in 1902, so we had been in India for a long time. But a lot of what used to happen was in the power business, we have not done much into the non-power business. During the time of Jack Welch (CEO of GE in 1981-2001), Jack really saw potential in the Indian market. Lightning was one of them and the other was in Healthcare. He felt that GE had not much of the market knowledge about these markets, therefore they were looking for a partner at that point of time to help them with their market access and market knowledge: how does the market work, what is the structure and how do you reach customers? This was the pre-liberalization period (in 1992/1993 India was liberalized and opened up its economy), and therefore there were a lot of restrictions and licenses. For a foreign company to operate in India at large scale you needed to have local knowledge, that was probably the primary driver. But looking at partners they were also looking at partners that have a very similar mindset as GE has, compliance and ethics was a big consideration for GE. The other consideration was that we wanted to partner with a company with a long-term view on the business as well, not just a short-term view to make a bit of money. More a strategic partner rather than a transaction partner who helps on licensing. Was there a specific reason to choose for an IT company? At that time IT was not necessarily the big piece. Wipro had a history in the consumer space. It had primarily to do with Mr. Premji, he was the chairman of Wipro at that time. He had a joint vision with GE Healthcare in India, he shared the passion to collaborate on the long term.*

- What were the key drivers to choose for a joint venture as type of alliance?

*If you look at the factors we talked about, it had more to do with market prices and how to structure the local market business. GE also had plans to increase their manufacturing capacity in India. They were coming to India and became almost a local company in India. This type of collaboration was more building trust and sharing risk.*

- How did both enterprises consult each other to define the business model for the joint venture?

*We have very strong and highly pro-active board which meets every quarter. The global CEO of GE Healthcare is in the board of the joint venture and also the CFO is. It is a super high-level thing. We take very strategic and long-term decisions and this is reflected in the business model. Most decisions were taken as equal partners.*

- How did both enterprises consult each other to define clear and shared goals and objectives for the joint venture at the time of the establishment of the joint venture?

*Difficult to say, I do not have exact details, but I do know that the processes we follow in the joint venture very closely reflects what we do in GE. Also goal setting in terms of operation metrics. I imagine that this was the same at that point in time. Those things are done in the board meeting on an ongoing basis with both parties coming together and discuss what they do in India. For GE the requirements for a collaboration partner were very clear.*

- To what extent was the consult mission, governance, strategy and structure for the alliance as proposed by both enterprise?

*The intent why the joint venture started had not changed so far, but over a period of time we had to make several adjustments in the joint venture to make sure we are still going towards our goals. For example, when we started it was actually a 51% Wipro and 49% GE Healthcare joint venture, Wipro was the larger partner. But later, when the market opened up, things changed and GE felt that from a corporate goals perspective they wanted to be the major shareholder in the joint venture. It was a mutual decision which was taken, now it is 51% GE Healthcare and 49% Wipro. These decisions are dependent on who needs what in which point of time. As long as they have a solid agreement saying that this is what we want to achieve in the market, these are the steps to make changes that both of them were willing to make in the strategy in terms of what they want. I think one of the biggest reasons why we are successful in doing that, is the relationships at the highest level of both sides. For a pretty long time Jack Welch, even when he was running such a large organization, had direct connection with the chairman of Wipro, they were very strongly connected at that level. Even after him, Jeff Immelt took over, used to be the GE Healthcare global CEO, they continue the connection for the next 15 years. After that, when John L. Flannery took over a couple of years back, the same thing happened, Flannery used to be the GE India CEO before he went to GE Healthcare and from there to GE. Those connections are very critical, because as long as you have that relationship at the highest level and you align what you want to achieve together, the rest of the teams will figure out how the transactions happens in the rest of the organization. Relationships between highest people in the organizations is important, they talk regularly to each other. Instantly align their mission, governance, strategy and structure.*

- How did both enterprises consult each other to define new goals and objectives when there were changes made in the individual enterprises?

*Whenever we had difficult changes happening at both sides, calls are made at the highest levels explaining why making some changes and how it does impact the joint venture. I have seen it happening at least 2 or 3 times in 2 or 3 years. When changes were happening there was a direct call made to the chairman of both sides to explain what we are looking and why we are doing. It is easy, rather than the news flowing down in the organization and back as you lose the essence of the news. That communication structure happens on a fairly high level, that is also one of the goals for me as the Wipro GE Managing Director. Whenever I see some large decisions being taken, it is my job to go back to the GE leadership to say that this is an important point. They should be in direct connection to explain this to the joint venture partner. Smaller ones I inform them. GE required 51% for strategic reasons and had a very open discussion with the joint venture partner and processed the proposal.*

- What were the similarities and differences in perceived goals and objectives of the enterprises at the time of the establishment of the joint venture?

*GE searched for a partner with the same vision as GE, there were no big differences to overcome in goals and objectives as far as we now know.*

- What was the ratio in contributed resources and skills (knowledge, assets, human resources) by the establishment of the joint venture?

*In general this joint venture has always existed as individual entity, it had the freedom to hire resources and skills from outside the organization. The resources came from both sides, but mostly from the GE side because it is a healthcare business and the expertise was in the GE Healthcare side. The knowledge and assets to a large extent came from GE, but for example how it get deployed in the market and the planning processes came from the Wipro side. We operate as an independent entity in the market, so we pick resources and skills from either GE Healthcare or other healthcare*

companies in India.

- How much resources and skills are contributed by the enterprises during the joint venture?  
*There are no set ratio's. You must imagine that GE in that time was the multi-billion company, probably 300 billion, and Wipro was still a very small company. Wipro was like a 1.0 or 1.5 billion. GE is known for its management capabilities, processes and talent a lot of that came actually from the GE side. The day to day governance of the organization, the local knowledge in terms of how the tax structure works, the best way to structure a new manufacturing facility, the benefits that one can get from the government came from Wipro; the best practices came from GE. The important part there is the role of the board members, they were the wisest back in the boards of both sides. For example, somebody on the Wipro side was ready to help people from GE to explain how things work in India, while GE explained about best practices in management.*
- How did the ratio in contribution by the enterprises in the joint venture evolve over time?  
*The division in shares changed from 51% for Wipro and 49% for GE to 51% for GE and 49% for Wipro. This was a requirement for GE, and after negotiations was agreed upon.*
- To what extent did both enterprises review the balance of investments made in the joint venture?  
*I would say that the joint venture is an entity by itself, the investment is done stand alone for the joint venture and every investment came to the board for discussion at the board level and they never looked at it as an investment from one of the enterprises.*
- To what extent did the negotiation about the contribution of resources and skills take place?  
*Negotiation about the contribution of resources and skills takes place at the board level of the joint venture.*
- How did the dependency of both enterprises on the joint venture evolve?  
*By definition, the dependency of GE on the joint venture is much higher given that we are in the healthcare business. This is the primary market for GE in India. There is a straight one-to-one connection to GE, so the dependency is very high. The dependency on the Wipro side is quite low, they are not in the healthcare business outside of this joint venture. Having said that, over the period of time the talent that is developed in the joint venture went to both GE and Wipro, a contribution back to both enterprises. The global CFO of GE Healthcare was a person who came from Wipro GE, similarly, the global CEO of Wipro was an ex-employee of Wipro GE. It is a very strong mechanism we have in place. No independent decisions regarding employees are taken at joint venture. There has to be an agreement on the right move and right timing for the employee and joint venture. Both sides have the ability to offer roles to that person. The employee can make a choice. There is a strong process in place to ensure there is no friction. It is a very asymmetric relationship in the sense that there is one company with strong local connections and a very large company looking at other markets, both of them have very different skill sets.*
- To what extent did renegotiation of the contractual terms of the joint venture take place during the collaboration?  
*We've had several situations where we had to renegotiate the contract, one was on the shareholder division. We had several discussions about manufacturing within the country and what products should be brought into the country. There was an acquisition that GE had made outside India and now they want to sell that product in India, the question was if that should be within the joint venture. That product was never sold by GE in the country. What helps is that it is really clear what we want to do in the country, and that we had to do it in the joint venture to make that happen in the country. Alignment of this after negotiations was happening at senior levels, these were long negotiations, but obviously we will be able to come to an agreement. Sometimes it takes time, it may take a year, but*

*we keep negotiating and make sure that it happens. We do it regularly. We had at least 4 or 5 major negotiations in the last 30 years on different aspects. It is part of the business for GE. We speak about it until it happens rather than having disagreements. Relationships between the highest level of people in the organization is a key driver.*

- To what extent did shifts in internal policies of the joint venture take place?

*Most of the internal joint venture policies are a reflection of the GE policies, we are a GE company. We never walked away from that; healthcare is more a GE business. The policies have always reflected more the GE side instead of the Wipro side. Is it correct that Wipro-GE uses GE Healthcare as brand name? Yes, Wipro-GE uses GE Healthcare as name for the brand; a lot of considerations go into play, like intellectual properties and taxation. In the past, when the joint venture started, the difference in Wipro and GE was a 100/200 times difference, GE was a 300 billion-dollar company. Today it might be a very different conversation.*

- How did enterprises manage to keep an equal interest (50-50) in the joint venture?

*Normally joint ventures are there for the financial aspects of it. They look at it from the balance sheet perspective. That was not the case here, Wipro was keen to contribute to Indian healthcare market and wanted to be part of the Indian healthcare system and contribute more in governance, compliance and strategy instead of just the finance. They know how to grow into the Indian market and what their capabilities are. In addition, the enterprise is an entity itself, selecting their own resources and skills. Both partners have equal passion and interest in the joint venture.*

- To what extent did both enterprises recognize new knowledge from the joint venture?

*From the GE side, the Indian market is a very unique market, it is a low-cost market with highly competitive prices. And therefore, to develop and design a product in India for the local market, means that it can be brought to the markets in Africa, Latin America, and other markets with similar challenges in healthcare perspective. GE does see the joint venture is an innovation source for emerging markets in terms of product development, we had several such cases in the past 20 years. The team in India has developed some of these products for the local market at much lower costs, but more important with specific capabilities built for the emerging markets. Then, GE has taken it and boosted it in the rest of the world. Winning in India is really important to win in other emerging markets, that is the mindset GE has always had about it. From a Wipro perspective, this was an organization starting to grow from a few billion-dollar company and they were very keen to understand and learn from a very large organization like GE about the processes, systems and culture. That was very important for Wipro to learn from the collaboration about the best practices.*

- How did the enterprises assimilate and apply this knowledge beyond the joint venture?

