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# HOW TO MOVE INNOVATIONS FROM DEVELOPING COUNTRIES TO ADVANCED MARKETS?

A multiple case study of three archetypes of reverse innovation

Master's Thesis
Mira Mielonen
Aalto University School of Business
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Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

**Abstract of master's thesis**

**Author** Mira Mielonen

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**Abstract**

Developing countries are becoming more and more attractive sources for innovations. The concept of reverse innovation has emerged to acknowledge this potential and to highlight the role developing markets play as a source for global solutions.

Prior research on reverse innovation has mainly been focusing on the context of multinational companies in which reverse innovation is seen as a strategy for creating new market opportunities in the developing world. This one-sided research focus underestimates the potential of the phenomenon and its implications. Therefore, the purpose of this study is to examine the concept of reverse innovation from a new perspective. The objective is to identify how developing country innovations can be used as a basis for new solutions in advanced countries and to provide insights on how the reverse innovation process for advanced-country organizations differs from a typical innovation process.

The review of existing literature reveals that transferring an innovation from developing to developed market is in the core of reverse innovation. Therefore, reverse innovation is not a concept that would associate an innovation with specific features, but instead, it should be seen as a process. The process of reverse innovation from the perspective of developed-country organization has four main phases. These phases are concept development, crossover, development and adaptation, and market introduction in advanced market.

The empirical analysis was conducted as a multiple case study and the following three cases were examined with respect to their innovation process: Megamalli, Prevention and Access to Treatment and Care (PACT) and MAC 400 by GE. Both primary and secondary data was used and the data was analyzed by using thematic analysis.

The results indicate that the biggest determinant of reverse innovation process is the so-called crossover phase, which captures the transfer of an innovation from developing to advanced market. From the analysis of the crossover stage in the case innovation processes it was possible to identify three different ways the innovation transfer can take place: 1) idea transfer; 2) method transfer; 3) full innovation transfer. These different archetypes of the reverse innovation process capture the extent to which the innovation is based on the original developing country innovation and the level of adaptation required before it is launched in the advanced market.

Understanding how reverse innovation can be implemented helps companies in advanced markets to identify the most suitable way for them to take advantage of the innovation potential present in developing countries. The archetypes of reverse innovation show that innovating for developing markets is not the only option to do so.

**Keywords** reverse innovation, innovation process, innovation transfer

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**Abstract of master's thesis**

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**Työn nimi** Miten tuoda innovaatioita kehitysmaista kehittyneille markkinoille? Monitapaustutkimus kolmesta käänteisen innovaation mallista

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**Tiivistelmä**

Kehitysmaista kehkeytyy jatkuvasti yhä merkittävämpi innovaatioiden lähde. Käänteisen innovaation konsepti on noussut esille korostamaan kehitysmaiden markkinoiden potentiaalia ja roolia globaalien innovaatioiden syntypaikkana.

Aikaisemmat tutkimukset käänteisestä innovatiosta ovat pääasiallisesti keskittyneet monikansallisten yritysten kontekstiin, jossa se nähdään strategiana luoda uusia markkinamahdollisuuksia kehitysmaissa. Tämä yksipuolinen lähtökohta käänteisen innovaation tutkimiseen rajoittaa konseptin potentiaalia ja sen mahdollisia seuraamuksia. Sen vuoksi tämän tutkimuksen tarkoitus on tarkastella käänteistä innovaatiota uudesta näkökulmasta. Tavoite on tunnistaa, miten kehitysmaainnovaatioita voidaan käyttää perustana uusien ratkaisujen luomiseen teollisuusmaissa sekä luoda käsitys siitä, miten käänteisen innovaation prosessi eroaa tyypillisestä innovaatioprosessista.

Kirjallisuuskatsauksesta käy ilmi, että keskeisessä osassa käänteisen innovaation käsitettä on innovaation siirto kehittyviltä markkinoilta kehittyneille markkinoille. Käänteinen innovaatio ei siis ole käsite, joka määrittelisi innovaatiolle jotkin tietyt ominaispiirteet. Sen sijaan käänteistä innovaatiota tulisi katsoa prosessina. Olemassaolevien teoreettisten mallien perusteella käänteisen innovaation prosessiin voidaan sisällyttää neljä päävaihetta. Nämä vaiheet ovat konseptin luominen, crossover eli innovaation siirto, kehitys ja muokkaus, sekä innovaation tuominen kehittyneille markkinoille.