*Products developed by the joint venture in India are now sold in other emerging markets and Wipro learned how to grow their company.*

- How did the enterprise manage that new knowledge will be recognized, assimilated and applied throughout the enterprise?

*There is no specific focus at learning from each other, we do not look at it in that way. It is really an organic process, there is no specific way how we do that. But the mindset is always there to look what the company can use. The joint venture in India is a pretty good source to learn from. We are not kept separate from the global GE system, we are seamlessly integrated in the GE knowledge pool. Are, for example, royalties involved, when a product of the joint venture is be sold in other markets? When a product is sold in another region no royalties are involved, but there is a strong process of transfer price. There are parts made by GE India for GE, but also the other way around. This is very well managed and monitored by the CEO of both sides.*



- What has been learned from the collaboration partner?

*Best practices of GE for Wipro and the market characteristics of India of Wipro for GE.*

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed country multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

Strategic positioning. To what extent the strategy of the joint venture is in line with the strategy of both enterprises.

Balanced contribution. To what extent the enterprises contribute equally to the joint venture in terms of resources and skills.

Symmetry. To what extent the enterprises are equally dependent on the joint venture.

Bilateral learning. The ability of the enterprises to recognize, assimilate and apply knowledge from the joint venture beyond.

- Based on your experience, how do these four dynamics relate to each other? In other words, an improvement in which alliance dynamic has the most positive impact overall and how do the other three dynamics change as a result?

*I would agree to the identification of strategic positioning, balanced contribution and bilateral learning. The symmetry is a bit hard to explain. The companies are very dependent on the joint venture. GE Healthcare would not have been successful in India without this collaboration, this market is also a great for the development and innovation of product for emerging markets. For Wipro, they saw this as an opportunity to work with a globally respected multinational partner. So, I would not say there is symmetry between both of them, they are not equally dependent. I would like to add something to this, I think the value component is very important. Several joint ventures happened in India, none of them have lasted for 30 years. You could have all these factors you said, but if they do not have the value-match between the collaboration partners, you have a problem. The value match has a few elements, fundamental commitment from both sides that they want to work together for the long term to transform the healthcare system in India and the collaboration not only exist for short-term profits. You need to make long-term investment, because the market in India can go up and down. The emerging market in India is a very volatile system. You have challenges at some point, but if you agree about the same values to collaborate for the long term and to transform the healthcare system. Wipro wanted to be seen as a partner in the development of the Indian healthcare system. And was not just here to just sell a piece of equipment and walk away from here. We are very much aligned on that. How do both partners ensure that the CEO and board members have the same vision and mission to achieve those values? This continues because of senior leadership on both sides, they are part of the joint venture over a period of time. The global CEO of GE Healthcare was always in the board. But the second thing is because folks from this joint venture have gone into leadership positions on both sides and they became board members later. So if I give you an example, our current board member, until very currently, was someone who grow up in the Wipro-GE system and then became the CFO. He is on the board of the joint venture now. He is a person who grew in the joint venture when he started his career here, so that value system continues. He is always pushing us saying that this is why we do what we do. Why are you guys not looking in this way, take some more long-term view. The people in the board of the joint venture have been in the board for 5/10/20 years, they have seen the continuity of it. And maybe if you want to stick to this framework, the strategic positioning could probably be expanded by adding the values part. It is important that both enterprises are in-line with both the strategy and values for the joint venture. I would say that it is a critical piece, if you get that right, the rest will follow. You have some challenges, but you will figure that out.*

- In hindsight, what do you think the key drivers really are for the successful collaboration between GE Healthcare and Wipro?

*The same values and the relationships between the CEOs and board members are the two most important key drivers. I think there are some strong processes on how we do certain things. No main decisions are made without the board members. There is a very strong structure for some of these things. If there is a major decision made in GE, there is always the CEO calling the chairman of the board. We do not put it on a piece of paper, because these are habits which are formed over a period of time. It's so intangible, but it is important.*

## C.2 Philips Healthcare (1)

Date of online interview: August 24th, 2020, 10:00 am (CEST)

Interviewee: Executive in PNMS joint venture

Language: Dutch

Before the start of the interview there is an agreement with the interviewee to record the interview and to make a transcript for verification.

- What were the key drivers for Philips Healthcare to start a collaboration with Neusoft in 2004?

*Philips is een bedrijf wat medische systemen maakt, altijd top-end producten met hoge specificaties en een relatief hoge prijs, welke voornamelijk verkocht werden in Noord-Amerika en West-Europa. Philips zag de Chinese markt opkomen, maar ook markten in andere delen van de wereld waar die systemen over-gespecificeerd waren en zeker ook te duur. Daarom wilde Philips in China iets beginnen om systemen te ontwikkelen en te maken, ze wilde deze systemen ontwikkelen in een omgeving waar het gaat om lage kosten en minder hoge specificaties. Deze producten werden niet low-cost producten genoemd, maar value systems. Dit zijn systemen met een hoge kwaliteit/prijs verhouding. De strategisch intentie van Philips was om die systemen in China te ontwikkelen met mensen uit China vanwege de beschikbaarheid en de lagere kosten van ontwikkelaars. Hierdoor kregen de systemen ook makkelijker toegang tot de Chinese markt wat betreft regulering. In China is er ook een soort FDA (Food and Drug Administration), waar een product van buiten China een traject van 1,5 á 2 jaar moet doorlopen voordat het nieuwe product vrijgegeven wordt voor China. Maar als het product gemaakt wordt in China met een Chinese partner, dan kan dat traject sneller doorlopen worden. Neusoft had hele goede contacten, Neusoft was een bedrijf waarmee de Chinese overheid de ambitie had om onafhankelijk te worden als het gaat om medische systemen, qua ontwikkeling en fabricage, zodat zij geen producten meer hoefde te kopen van Philips, General Electric of Siemens. Dat is altijd de ambitie van de Chinese kant geweest. Philips wilde toegang tot de markt en goedkope arbeidskrachten in grote aantallen.*

- What were the key drivers to choose for a joint venture as type of alliance?

*Philips startte een joint venture met een Chinese partij om de processen voor het vrijgeven van producten te versnellen. De topmannen namens Philips in de joint venture werkte samen met professor Liu van Neusoft, hij was een prominent persoon in dat gebied. Hij noemde zichzelf een kind van de partij, hij heeft zijn hele carrière te danken aan de communistische partij en hij was lid van het Chinese volkscongres. Ieder jaar bij de grote bijeenkomst was professor Liu een van de mensen die in die zaal zat, via hem had de joint venture hele goede contacten. Op een bepaald moment kwam Karvinen op bezoek in Shenyang en was er een lunch georganiseerd met de burgemeester van Shenyang en zijn hele entourage. De burgemeester moest ook achter de joint venture staan, want dan kon er geregeld worden wat er geregeld moest worden. Shenyang mag niet onderschat worden, in die tijd was het al een stad van 5 tot 6 miljoen inwoners. De burgemeester gaf aan dat het een mooie*

samenwerking is en er gebeld kon worden wanneer er iets moest gebeuren zodat hij het kon regelen.

- How did both enterprises consult each other to define the business model for the joint venture?

*Dat is denk waarom het aan het einde weer ontvlochten is, Philips had de intentie om samen met Neusoft die value systems te maken, die Philips met name buiten China wilde verkopen, maar ook gedeeltelijk in China. Neusoft zou dan ook die value systems hebben en zij zouden met name de verkoop in China doen. Toen de joint venture er was werd al snel duidelijk dat zij helemaal niet geïnteresseerd waren in de value systems want dat konden zij zelfstandig wel. Zij waren geïnteresseerd in de geavanceerde technologie van Philips. Zij wilde niet een 1,5 tesla MRI maken, maar een 3 tesla MRI en wilde niet een basis CT maken, maar de meest geavanceerde CT. Neusoft verwachtte dat Philips al deze kennis in de joint venture bracht, maar dat wilde Philips niet want dan waren zij al die kennis kwijt. Want Neusoft was actief met verkopen in China, maar werd ook steeds actiever met verkopen buiten China. Zij gingen buiten China distributeurs benoemen, die distributeur gingen al snel de boodschap in de markt brengen dat het Neusoft product gelijk is aan het Philips product maar dan voor de helft van de prijs. Toen kwamen er in de markt conflicten tussen de Neusoft verkooporganisaties en de Philips verkooporganisaties. Daar zijn eindeloze vergaderingen over geweest, Neusoft zei dat je distributeurs niet altijd in de hand hebt, daarover bleef gesteggeld worden. In het begin leek het erop dat het een hele succesvolle joint venture kon worden, ook omdat Neusoft niet zomaar een bedrijfje was. Zij waren heel goed gelinieerd aan de communistische partij, heel goed gelinieerd aan de lokale overheid en er was een goede link tussen Neusoft en de universiteit in Shenyang. Ieder jaar kwamen de beste studenten in allerlei richtingen bij Neusoft werken. Neusoft was best wel geavanceerd, zij hadden een hele Neusoft campus gebouwd en mensen die van de universiteit kwamen kregen een appartement en allerlei voorzieningen en die gingen daar dan ook graag werken. De campus was groot, de mensen woonde, werkte en sportte daar, dat was voor Philips gunstig want daar waren mensen die slim waren en bereid waren om heel veel te werken om al die ontwikkel projecten te doen. De specifieke healthcare kennis hadden ze onvoldoende en daar hadden ze Philips voor nodig, terwijl Philips niet zomaar alle kennis in de joint venture wilde brengen om te voorkomen dat ze een sterke toekomstige concurrent creëren. Want in die tijd was Neusoft wel al actief op healthcare gebied of was het meer IT gerelateerd? Oorspronkelijk waren ze IT gerelateerd, ze hadden al een aantal pogingen gedaan om op healthcare gebied wat te doen maar hadden hulp nodig. Neusoft had een ander ontwikkel model dan Philips, als Philips met een nieuw product komt moet het uitgebreid getest zijn en moet het van een kwaliteitsniveau en stabiliteit zijn wat Philips geen imago schade kan berokkenen. Bij Neusoft was dat veel minder, die hadden de aanpak om zo snel mogelijk iets te ontwikkelen wat niet helemaal volmaakt is en waar kinderziekten in zitten en toch zo snel mogelijk in de markt gezet wordt met name in de ziekenhuizen in Shenyang en in de rest van China. Dan gaat er van alles fout, daar wordt van geleerd en het ontwikkelteam moet dan heel snel oplossingen aandragen voor de problemen die naar bovenkomen. Dat was een groot verschil tussen Neusoft en Philips, Philips wilde geen Philips systeem waar klanten allerlei problemen mee hadden want dat zou de brand image schaden. Van Neusoft werd dat geaccepteerd in de ziekenhuizen omdat zij wisten dat de problemen van het systeem binnen een paar maanden voor het belangrijkste gedeelte worden opgelost. De ziekenhuizen hebben dan toch een heel goedkoop systeem kunnen kopen en accepteren dan dat het systeem niet altijd werkt, voor Philips kon dat niet. Vanuit het hogere management was er een sterke push om de joint venture te vormen, andere topmannen waren heel sceptisch over het opzetten van deze joint venture en gaven aan dat Neusoft waarschijnlijk hele andere plannen en ideeën hadden met de joint venture. Strategisch gezien waren er grote verschillen tussen Neusoft en Philips, vroeg of laat zou dat gaan wringen. Karvinen kwam van het Zweedse ABB en had in het verleden een joint venture in Beijing in China gestart en gaf aan dat de joint venture met Neusoft doorgedrukt moest worden. Echter, deze joint venture maakte elektromotoren, slechts een component van een systeem wat de Chinezen wel kunnen. Een compleet medisch systeem*