Tutkimus suoritettiin monitapaustutkimuksena ja seuraavat kolme tapausta analysoitiin niiden innovaatioprosessin suhteen: Megamalli, Prevention and Access to Treatment and Care (PACT) ja MAC 400. Tapaukset koostettiin sekä ensisijaisesta että toissijaisesta aineistosta, jotka analysointiin teema-analyysin mukaisia metodeja käyttäen.

Tulokset osoittavat, että käänteisen innovaation innovaatioprosessin suurin määrittelevä tekijä on niin kutsuttu crossover-vaihe, joka kiteyttää innovaation siirron kehittyviltä markkinoilta kehittyneille markkinoille. Tapausten crossover-vaiheen analyysista on mahdollista tunnistaa kolme eri tapaa, jolla innovaation siirto voi tapahtua: 1) ideaperusteinen siirto; 2) toimintatapojen siirto; 3) täydellinen innovaation siirto. Nämä käänteisen innovaation prosessityypit määrittelevät laajuuden, jolla käänteinen innovaatio perustuu alkuperäiseen kehitysmaainnovaatioon sekä sopeuttamisen tason, jonka innovaatio vaatii ennen sen tuomista kehittyneille markkinoille.

Käänteisen innovaation eri toteutustapojen ymmärtäminen auttaa kehittyneiden maiden yrityksiä löytämään parhaimmat tavat hyödyntää kehitysmaiden innovaatiopotentiaalia. Käänteisen innovaation mallit osoittavat, että innovaatioiden kehittäminen ensin kehitysmaiden markkinoille ei ole ainoa vaihtoehto.

**Avainsanat** käänteinen innovaatio, innovaatioprosessi, innovaation siirto

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# 1. Introduction

## 1.1 Background

Traditionally developed countries have been considered to be the major source for global innovations. This is due to their high-level of technological development and abundance of capital and resources. However, resource-rich Western innovations that are created for the global market fail to address the needs of one major customer group.

Majority of the world's population lives in the developing world. According to the World Bank statistics 6.2 billion people lived in low and middle income countries in 2016. Moreover, it has been estimated that around 10 percent of the world population lives with less than 1.90$ per day (World Bank Group, 2016). These people constitute the so-called bottom of the pyramid (BOP) market with particular needs and living conditions. Life in the BOP market is characterized by several constraints, including but not limited to financial constraints, limited infrastructure, and a general lack of available resources. These aspects are usually not taken into account in global innovations and many Western solutions do not match with the needs of the developing markets.

While the market potential of BOP is not unknown for global companies, the strategies that have been most commonly used to tap those markets have involved adapting existing products and business models used in the developed markets. However, this approach often turns out to be unsuccessful (Prahalad, 2006: 48). The opportunities that exist in the BOP market can only be exploited by prioritizing the needs and requirements of the low-income customers. It is essential to innovate new solutions that are initially targeted solely for the developing markets.

The particular conditions faced by the people in the BOP market make developing countries an attractive source for innovations not only locally but also on the global level. The environment in which those innovations are created is very distinctive in comparison

to the innovation environment in developed countries. New products and services in developing countries are usually created in a very resource constraint environment, which often leads to solutions characterized by features such as low cost, portability, efficiency, sustainability, durability, and the like. The need for products and services with that kind of characteristics is not unfamiliar to advanced markets either. Therefore, the potential of those innovations to provide novel solutions to developed countries is significant.

The application of developing country innovations in developed markets is captured by the concept of reverse innovation. In simple terms reverse innovation can be defined as innovations that have first been introduced to developing country markets and later launched also in advanced markets. The term was initially coined by Immelt, et al. (2009) as a contrary process to the glocalization approach, in which innovations created for global markets are adapted according to requirements of local markets. Since then the phenomenon has been studied in increasing numbers.

Reverse innovation as a phenomenon is particularly interesting as it has important implications both in advanced and developing countries. On one hand it entails engaging Western innovators in innovating solutions for problems in developing countries, while on the other hand, it is about using those developing country innovations to provide solutions to advanced markets. The importance of the concept for businesses is in the new growth opportunities that innovating for developing markets can bring, but also in using reverse innovation as a source for new type of value creation. Knowledge about the impact of reverse innovation in societies in the developed world is still limited, but taking into consideration the features that developing country innovations can have, turning those innovations into global solutions could provide answers to issues related to sustainability, increasing costs, and inefficiency.