*maken waarbij niet alleen technische kennis nodig is, maar ook applicatie kennis: hoe die systemen in ziekenhuizen worden gebruikt, dat kan niet in 1 of 2 jaar geleerd worden. De joint venture werd doorgedrukt en de andere topmannen moesten er het beste van maken om de schade te beperken. In de onderhandelingen werd ervoor gezorgd dat Philips niet met huid en haar overgeleverd werd aan een Chinese partner, daarom werden er afspraken gemaakt over welke systemen er door de joint venture gemaakt werden. Al snel werd duidelijk dat in de projecten die voor Philips van belang waren weinig vaart zat want daar lag hun interesse niet. Zij zeurde over de projecten waar zij geïnteresseerd in waren maar die Philips eigenlijk niet wilde.*

- Which medical devices became reverse innovations during the joint venture?

*Philips was er zelf achter gekomen dat het niet lukt om een high-end systeem te downgraden op bepaalde punten, dat lukt alleen maar als vanaf dag 1 de target prijs van het systeem duidelijk is en duidelijk is wat het systeem moet kunnen. Dan moet vanaf sketch een low-cost systeem gemaakt worden. De hoop was dat een Chinese partij veel kennis in huis had voor het ontwikkelen en designen van low-cost systemen, maar dat bleek tegen te vallen. In het bedrijf was de politieke keuze gemaakt dat de joint venture er moest komen, daarom werd er minder diepgravend en due diligence onderzoek gedaan naar de capaciteiten van Neusoft. Karvinen had de perceptie dat de mensen in Best, maar ook de Philips mensen in Amerika waar CTs gemaakt worden, alleen high-end systemen konden maken, terwijl de Chinezen weten hoe value systems gemaakt moesten worden. De joint venture heeft low-cost CTs gemaakt en röntgengeneratoren, aan het begin zaten daar haken en ogen aan, maar uiteindelijk zijn daar producten uit gekomen die Philips wereldwijd heeft verkocht. Het probleem bleef in de joint venture dat Neusoft helemaal niet geïnteresseerd was in die systemen. Zij wilde naar de top-end systemen en daarop bleef het wringen. Over projecten voor low-costs systemen werd eindeloos gedebatteerd of er gestart moest worden en zij waren aan het pushen voor high-end systemen.*

- How did both enterprises consult each other to define clear and shared goals and objectives for the joint venture at the time of the establishment of the joint venture?

*Neusoft wilde graag de joint venture omdat ze op een legale manier ongekend veel kennis binnen konden halen van Philips. In dat deel van het traject waren ze ook bereid om bij Philips de illusie te wekken dat beide partijen strategisch aligned waren. Aan de voorkant waren goals en objectives overeengekomen, later kwamen zij daarop terug. Wat ook niet goed werkte is dat de joint venture bijna geen geld meer mocht kosten van Philips. In Shenyang startte BMW een joint venture met een Chinese partij om BMWs te bouwen. BMW had binnen de kortste keren 50 mensen vanuit Duitsland in de joint venture werken en ze hadden met Lufthansa afgesproken dat er drie keer per week vanuit Frankfurt een rechtstreekse vlucht naar Shenyang was om daar zo snel mogelijk de zaak daar op BMW-niveau te krijgen qua kwaliteit en organisatie. BMW investeerde daar gigantisch in omdat zij geen zin hadden om Chinese BMWs te krijgen die na 10.000km uit elkaar vallen. Bij Philips, toen die joint venture er was, mocht het niets meer kosten, toen was er een gigantische discussie hoeveel mensen naar China mochten. In de joint venture zaten 500 mensen waarvan 3 tot 5 mensen van Philips waren, zij hadden bijna geen invloed, ook al was de directeur van Philips en nog een aantal leidinggevenden. Echter was de meerderheid van Neusoft waarvan een groot deel geen Engels sprak, alleen Chinees. Er waren maar een paar mensen die voldoende Engels spraken en daarmee moesten de Philips mensen communiceren. Vanuit Europa werden mensen naar China gestuurd voor circa 2 weken om ze dingen te leren of af te spreken, dan werden er twee stappen vooruitgezet en een maand later was er weer een stap achteruit gezet. Op papier leek het alsof Philips de leiding had van de joint venture, maar in werkelijkheid helemaal niet. De mensen in de organisatie deden precies wat hen door Neusoft opgedragen werd, Philips had daar helemaal geen grip op.*

- To what extent was the consult mission, governance, strategy and structure for the alliance as

proposed by both enterprise?

*Zie het antwoord van de vorige vraag.*

- How did both enterprises consult each other to define new goals and objectives when there were changes made in the individual enterprises?

*Eens per maand was er een joint venture overleg met ellenlange discussies, die altijd over geld gingen en waar de prioriteiten zouden moeten liggen. Een ander punt wat ons ook in de wielen reed was dat professor Liu, de CEO van Neusoft, heel goed gelinieerd was aan de communistische partij en snel toegang had tot meneer Kleisterlee. En Karvinen had het idee dat de Chinezen alles beter wisten, dus zat het topmanagement klem want een aantal dingen gingen niet zoals gewenst maar daarover kon niet gesproken worden.*

- What were the similarities and differences in perceived goals and objectives of the enterprises at the time of the establishment of the joint venture?

*Neusoft was vanaf het begin niet echt in de value systems geïnteresseerd omdat ze de overtuiging hadden dat ze dat ook zelf wel konden. Zij waren meer geïnteresseerd in de high-end systemen dat hebben ze aan de voorkant nooit duidelijk gemaakt. Dat bleek later toen Philips projecten wilde starten voor de value systems en van tevoren werd het beeld gecreëerd dat zij veel kennis en ervaring hadden op het gebied van medische systemen en dat bleek achteraf ook niet zo te zijn. Zij wisten veel meer van IT af dan van medische systemen, dat waren uiteindelijk twee tegenvallers voor Philips.*

- What was the ratio in contributed resources and skills (knowledge, assets, human resources) by the establishment of the joint venture?

*Kwantitatief was de verhouding Philips/Neusoft: 5/500, maar kwalitatief was de verhouding 80 á 90% kennis van Philips, er gingen van Philips veel mensen die kant op om kennis over te brengen en Neusoft zoog dat op als een spons. De faciliteiten waren van de joint venture.*

- How much resources and skills are contributed by the enterprises during the joint venture?

*Philips bracht tijdens de joint venture continue meer kennis mee dan dat Neusoft dat deed.*

- How did the ratio in contribution by the enterprises in the joint venture evolve over time?

*Deze vraag kan meneer [anoniem] heel makkelijk beantwoorden, hij heeft dat in kaart gebracht. Het is dus een vraag waar je zeker bij hem mee terecht kunt. Qua kennis inbreng is het altijd Philips geweest die kennis moest inbrengen en niet zo zeer Neusoft, zij voelde zich daar niet toe geroepen. Zij zagen hun bijdrage in mensen en faciliteiten als gebouwen en fabrieken als voldoende en de kennis moest van Philips komen, met name kennis wat Philips niet wilde delen.*

- To what extent did both enterprises review the balance of investments made in the joint venture?

*Daar werd flink over gesteggeld, er werd veel over geld gesproken.*

- To what extent did the negotiation about the contribution of resources and skills take place?

*Neusoft wilde nooit echt geld in de joint venture brengen, zij keken altijd naar Philips om geld in de joint venture te brengen.*

- How did the dependency of both enterprises on the joint venture evolve?  
*Philips had de behoefte om de value systems in hun portfolio te krijgen en nadat het met Neusoft niet lukte is Philips zelf verder gegaan in China. Zij zijn in de buurt van Shanghai, in Suzhou, een Philips vestiging gestart waar zij röntgensystemen, CTs, MRIs en ultrasound systemen zelfstandig als Philips ontwikkelen en produceren. Philips had er wel degelijk een belang bij dat het een succes werd, maar is men uiteindelijk tot de conclusie gekomen dat het met Neusoft niet zou lukken. Zijn de faciliteiten in Suzhou een reactie geweest op de moeizame samenwerking met Neusoft? Neusoft is met name een IT-bedrijf en hun medische tak is ondergeschikt aan het totale Neusoft. Toen de joint venture niet liep was er aan de Neusoft kan geen urgentie de joint venture te beëindigen, bij Philips was die urgentie er wel omdat zij die value systems wilde ontwikkelen in China voor de Chinese markt, maar ook voor de markt daarbuiten. Philips zat klem en stond in de onderhandelingspositie zwak en moest daardoor betalen. Pas na het beëindigen van de joint venture kon Philips zelfstandig opperen in China door contractuele afspraken met Neusoft. Neusoft had goede contacten en kon pogingen van Philips makkelijk blokkeren.*
- To what extent did renegotiation of the contractual terms of the joint venture take place during the collaboration?  
*Er is uitgebreid onderhandeld over veranderingen om tot een betere samenwerkingen te komen, maar uiteindelijk kwam Philips tot de conclusie dat Neusoft gewoon niet wilde en bleek het een kwestie van afkopen.*
- To what extent did shifts in internal policies of the joint venture take place?  
*Dat zou ik zeker aan meneer [anoniem] vragen want die kan een aantal periode onderscheiden in die tien jaar. Bijvoorbeeld de periode dat iedereen er vol goede moed aan begon en de periode dat het duidelijk werd dat er onvoldoende strategische alignment was. Die verschillende perioden heeft hij in kaart gebracht.*
- How did enterprises manage to keep an equal interest (50-50) in the joint venture?  
*Al snel werd duidelijk, bij Neusoft ook, dat zij niet al die kennis zouden krijgen waar ze op gehoopt hadden. Daardoor werd de belangstelling van Neusoft in de joint venture een stuk minder.*
- To what extent did both enterprises recognize new knowledge from the joint venture?  
*Wat we in de joint venture geleerd hebben is toegepast in het opzetten van de eigen Philips organisatie in Suzhou. Veel Neusoft mensen werkte niet meer bij Neusoft toen Philips de organisatie in Suzhou begon, kennis wat eerder is vergaard is ook kwijtgeraakt, zeker op managementniveau. Op niveaus lager in de organisatie werken nog wel dezelfde mensen, daar blijft de kennis wel. Kennis op managementniveau is moeilijk te documenteren, er was geen proces om de kennis vast te leggen en over te dragen. Uiteindelijk is dat wel gedaan door een post-mortem studie die meneer [anoniem] heeft gedaan, toen is er voor toekomstige generaties vastgelegd wat er is gebeurd, wat er is misgegaan en wat beter had gekund. Dat is een formeel project geweest waar in de toekomst van geleerd kon worden.*
- How did the enterprises assimilate and apply this knowledge beyond the joint venture?  
*Zie het antwoord van de vorige vraag.*
- How did the enterprise manage that new knowledge will be recognized, assimilated and applied throughout the enterprise?

*Zie eerder antwoord.*

- What has been learned from the collaboration partner?

*Zie eerder antwoord.*

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed market multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

Strategic positioning. To what extent the strategy of the joint venture is in line with the strategy of both enterprises.

Balanced contribution. To what extent the enterprises contribute equally to the joint venture in terms of resources and skills.

Symmetry. To what extent the enterprises are equally dependent on the joint venture.

Bilateral learning. The ability of the enterprises to recognize, assimilate and apply knowledge from the joint venture beyond.

- Based on your experience, how do these four dynamics relate to each other? In other words, an improvement in which alliance dynamic has the most positive impact overall and how do the other three dynamics change as a result?

*De strategic intent, als er samengewerkt wordt in een joint venture en er blijkt dat beide partijen dit om verschillende redenen doen, die haaks op elkaar staan, dan gaat de samenwerking mislukken. Strategisch moeten beide bedrijven volledig aligned zijn, zodat gezamenlijk doelen gedefinieerd kunnen worden en samen bereid bent om de resources erin te stoppen om die doelen te bereiken. Als het mis gaat aan de strategische kant, omdat de een linksaf wil en de ander rechtsaf, dan komt niets van de grond.*

- In hindsight, what do you think the key drivers really were for Philips Healthcare to sell its stake in the joint venture to Neusoft?

*Philips zat gevangen in de joint venture, de ontwikkeling van producten en de ontwikkeling van competenties en vaardigheden kwam niet uit de verf. Toen kwam Philips erachter dat het met Neusoft niet ging lukken en wilde van de samenwerking af. Het gevaar bestond dat bij een ruzie met Neusoft Philips in het algemeen in China op de zwarte lijst zou komen, want China hanteert zwarte lijsten en als je als buitenlands bedrijf daarop komt blokkeren ze gewoon al je activiteiten in China. Misschien is dat geen officiële zwarte lijst, maar hij bestaat wel. Dus als Philips ruzie maakt met Neusoft dan bestond het gevaar dat de belangen van Philips in het algemeen in gevaar kwamen. Daarom moesten beide bedrijven tevreden zijn met de afwikkeling van de joint venture, dat heeft veel geld en onderhandelingen gekost. Naast de vier kernelementen is het belangrijk om te bekijken wat het politieke draagvlak is voor een joint venture en te bekijken of de joint venture wordt gestart om de juiste redenen. Deze joint venture is gestart omdat het hogere management dat graag wilde en met het idee dat er iets in China moest gebeuren. Volgens moesten andere mensen binnen Philips de details invullen en er een succes van maken, het hogere management is er vervolgens niet in geïnteresseerd als er vraagtekens gesteld worden. Tegenwerpingen worden van tafel geveegd, maar vroeg of laat is dat niet overleefd te houden. Om bedrijfsspolitieke redenen zoiets willen en doordrukken, maar dan is het uiteindelijk geen lang leven beschoren. Om een succes van de joint venture te maken dan moet er een reëel en bedrijfseconomisch draagvlak voor die joint venture zijn.*

*Het moet niet toevallig de wens zijn van hoger management leden om een joint venture erdoorheen te drukken. Kleisterlee wilde toegang tot de Chinese markt voor Philips in het algemeen en deze joint venture paste goed in dat plan. Het hogere management is ook de board, Karvinen was de baas van de healthcare divisie en zat in de Philips board en Kleisterlee was de president van Philips in het algemeen en zat ook in de board. Een board wordt toch gevormd om de continuïteit van een organisatie te waarborgen? Zo staat het in de boeken, er spelen allerlei andere belangen een rol. Een joint venture in China met de juiste partner, dat is goed voor Philips, maar dan moet wel de juiste partner gevonden worden en niet een partner die andere strategische belangen heeft. Neusoft had doelen en hebben bij de vorming van de joint venture niet het achterste van hun tong laten zien. Zij zorgde voor een goede relatie met de bazen van de mensen waarmee ze dagelijks te maken zodat ze op dat niveau zaken konden doordrukken. Philips is naïef geweest bij de vorming van de joint venture. Had Philips dit kunnen voorkomen met beter onderzoek? Philips zou baat hebben gehad bij een consultantbureau met veel ervaring bij het oprichten van een joint venture in China. Door ervaring heeft zo een bureau veel geleerd en weten aan de hand van een checklist of de kans op succes groot genoeg is. Zij zouden snel doorhebben of de strategieën van beide bedrijven wel aligned zijn. Maar hebben ook de kennis hoe een joint venture gerund moet worden, niet met 5 mensen van Philips in Shenyang en dan verwachten dat je in een organisatie van 500 mensen als Philips invloed hebt. BMW had dat beter in de gaten, zij hadden 50 mensen ter plekke en veel mensen vlogen ernaartoe om zo snel mogelijk daar een BMW-cultuur en BMW-processen in te voeren, om op die manier daar goede auto's te kunnen maken. Dat heeft Philips niet gedaan, ook omdat er mensen bij het hogere management zaten die dachten dat de Chinezen het allemaal veel beter wisten.*

### C.3 Philips Healthcare (2)

Date of online interview: August 26th, 2020, 09:00 am (CEST)

Interviewee: Member of disentanglement team of the joint venture

Language: Dutch

Before the start of the interview there is an agreement with the interviewee to record the interview and to make a transcript for verification.

- What were the key drivers for Philips Healthcare to start a collaboration with Neusoft in 2004?  
*Wij waren de laatste van de drie grote medische technologiebedrijven die geen industriële vestiging had in China, de twee grote concurrenten Siemens en GE zaten daar al. Wij waren dus naarstig opzoek naar een locatie in China, hadden nog nooit een green-field fabriek opgezet, want alle fabrieken die we hadden waren het gevolg van acquisities, met uitzondering van de locatie Best, maar die stond er al 75 jaar. Philips had geen ervaring met een nieuwe fabriek opzetten en geen ervaring met business doen in China, vandaar dat Philips opzoek was naar een joint venture partij om het niet alleen te doen. Philips is bij Neusoft uitgekomen omdat dat ook een speler was op het gebied van healthcare, er waren niet veel kandidaten die een beetje de grootte hadden, ook al was Neusoft niet zo heel groot, waar Philips wat mee kon omdat Philips een groot bedrijf was.*
- What were the key drivers to choose for a joint venture as type of alliance?  
*Om een aantal verschillende redenen, Philips wilde groei van de joint venture laten zien in de top-line, dus Philips wilde die bedragen consolideren in het financial statement, en wilde daarom een meerderheidsaandeel hebben. En Philips wilde controle houden over wat er in de joint venture gebeurde, want Neusoft was een bedrijf wat zelf ook medische technologie naar de markt bracht, zij hadden ook een brand en eigen verkopers. Philips was bang voor concurrentie van de Neusoft in de Chinese markt. De afspraak was dat alleen vanuit de joint venture ontwikkelde producten op de markt kwamen.*



- How did both enterprises consult each other to define the business model for the joint venture?  
*Er is lange tijd onderhandeld, uiteindelijk is er besloten een joint venture te starten met een kleine meerderheid voor Philips, 51/49% was de aandelen split. De board was 50/50 in stemverhoudingen, beide partijen hadden vier stemmen, wat betekende dat men altijd opzoek moest naar een consensusachtig model als er een board besluit genomen moest worden. Vervolgens was er afgesproken dat Neusoft al zijn productontwikkeling in de joint venture zou inbrengen, de producten die zij zouden verkopen gedurende een aantal jaren zouden alleen maar van die joint venture afkomen, zij zouden dus geen andere producten aanbieden dan die van de joint venture. Philips zou de joint venture gebruiken om een deel van hun low-end behoefte in China, maar ook in andere delen van de wereld, af te dekken terwijl de high-end producten gewoon nog uit Europa en Amerika kwamen. Onder welke naam bracht de joint venture producten op de markt? Dat was een heel gevoelig onderwerp, Philips wilde Philips-branded en Neusoft wilde Neusoft-branded, achterop het product zat vaak een sticker met "Produced by Philips & Neusoft Medical Systems". Achterop kon men zien dat het product uit de joint venture kwam, maar aan de voorkant was de brandname verschillend en de look en feel was anders, ook de software zag er wat anders uit. Voor welke partij was dit een gevoelig onderwerp? Vooral Philips was daar erg gevoelig voor, want Philips heeft een premium brand, ook in China, en hebben ook een veel grotere en duurdere organisatie, dus het prijspunt van de Philips producten lag vaak een stuk hoger dan die van Neusoft. Philips was bang dat Neusoft ging concurreren bij de Chinese ziekenhuizen met producten waarvan zij zeiden dat het dezelfde producten zijn als die van Philips.*
- Which medical devices became reverse innovations during the joint venture?  
*De joint venture had een producten portfolio toen het begon, want Neusoft had een aantal producten ingebracht. Deze producten waren niet erg succesvol, Philips dacht, misschien een beetje naïef, dat met inbreng van technologie van Philips de producten redelijk snel naar een hoger niveau geteeld konden worden, dat bleek uiteindelijk heel lastig. Dat was de ambitie, maar in praktijk bleek dat moeilijk. De joint venture is toen gestart met de ontwikkeling van een aantal producten, vooral gericht op de Chinese, lower-end markt, met inbreng van Philips technologie. Vervolgens zouden die producten worden verkocht in China door Philips en door Neusoft verkopers, dus met verschillende brands. Philips zou vervolgens die producten ook internationaal verkopen, Neusoft had op dat moment een beperkt internationaal netwerk. Het meest succesvol zijn de ultrasound producten geweest, die hebben behoorlijk hun weg gevonden in zowel de Chinese als in de internationale markt.*
- How did both enterprises consult each other to define clear and shared goals and objectives for the joint venture at the time of the establishment of the joint venture?  
*In het begin is er een businessplan gemaakt met heel veel groei en allerlei nieuwe producten, een businessplan van een jaar of vijf vooruit. Dat businessplan werd ieder jaar herzien in een jaarlijkse strategie ronde. Philips kende een jaarlijks strategie proces waarin plannen werden aangepast en uitgelegd, daar hoorde ook een financiële projectie bij. Dit proces werd ook gebruikt voor de joint venture, dus jaarlijks een board meeting waarin werd gekeken wat het budget is voor het komende jaar en hoe de komende vijf jaar eruit ziet. In die meetings werd het plan aangepast, in de eerste jaren was dit steeds een bijstelling naar beneden ten opzichte van het oorspronkelijke plan. Er was waanzinnig veel groei voorspeld in het oorspronkelijke plan toen de joint venture werd gevormd, uiteindelijk was er een waanzinnig verschil met de oorspronkelijk ambitie. Waardoor viel de groei van de joint venture tegen? Een aantal dingen, de kwaliteit van de producten die Neusoft had waren ernstig overschat, ook de kennis en kunde van het team van Neusoft wat zij inbrachten in de joint venture was een overschatting. Vervolgens was er bij de Philips businesses heel veel terughoudendheid om kennis en technologie naar die joint venture te sturen en te delen. Philips was namelijk bang dat die technologie in China terecht zou komen, ofwel bij Neusoft ofwel bij anderen, zodat Philips er geen controle meer over zou hebben en ermee zou worden beconcurrerd. De Philips businesses hebben niet*

*allemaal meegewerkt om die groei te bewerkstelligen. Daarnaast heeft Philips weinig mensen naar China gestuurd, er was een meerderheidsbelang van 51% maar op de campus werkte er 500 die van Neusoft af kwamen en drie mensen die van Philips af kwamen, dat was een gigantische onbalans in work-force. Het leiderschap van de joint venture werd gedaan door expats van Philips, zij zijn heel duur want zij brengen hun gezin mee en krijgen hoge vergoedingen. Philips stuurde dus weinig expats, dat betekent dat het heel moeilijk is om technologie van Philips naar de joint venture te krijgen omdat die kennis in de hoofden van mensen zit. Dus (1) het overschatten van de capabilities van de mensen en het product portfolio van Neusoft in het begin en (2) het vrijwel niet overbrengen van kennis en kunde van Philips in de joint venture.*

- To what extent was the consult mission, governance, strategy and structure for the alliance as proposed by both enterprise?

*Er zaten een aantal weeffouten in het design van de joint venture, Philips wilde deze joint venture vooral om een low-end product potfolio te hebben voor China en misschien wat reverse engineering te doen, maar Neusoft had een exclusiviteitsclausule in dat contact staan wat bepaalde dat zij alleen producten van de joint venture mochten verkopen. Dus Neusoft wilde zo snel mogelijk naar een high-end portfolio want zij wilden in China concurreren met low-end en high-end producten, Philips wilde alleen maar low-end en Neusoft was volledig afhankelijk van die portfolio want die hadden en mochten niets anders, dus zij wilden high-end. Vanaf het begin was er al discussie welke producten ontwikkeld en gemaakt zouden worden, vervolgens waren er twee sales organisaties met hun eigen brandname die producten verkochten uit dezelfde fabriek, wat veel wrijving gaf ondanks dat die producten er iets anders uit zagen. Philips hoorde vaak dat Neusoft verkopers zeiden tegen ziekenhuizen om te kijken in de fabriek om te zien dat aan de ene kant een Philips apparaat staat en aan de andere kant een Neusoft apparaat staat. Het Neusoft apparaat was 10% goedkoper. Dat gaf heel veel wrijving aan de business kant en aan de sales kant. En de manier van werken was heel anders, de Neusoft mensen die onderdeel werden van de joint venture hielden allemaal hun Neusoft-emailadres, woonde op de campus van Neusoft en voelde een loyaliteit richting hun oude werkgever en niet naar die nieuwe joint venture. Terwijl de Philips mensen maar met drie waren, zij konden weinig inbrengen. De cultuurverschillen en de manier van werken en de loyaliteit naar die nieuwe identiteit was een groot probleem. De vestiging van de joint venture was op de campus van Neusoft? Neusoft is een groot softwarebedrijf met een beetje healthcare in hun portfolio, de joint venture was een van de gebouwen op hun campus. Philips heeft deze joint venture nooit echt omarmd, ondanks een meerderheid in aandelen, het werd altijd gezien als een bedreiging. Neusoft had geen keuze, zij moesten met de joint venture verder want hadden anders geen healthcare business vanwege die exclusiviteitsclausule in het contract.*

- How did both enterprises consult each other to define new goals and objectives when there were changes made in the individual enterprises?

*Het was altijd moeizaam want er waren veel verwijten over en weer, van jullie doen dit niet en wij doen dat niet. Maar omdat in de board de stemverhoudingen staakten moest er uiteindelijk een compromis komen zonder dat de harde feiten op tafel kwamen. Ieder jaar werd afgesproken het beter te doen door beide partijen. Er was niet een partij de baas, dat gold ook voor de managementposities, er was afgesproken dat Philips de technisch directeur benoemde en Neusoft de vice manager en Philips weer de manager. Als de ene partij iemand neerzette die niet functioneerde en niet competent was, dan had de andere partij daar niets over te vertellen. Dat hielp niet mee om een aligned managementteam te bouwen, want die managers in dat team voelde veel loyaliteit naar degene die hen daar weg had gezet, ofwel de Neusoft familie ofwel de Philips familie. Dus het managementteam was niet aligned en de board was niet aligned, de stemming in de board staakte steeds, dus moest er steeds een compromis gevonden worden. Moeilijke besluiten nemen was vrijwel onmogelijk, het was*

*vrijwel onmogelijk om hard in te grijpen om het anders te gaan doen.*

- What were the similarities and differences in perceived goals and objectives of the enterprises at the time of the establishment of the joint venture?

*Zie eerdere antwoorden.*

- What was the ratio in contributed resources and skills (knowledge, assets, human resources) by the establishment of the joint venture?

*Neusoft bracht zijn product portfolio in, Philips stemde toe dat de joint venture gebruik mocht maken van de Philips technologie en de patenten van Philips voor dat deel van de product portfolio. Philips bracht vooral intellectual property in en Neusoft bracht vooral mannetjes in en bestaande producten die zij hadden.*

- How much resources and skills are contributed by the enterprises during the joint venture?

*Er zijn verder geen investeringen geweest in termen van capital en dergelijke, de scope van de joint venture is nooit echt aangepast. De inbreng van beide partijen is stabiel gebleven.*

- How did the ratio in contribution by the enterprises in the joint venture evolve over time?

*De joint venture was een legal entity, dus die ging mensen aannemen, mensen uit China, want het heeft geen zin om Europeanen daar aan te nemen. Die mensen uit China hadden geen verleden met Neusoft, want zij werden rechtstreeks van de universiteit aangenomen, Dus op termijn verminderde die loyaliteit naar die oorspronkelijke parent company omdat veel mensen daar nooit gewerkt hadden en direct voor de joint venture aangenomen werden. Maar het aantal mensen uit China versus de inbreng van Philips uit Europa bleef natuurlijk hartstikke scheef, dat is nooit rechtgetrokken. Mensen raakte verknocht aan de nieuwe joint venture, het ontwikkelteam van de joint venture werkte samen met andere ontwikkelteams bijvoorbeeld op het gebied van CT-scanners. Op die manier ontstonden er banden tussen de joint venture en Philips mensen, de verhouding van het trekken naar de Chinese partij werd veel meer gebalanceerd gedurende de tijd vooral bij de ontwikkelaars. Niet zozeer in het managementteam, want het managementteam was nog steeds benoemd door of Philips of Neusoft. Stroomde deze mensen door naar managementposities? De managementposities waren afgetikt door Philips en Neusoft, de joint venture heeft niet lang genoeg geleefd om die carrière stap te laten zien. Tussen de ontwikkelaars kwam een betere dynamiek in termen van samenwerkingen en dergelijken. Belangrijk is dat beide partijen bekijken of zij met de joint venture hun doelen kunnen bereiken, deze doelen zijn vaak verschillend. Er was niet goed over nagedacht dat de producten uit een fabriek door twee verschillende verkooporganisaties op de markt werden gebracht. Doordat er concurrentie was bij ziekenhuizen waar twee partijen met hun product aankwamen, ontstond wrijving en veel weerstand aan de Philips kant om meer complexe technologie te delen met de joint venture. Philips was bang dat op die manier een concurrent werd opgericht en de concurrent sterker werd gemaakt.*

- To what extent did both enterprises review the balance of investments made in the joint venture?

*Dat is alleen aan het begin gedaan, vervolgens werd er ieder jaar een budget gemaakt en dat was geld van de joint venture, er ging verder geen geld in van beide partijen.*

- To what extent did the negotiation about the contribution of resources and skills take place?

*Zie eerdere antwoorden.*

- How did the dependency of both enterprises on the joint venture evolve?

*De afhankelijkheid van de joint venture was totaal uit balans, een van de grotere problemen, Neusoft had toegestemd in een exclusiviteitsclausule waardoor zij alleen hun medische apparatuur die zij wilden verkopen uit de joint venture mochten halen. Dus als die joint venture besloot een bepaald product niet te maken dan had Neusoft geen product, terwijl Philips dat product gewoon in Europa of Amerika kon laten maken. Philips kon een compleet product portfolio aanbieden, terwijl Neusoft alleen maar kon aanbieden wat uit de joint venture kwam. Dat gaf heel veel spanning, want Neusoft wilde het product portfolio zo groot mogelijk maken en zo high-end mogelijk. Terwijl dat voor Philips niet nodig was omdat zij die producten al hadden en ergens anders konden laten maken, dus een zeer grote onbalans in termen van afhankelijkheid.*

- To what extent did renegotiation of the contractual terms of the joint venture take place during the collaboration?

*Na vijf jaar mocht Neusoft ook producten elders vandaan halen en dat heeft de zaak nog verder op scherp gezet, want toen gingen zij opzoek naar Chinese samenwerkingspartners voor producten, op een gegeven moment hebben ze gewoon besloten om zelf die producten te gaan ontwikkelen. Net zoals Philips zijn eigen ontwikkelorganisatie had voor andere producten is Neusoft daar ook mee begonnen. Zij waren op een gegeven moment uit die exclusiviteitsclausule die vijf jaar liep, hierdoor ging de levensvatbaarheid van de joint venture nog verder achteruit omdat Neusoft niet meer alles van de joint venture af hoefde nemen, zij konden elders shoppen voor producten. Ten tweede, zij vroegen engineers, die natuurlijk op de campus woonde, om weer voor Neusoft te komen werken. Vooral de knappe koppen maakte de overstap naar Neusoft en dan gaf nog meer spanning tussen de twee parent companies. Neusoft wilde niets weten van een verlenging van de exclusiviteitsclausule en daar is dus ook niet over gesproken. Philips was ook niet zo tevreden met de joint venture, het was niet wat ze ervan gehoopt hadden, dat was namelijk low-end producten maken van hoge kwaliteit die Philips in grote aantallen zou kunnen verkopen. Beide partijen waren ongelukkig met de joint venture, dus na een jaar of vijf is er een proces gestart om bekijken hoe Philips van deze constructie af kon komen.*

- To what extent did shifts in internal policies of the joint venture take place?

*Vanwege de ambities van beide parent companies was het niet mogelijk om de stragic intent aligned te krijgen, Philips wilde een low-end producten portfolio hebben maar wel kwalitatief goed want het moest passen binnen de Philips brand, want de Philips brand staat voor kwalitatief goede producten. De Neusoft ambitie was om een heel grote healthcare company te worden in China met een volledig product portfolio van low-end tot high-end. Vanaf het begin was er een grote strategische mis-match en Neusoft werd aan het begin gelimiteerd door die exclusiviteitsclausule en Philips voelde een bedreiging, achteraf was dit een set-up to fail. De joint venture heeft een aantal zaken goed gedaan, de ultrasound product portfolio was een knap staaltje reverse engineering, die producten zijn best wel succesvol geweest in het lower-end van het portfolio, Philips verkocht daar heel veel producten van wereldwijd, dat was denk het meest succesvolle productplatform uit de joint venture. De joint venture maakte verder nog CT-scanners, x-ray apparaten en uiteindelijk ook MR-scanners, maar ultrasound was duidelijk de favoriet en deed het wereldwijd ook heel goed, het was een goed product en goed geprijsd. Maar alle andere productlijnen gingen uitermate moeizaam.*

- How did enterprises manage to keep an equal interest (50-50) in the joint venture?

*Het was lastig om een aligned interest te houden omdat die interests vanaf het begin af aan niet aligned waren, daardoor konden ook geen harde besluiten genomen worden omdat er geen vertrouwen was en geen meerderheid in de board geworven kon worden door een van de twee partijen.*

- To what extent did both enterprises recognize new knowledge from the joint venture?  
*Er was een uitgebreide intellectual property clause gemaakt dat de kennis en kunde die in de joint venture werd gebracht aan het begin, of die van Philips of van Neusoft kwam, bleef van de parent company, maar de joint venture mocht dat gebruiken. Alles wat de joint venture ontwikkelde mocht gebruikt worden door de joint venture en toen de joint venture ontmanteld werd mocht die kennis door beide partijen worden gebruikt. Werde er tijdens de joint venture betaald voor de intellectual property? Philips kreeg, gedurende een aantal jaren, een paar procent royalty's voor de kennis en kunde die Philips in de joint venture heeft gebracht in het begin. Dat was een geaccepteerd model door beide partijen.*
- How did the enterprises assimilate and apply this knowledge beyond the joint venture?  
*De intellectual property van de joint venture bleef van de joint venture en mocht niet zomaar door Philips of Neusoft worden gebruikt. Hoe verliep deze afspraak toen Neusoft een eigen medische afdeling begon na de eerste vijf jaar? Dat was lastig te controleren, zij namen personeel over van de joint venture en daardoor ging Philips ervan uit dat er ook kennis en kunde uit die joint venture vertrok naar Neusoft, dat heeft Philips nooit kunnen bewijzen. Het is ook lastig om in China een bedrijf voor de rechter te slepen want veel bedrijven hebben banden met de Chinese overheid en Philips had veel andere belangen in China. Philips wilde veel medische apparatuur verkopen aan Chinese ziekenhuizen en die ziekenhuizen zijn ook allemaal in handen van de overheid. Een buitenlands bedrijf is kwetsbaar in China bij de rechter wanneer er ook andere belangen meespelen.*
- How did the enterprise manage that new knowledge will be recognized, assimilated and applied throughout the enterprise?  
*Uiteindelijk heeft Philips de kennis omtrent ultrasound niet uit de joint venture meegenomen, toen zij de joint venture ontmantelde was het niet het geval dat een van de partijen zijn aandelen wilden verkopen aan de andere partij. Beide partijen wilden door met een deel van de kennis en kunde van de joint venture. Philips had intussen veel vertrouwen gekregen in het team dat de CT-producten maakte en Neusoft wilde allerlei andere producten kunnen voortzetten, want zij wilden een grotere medische business bouwen. Uiteindelijk is de joint venture gesplitst, Philips kreeg de CT-groep en Neusoft kreeg de rest. De hele splitsing van: hoe doe je dat? Hoe zorg je dat mensen niet weglopen? Hoe voorkom je dat oneerlijke concurrentie plaatsvindt? En hoe voorkom je dat intellectual property niet wordt misbruikt? Dat heeft heel lang geduurd, vandaar dat de splitsing uiteindelijk vijf jaar heeft geduurd. Met deze kennis, is het verstandig een samenwerkingspartner te kiezen actief in een andere sector? Dat klinkt logisch, dan wordt voorkomen dat een concurrent in het zadel wordt geholpen, aan de andere kant heeft zo een bedrijf dan ook minder waarde want zij brengen dan minder relevante kennis en ervaring mee. Het heeft zeker voordelen maar ook nadelen. De lessen getrokken uit deze joint venture zijn tweeledig, (1) denk heel goed na of de partijen strategisch aligned zijn, of beide partijen op de langere termijn hun doelen kunnen bereiken met hoe de joint venture opgezet wordt. Het was beetje een rush-rush om zo een joint venture te maken omdat Philips voelde dat zij veel te laat waren in China en dus eigenlijk haast hadden. Als Philips daar goed over na had gedacht hadden ze veel ongelukkig voorkomen. (2) Als zo een joint venture wordt gestart moet goed nagedacht en opgeschreven worden hoe de joint venture beëindigd wordt. Want iedereen begint in euforie, we maken een businessplan dat groeit tot in de hemel, we zullen voor altijd best-friends zijn, maar dat is natuurlijk niet zo. Denk eraan hoe je uit elkaar gaat als je uit elkaar besluit te gaan, joint ventures zijn zelden voor eeuwig, ze hebben bijna altijd een houdbaarheidsdatum, er wordt zelden goed over na gedacht hoe men uit elkaar gaat, dat creëert heel veel problemen later. Wat was de beoogde termijn voor de joint venture? De beoogde termijn was waarschijnlijk 20 jaar. Er waren allerlei belastingvoordelen, die hadden een tienjarige timeline.*

- What has been learned from the collaboration partner?

*Zie eerdere antwoorden.*

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed market multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

Strategic positioning. To what extent the strategy of the joint venture is in line with the strategy of both enterprises.

Balanced contribution. To what extent the enterprises contribute equally to the joint venture in terms of resources and skills.

Symmetry. To what extent the enterprises are equally dependent on the joint venture.

Bilateral learning. The ability of the enterprises to recognize, assimilate and apply knowledge from the joint venture beyond.

- Based on your experience, how do these four dynamics relate to each other? In other words, an improvement in which alliance dynamic has the most positive impact overall and how do the other three dynamics change as a result?

*Er was een behoorlijke asymmetrie in termen van afhankelijkheid, Neusoft was in het begin voor de hele healthcare business afhankelijk van de joint venture, terwijl het voor Philips een druppel in een emmer was, want Philips had heel veel andere fabrieken. Het was een erg asymmetrische afhankelijkheid. Strategic positioning is het belangrijkste element, als het daar mis gaat is dat heel moeilijk de corrigeren met de andere drie elementen. Deze joint venture was bijna een schoolvoorbeeld hoe het niet te doen, het ging op heel veel punten mis, het was uiteindelijk een pijnlijke leerschool. Al heeft Philips dat extern minder op die manier gepositioneerd, het persbericht gaf aan dat de partijen uit elkaar groeide en blij waren met wat ze hadden bereikt. Als de strategic positioning niet goed is kan dat niet gecorrigeerd worden met eventueel andere dingen. Welke belangen speelde er binnen Philips nog meer buiten de kennis en producten die uit de joint venture zouden moeten komen? Philips was de enige van de grote drie medische partijen die niets hadden in China, het senior leadership van Philips, van de healthcare business, wilde heel graag succes laten zien. Vandaar dat Philips redelijk snel en te weinig doordacht een joint venture is gestart. Er was een prestige waardoor niet alle checks en balances op de goede manier zijn uitgevoerd. Tijdens het ontvlechten van de joint venture was Philips geïnteresseerd in delen van de activiteiten, Philips was bereid alles te kopen als het had gekund, maar daar wilde Neusoft niet aan mee werken, zij waren erg afhankelijk van hun portfolio van de joint venture, zij hadden de ambitie om een groot healthcare bedrijf te worden. Als een van beide partijen had gezegd de joint venture te willen kopen en de ander had gezegd dat prima te vinden omdat zij geen belangen hadden daar en genoeg hadden aan een zak geld, dan had de splitsing nooit vijf jaar geduurd. Het heeft uiteindelijk vijf jaar geduurd omdat beide partijen geen afscheid wilden nemen van delen van de activiteiten, toen moest gezocht worden naar een verdeling waar beide partijen vrede mee hadden en waarmee zij verder konden. Op het internet is te lezen dat er een afdeling in Suzhou begonnen is door Philips, kunt u daar meer over vertellen? Deze samenwerking werd zo moeizaam, terwijl Philips het belang in China zag als markt en productie plaats en ook als source van engineering talent. Philips had op een gegeven moment mensen die al eerder een nieuwe fabriek waren gestart, die mensen kwamen van buiten, zij kwamen van GE Healthcare af. Uiteindelijk heeft Philips in Suzhou een grote healthcare fabriek neergezet die volledig Philips eigendom was en daar was Philips van alle problemen af. Die fabriek draaide al voordat de joint venture was afgewikkeld, bij het afwickelen van de joint venture ging het alleen nog maar om de intellectuele eigendommen*

*en de kennis en kunde die in de mensen van de joint venture zat. Philips wilde een deel van het CT-ontwikkelteam hebben en Neusoft wilde de andere delen hebben. Die CT-ontwikkelaars werden onderdeel van Philips en werden gekoppeld aan de identiteit die Philips in Suzhou had gebouwd, al lag dat nog wel twee uur vliegen uit elkaar. Dat werd organisatorisch gezien onderdeel van de Suzhou vestiging.*

- In hindsight, what do you think the key drivers really were for Philips Healthcare to sell its stake in the joint venture to Neusoft?

*Zie eerdere antwoorden.*

## C.4 Philips Healthcare (3)

Date of online interview: August 26th, 2020, 11:00 am (CEST)

Interviewee: Project manager of x-ray and ultrasound in the PNMS joint venture

Language: Dutch

Before the start of the interview there is an agreement to record the interview and make a transcript of it, there is an agreement on the transcript.

*Om wat context te geven, deze joint venture is vanuit Philips gekomen omdat het strategisch een goed idee zou zijn, daarna is er de verschillende business gevraagd om de strategie in te vullen. Dat is gestart met CT, daar was Neusoft het verste mee, daarna is URR, een andere medische business binnen Philips daar begonnen. Op een gegeven moment is ook de CV (cardiovasculaire) groep binnen x-ray gevraagd om met Neusoft samen te gaan werken. Toen begon er een krachtenveld tussen de corporate Philips strategie met de x-ray organisatie die een bepaalde richting op wil en de businesses binnen die x-ray organisatie die dat moesten gaan invullen, die daar hun eigen inzichten en belangen in hebben. Dus een centrale x-ray organisatie met daarnaast eigen businesses binnen de organisatie waaronder dus CT, remote/URR en cardiovasculaire imaging.*

*De joint venture is een strategic rationale geweest vanuit een marketing view, een benadering dat China een groeiemarkt was op het gebied van mid-range producten, een nog niet ontgonnen markt. Er was behoefte aan producten met een Chinese userinterface, in die tijd was het niet gangbaar dat medische producten Chinees ondersteunen. De samenwerking was een manier om regulatory exclusion te voorkomen, zeker in China is er een sterke regulering vanuit de overheid en is het daardoor lastig om market access te krijgen als er geen samenwerking is met een Chinese partner.*

Is een joint venture een voorwaarde om regulatory exclusion te voorkomen?

*Exact, sourcen is niet genoeg, beide partijen moesten samen producten ontwikkelen. Alleen sourcen zou vanuit de Chinese overheid niet goedgekeurd worden.*

*De joint venture was opgericht om een serie mid-range producten op de Chinese markt te kunnen verkopen omdat die markt sterk groeiend was, de joint venture was een manier om daarop te antwoorden. De Chinese markt zou de tweede grootste medische apparatuur markt zijn van het volgende decennium. Lokale productie was belangrijk voor een interessanter price-point voor de economy- en mid-range producten, Philips staat bekend om kwalitatief goede producten die ook duur zijn. In dit soort marktsegmenten moet ingezet worden op het prijspunt van de producten. Ook competitie was een reden, omdat GE en Siemens een grotere rol speelde op het gebied van economy- en mid-range producten. Philips speelde alleen een rol op het gebied van high-end producten, vaak wil een vender een complete range van producten aan kunnen bieden, zeker als de concurrenten dat al kunnen. Vandaar dat men een bedreiging zag voor het high-end segment waar Philips traditioneel inzit, wanneer Philips geen coverage zou hebben in de andere segmenten. Het productaanbod moest een range kunnen afdekken, de markt kan worden gesegmenteerd: high-end, mid-end, rural, blijkbaar*

*is daar een relatie tussen en is het goed om een portfolio te hebben om alle behoeftes van klanten af te kunnen dekken, variërend van high-end tot extreem low-end, als alleen high-end afgedekt wordt kan een partij afvallen.*

*In een analyse van de markt bleek dat China de derde grootste medische markt was en sterk groeide, vandaar de focus op China en de verwachting dat het de tweede grootste markt zou worden. Lokale partijen hoeven geen tender process te doorlopen, dit is lokale wetgeving. Als er Philips op het product staat moet een tender process ondergaan worden, terwijl met Neusoft op het product die kan worden vermeden. Daarnaast vond er een reshape van het healthcare systeem plaats in China met investeringen van de overheid. Philips had een redelijk marktaandeel in de markt voor high-end producten maar nauwelijks in de mid-end en low-end markt. Philips zat overal, in Noord-Amerika en in Europa met een aantal centers, maar ook in Bangalore en Singapore, terwijl China een zwart gat was, China was een natural extension of the industrial network, Philips had daar nog geen coverage.*

Was de joint venture gestart om de markt in China te betreden of ging het om de ontwikkeling van reverse innovations?

*Primair voor de Chinese markt, maar het was ook de bedoeling om de producten voor de rest van de wereld beschikbaar te maken. Ook om mid- en low-range producten ook in andere markten af te gaan zetten, bijvoorbeeld in India.*

*Een kans was de manufacturing omgeving die uiteindelijk voor wereldwijd kon produceren, vooral economy- en midrange producten. Daarnaast het gebruik maken van sourcing, leveraging key suppliers van de Chinese markt including their existing suppliers in the industrial market. Leverage of R&D-resources van Neusoft en de technische expertise die zij al hadden, met hun links naar university network en R&D-talent. Philips zou eenvoudiger over talent kunnen beschikken, dat zou gevoed worden met de global R&D strategy van Philips door het injecteren van kennis van de Philips organisatie aangevuld met lokaal kennis en kennis van de partner, dan was er een sterke R&D-opportunity. Men dacht ook van veel relaties gebruik te kunnen maken, een lokale partij heeft makkelijker ingangen in allerlei instanties in China dan een externe partij. Medische systemen moeten door certificeringstrajecten heen van instanties die gaan toetsen of de voorwaarden die van toepassing zijn op het systeem ingevuld zijn. In Amerika is dat de FDA en in China kennen ze de SFDA, dat is een instantie die checkt of medische apparatuur aan kwaliteitsstandaarden voldoet. Het verbaasde Philips dat Neusoft bepaalde producten goedgekeurd kreeg gezien de normen en status van de producten. Zij waren in staat, met de relaties die zij hadden, goedkeuring te krijgen bij de SFDA, als buitenstaander had dat nooit gelukt. Vandaag de dag gaat dat niet anders, die trajecten zijn voor Philips twee jaar, terwijl een lokale partij daar sneller doorheen komt.*

*Het idee was dat er een footprint gecreëerd werd met een lokale fabriek met lokale R&D en dat de producten die eruit kwamen gelijk waren met alleen een ander label. Dus een product verkocht door Neusoft met een Neusoft label en hetzelfde product met een Philips sticker werd dan door het Philips kanaal verkocht. Dat zou dan ook in andere market verkocht kunnen worden, maar het product was dan precies hetzelfde met uitzondering van de sticker. De naam van de joint venture was PNMS, een legal entity met een managementstructuur met Philips' business controls and code of conduct. Businessunits van Philips konden besluiten hun R&D en manufacturing voor bepaalde product ranges door die joint venture te laten doen.*

*De cv-tak is in 2006 in de joint venture begonnen, steeds meer businessunits werden involved in de joint venture. Voor 49 miljoen euro is 51% ownership verkregen in de joint venture door Philips. In 2006 waren er twee CT-scans gereleased door de joint venture en GXR (general x-ray) heeft ook twee configuraties gereleased om die markten te gaan bedienen. Deze configuraties moesten ook door instanties buiten China worden gecertificeerd om die systemen te kunnen verkopen buiten China. In 2006 werd onderzoek gedaan hoe de kwaliteit van de suppliers verbeterd kon worden. De Essenta RC en Essenta RAD werden geïntroduceerd*



voor de x-ray range, deze zijn ook verkocht in Amerika, Frankrijk en Spanje, hierdoor moest ook het cv-team producten ontwikkelen met de joint venture.

Zijn deze producten wereldwijd een succes geworden?

*Dat viel behoorlijk tegen, Philips heeft behoorlijk veel problemen gehad met de acceptatie van dit soort systemen, de kwaliteit en service van deze systemen is geen kwaliteit geworden. Door de druk van de organisaties voelde verschillende afdelingen de druk om in de navolging van CT en GXR ook gebruik te maken van de joint venture, maar het duurt lang voordat men wist of het allemaal goed werkte. Ook ultrasound heeft in de joint venture gezeten. De eerste challenges waren de transfer van kennis naar de joint venture en de ontevredenheid over de supplier-base, this needed improvement and extension. Wat de gedachtegang was tijdens de oprichting van de joint venture was gebruik maken van de beschikbare en goedkope resources in China en wat men daar voor ogen had was standaarden die in de Shanghai regio in ontwikkeling waren, maar gaandeweg bleek dat Neusoft, wat gevestigd was in de Shenyang regio, sterk gebruik maakte van de lokale infrastructuur. Zij zaten dus helemaal niet in het netwerk wat Philips voor ogen had, wat veel meer gericht was op Shanghai wat veel verder ontwikkeld was dan de Shenyang regio. Daar zat een heel groot probleem, lokaliseren van toptalent en expats was allemaal veel problematischer dan wanneer de joint venture in Shanghai was opgezet.*

*Vervolgens liep de planning en dus de introductie van producten uit en er verbeteringen nodig waren om vervolgprojecten volgens plan te laten verlopen. Philips was zich bewust van het hoge risico op non-quality producten. In de Shenyang regio was het difficult to attract and retain toptalent as wel as expats, er was een heel hoog verloop van 17% binnen een jaar. Het voorstel was om een competent centre China te creëren en daarmee knowledge transfer te versnellen en daarmee ook een sustainable improvement te realiseren. Het idee was om daar 12 expats van Philips aan te spenderen, aangevuld met 20 lokale toptalenten, deze zouden gevestigd moeten worden in de Shanghai regio. Gezocht werd naar mensen in product development, applicatie support, supplier quality, engineering, manufacturing, service, distribution, in totaal 32 man om versneld kennisoverdracht te realiseren. Dit is voorgesteld door de PMS-board om te versnellen en de maturity verder op te krikken voor al die verschillende businesses met als preferred location Shanghai. In Shanghai zat al de research campus van Philips, dus het idee was om dit te koppelen aan de existing footprint van Philips in die regio. Het was dan eenvoudiger om expats en Chinese toptalenten binnen te halen. Neusoft bood veel weerstand hiertegen, zij waren erg regionaal georiënteerd, zij waren tegenstander van de focus naar de Shanghai regio. De businesses moesten veel meer investeren dan voorzien was om goede kwaliteit producten te krijgen, zij dachten daar te kunnen vertrouwen op een goede partner en te kunnen bouwen op een goede infrastructuur, in de praktijk bleek dit weerbarstiger.*

Had Neusoft een medische divisie voor de start van de joint venture?

*Neusoft had inderdaad een medische arm in hun organisatie, zij hadden vooral ervaring op het gebied van CT. Het idee was om naast CT meer producten aan hun portfolio toe te voegen in andere segmenten, XR, CV, Ultrasound, daar had Neusoft nog helemaal geen ervaring in.*

## C.5 Neusoft Medical

Date of online interview: period July 27nd, 2020, until July 31st, 2020

Interviewee: President and strategy officer of Neusoft Medical, close cooperation with joint venture teams

Language: English

Written answers via mail

- What were the key drivers for Neusoft to start a collaboration with Philips Healthcare in 2004?  
*GE and Siemens approached Neusoft with various offers that were not of interest to Neusoft. Thus, both GE and Siemens built their own factories in China. Philips approached Neusoft and together Philips and Neusoft were able to develop a joint venture that met both organization goals and objectives.*

*Philips wanted to break into the developing country markets i.e. China and needed a factory. Neusoft wanted to break into the developed countries (USA and Europe) markets and needed a product that met the needs of the international markets. Develop product together, use one of the factories at Neusoft with Neusoft employees, each company would brand, market and sell the same product under their own brand names thus competing against each other with the same technology. Philips primarily focused the efforts of the joint venture products in the developing countries, while Neusoft focused their efforts on both the developing countries as well as new markets such as the USA and Europe. Philips did sell the product to the low end market in the USA as well, but it was not their lead CT product in the USA. Philips and Neusoft were competitors in all markets. In emerging with the same product. Were import restrictions in China a driver for Philips to collaborate with a local multinational to be able to sell more products in China? “Made in China” has the same significance in China as “Made in the USA” has in the USA. The Silk Road is a national program, Made in China 2025 is a focused program from the Chinese Government.*

- What were the key drivers to choose for a joint venture as type of alliance?  
*Develop product together, use one of the factories at Neusoft with Neusoft employees, each company would brand, market and sell the same product under their own brand names thus competing against each other with the same technology.*
- How did both enterprises consult each other to define the business model for the joint venture?  
*Philips primarily focused the efforts of the joint venture products in the developing countries, while Neusoft focused their efforts on both the developing countries as well as new markets such as the USA and Europe.*
- Which medical devices became reverse innovations during the joint venture?  
*During the 10 years, Philips & Neusoft Medical Systems (PNMS) develop CT, MRI and Ultrasound. There may be other products but these are the ones to my knowledge.*
- How did both enterprises consult each other to define clear and shared goals and objectives for the joint venture at the time of the establishment of the joint venture?  
*PNMS was run as a separate entity. Philips purchased the equipment from PNMS and likewise Neusoft purchase equipment from PNMS. This enable Philips and Neusoft to have independent strategies, pricing, service, applications, project management, marketing, etc. that was 100% separate from each other. PNMS was simply the manufacturer. As the manufacturer PNMS had one goal, create and manufacturer quality products to bring the global market. The products developed were based upon the joint needs of both organizations. In developed markets, Philips may lead with a different CT developed and manufactured 100% by Philips competing against the PNMS product that was position by Neusoft under Neusoft’s brand. The challenge for Philips was Philips couldn’t say anything negative about the PNMS CT because it was the same CT Philips could sell. Neusoft needed new products for the global market. Philips needed cost effective products for the developing countries and a lower cost of manufacturing.*
- To what extent was the consult mission, governance, strategy and structure for the alliance as proposed by both enterprise?  
*The joint venture was a separate entity and just a manufacturer of products for Neusoft and Philips. The mission was to serve out the 10-year agreement.*
- How did both enterprises consult each other to define new goals and objectives when there were changes made in the individual enterprises?  
*During the joint venture no changes took place in goals and objectives, consultation was therefore not needed.*

- What were the similarities and differences in perceived goals and objectives of the enterprises at the time of the establishment of the joint venture?  
None, both parties needed a manufacturing plant for their products.
- What was the ratio in contributed resources and skills (knowledge, assets, human resources) by the establishment of the joint venture?  
*51/49 ownership (Philips/Neusoft)*
- How much resources and skills are contributed by the enterprises during the joint venture?  
*Philips delivered a long history of product innovation.*  
*Neusoft delivered the human resources for manufacturing.*  
*Philips delivered the international technology for product development.*  
*Neusoft delivered the physical plant.*  
*Neusoft delivered the software development and resources.*  
*Philips delivered the international human resources.*
- How did the ratio in contribution by the enterprises in the joint venture evolve over time?  
Not applicable to PNMS, the (ratio in) investments are made during the establishment and did not change over time.
- To what extent did both enterprises review the balance of investments made in the joint venture?  
Not applicable as the balance did not change over time.
- To what extent did the negotiation about the contribution of resources and skills take place?  
Only at the establishment of the joint venture, during the joint venture no changes took place.
- How did the dependency of both enterprises on the joint venture evolve?  
*Both companies needed it each for access to new markets with appropriate product lines.*
- To what extent did renegotiation of the contractual terms of the joint venture take place during the collaboration?  
Did both parties negotiate about an extension of the 10-year agreement during the joint venture?  
*Not to my knowledge. The joint venture served its purpose for both companies. There was no reason to extend an agreement. Philips gained entrance to developing markets and could now position their own products. Neusoft gained entrance into the developed markets and needed to develop their own products without relying on a joint venture.*
- To what extent did shifts in internal policies of the joint venture take place?  
PNMS was just the manufacturer, so no shifts in internal policies took place. Policies were clear from the beginning.
- How did enterprises manage to keep an equal interest (50-50) in the joint venture?  
No management was needed to keep an equal interest in the joint venture as PNMS was just the manufacturer. Both parties bought the product from the joint venture and managed their own strategies, pricing, service, applications, project management, marketing, etc.
- To what extent did both enterprises recognize new knowledge from the joint venture?  
*Philips learned from Neusoft how to work in developing countries.*  
*Neusoft learned new technology from Philips for developed countries.*
- How did the enterprises assimilate and apply this knowledge beyond the joint venture?  
Neusoft needed a product that met the needs of the international markets.

- How did the enterprise manage that new knowledge will be recognized, assimilated and applied throughout the enterprise?
- What has been learned from the collaboration partner? Neusoft learned what is needed for a product to meet the needs of international markets.

Based on existing literature, I developed a conceptual framework about the alliance dynamics between developed market multinational enterprises (DMNEs) and emerging market multinational enterprises (EMNEs) in the context of reverse innovation of medical devices. In this study, I identify four key dynamics that form a conceptual framework of alliance dynamics: (1) strategic positioning, (2) balanced contribution, (3) symmetry and (4) bilateral learning.

Strategic positioning. To what extent the strategy of the joint venture is in line with the strategy of both enterprises.

Balanced contribution. To what extent the enterprises contribute equally to the joint venture in terms of resources and skills.

Symmetry. To what extent the enterprises are equally dependent on the joint venture.

Bilateral learning. The ability of the enterprises to recognize, assimilate and apply knowledge from the joint venture beyond.

- Based on your experience, how do these four dynamics relate to each other? In other words, an improvement in which alliance dynamic has the most positive impact overall and how do the other three dynamics change as a result?

*Joint ventures are extremely challenging for any organization. In my 30 years of experience, developing product then competing with the same product in the same market is also extremely challenging. This joint venture was successful because the PNMS was the OEM, then Philips and Neusoft individually handled their own sales, marketing and service. Each company's goals were very different from each other, and each company was able to achieve their goals through the joint venture products.*

- In hindsight, what do you think the key drivers really were for Neusoft to buy out Philips Healthcare from the joint venture?

*The joint venture served its purpose beautifully. Philips and Neusoft were able to successfully achieve their goals and objectives. There was no reason to continue the joint venture. The joint venture did add one more person in the supply chain which adds costs. Philips had their own product lines that they could introduce to the markets. Neusoft wanted to continue the development of their own CT product line based upon the joint venture models. Eliminating the joint venture eliminated that cost factor. The lessons learned by each company served to enable both companies to going moving forward independently with product development.*

*Philips owned 51% and Neusoft 49% of Philips & Neusoft Medical Systems. At the end of the 10 year agreement, Neusoft bought out the remaining 51% from Philips. Philips had continued evolving their own product lines independent of the joint venture and could take those products into the market Philips gained greater access due to the joint venture. Philips also built their own independent factory in China during these 10 years. Neusoft wanted to continue to develop the product and hired the majority of the Philips people to join Neusoft. Neusoft continued to manufacture the joint venture products for 2-3 years after the joint venture ended, thus being the OEM for Philips in very specific product lines.*

*There was and continues to be an agreement that Neusoft will not service any of the joint venture products sold by Philips and likewise Philips will not service any of the joint venture products sold by Neusoft. The OEMs such as Dunlee for the x-ray tube may not sell x-ray tubes to the other manufacturer's customers.*