## 1.2 Research gap

As the concept of reverse innovation is rather new, literature on reverse innovation remains quite scarce and dispersed. One common trend, however, is the focus on MNCs. Reverse innovation was initially seen as a strategic move for MNCs to gain access to

developing markets and to get their share of global growth (Govindarajan & Trimble, 2012b). As developing markets are becoming more attractive source for innovation, their value creating potential could pose a threat to the competitiveness of western MNCs (Sarkar, 2011). Thus, exporting existing solutions from advanced markets is a failing strategy (Govindarajan and Trimble, 2012a) while reverse innovation allows MNCs to find new sources of innovation and enter new markets in the developing world, and potentially disrupt the existing markets in advanced countries. This strategic perspective, however, means that in order to apply the strategy MNCs have to create new solutions from scratch if they desire to exploit the potential presented by reverse innovation (Govindarajan and Trimble, 2012b).

Focusing reverse innovation research only on the context of MNCs limits the potential of the phenomenon. Reverse innovation is not only about reaching new markets by innovating for developing countries, but it also entails bringing those developing country innovations to the advanced markets. There already exists a variety of developing country innovations and these already existing solutions could have the potential to provide solutions in other parts of the world as well. Yet, it has not been addressed in the existing literature. While most of the literature around reverse innovation focuses on its strategic importance for MNCs, it should not be forgotten that reverse innovation is not limited to the context of MNCs. There is potential also for other types of advanced country firms, like start-ups and SMEs, to find opportunities in developing country innovations.

The concept of reverse innovation has also been studied in comparison to other types of innovations that stem from developing countries (for example, Brem and Wolfram, (2014) and Zeschky, et al. (2014)), but what the academic discussion has been lacking is a more thorough analysis of the process that companies go through when transferring developing country innovations to markets in the developed world. There has been some research on reverse innovation from the point of view of diffusion of frugal innovation (Hossain, et al., 2016), but no attempts to understand what the reverse innovation process entails and whether it differs from a typical innovation process. Moreover, understanding the different archetypes of the reverse innovation process provides valuable knowledge

on how reverse innovation can implemented by different types of organizations and what kind of possibilities it provides for them.

Therefore, the focus of this thesis is on the reverse innovation process but not only from the point of view of MNCs. The intention is to look at reverse innovation as a tool for different type of organizations and explore the different ways developing country innovations can be used as a basis for new solutions for advanced countries.

## 1.3 Research objective

Taking into consideration the above described research gap the objective of the thesis is to understand how organizations in advanced countries can bring developing country innovations to their home markets and what they should expect from the process.

The research will have both academic and practical contributions. From the academic perspective the thesis will aim at increasing the knowledge and bringing new perspectives to the current academic discussions in the field of reverse innovation. The thesis will contribute by examining reverse innovation from the point of view of different types of organizations and not only of MNCs. In addition, the thesis will not focus on understanding how the organizations could innovate in and for developing countries, but instead, the focus will be on the transfer of developing country innovations to advanced countries. Therefore, the main context for the thesis is advanced country organizations.

While the advanced country firms are not the only organizations that can exploit reverse innovation as a strategy to expand into new markets, this study excludes organizations from developing countries because it can be assumed that the process would be very different from their perspective. Moreover, the research context could have been even more focused since there are differences between companies depending on which country they come from. Advanced countries are not a homogeneous group. However, the case study nature and lack of existing cases forced me to keep the context quite broad.

The practical implications of the research will provide value particularly for advanced country organizations. The thesis will contribute by providing insights on new sources

and ways of innovating for their home market and on what can be expected along the innovation process.

With this thesis I seek to demonstrate that reverse innovation process has some specific elements that differentiate it from a typical innovation process.

## 1.4 Research questions

Taking into consideration the objectives of the study I have formulated one main research question and three sub-questions.

The main research question is the following: how can innovators from developed countries use reverse innovation to bring new solutions to their home markets?

The following sub-questions are used to facilitate answering to the main research question:

- What kind of innovations can be reversed?
- What are the different stages in the reverse innovation process for a developed country organization?
- Which factors need to be considered in a reverse innovation process?

## 1.5 Definitions

Certain concepts are used widely across this thesis. In order to avoid ambiguities the following definitions are used for each concept.

**Reverse innovation**

Innovations that are originally created for developing markets and later on transferred to advanced markets

**Developing country innovation**

Innovations that are created in and for developing country markets

**Frugal innovation**

"Innovations specifically developed for resource-constrained customers in emerging markets" (Zeschky, et al., 2014)

**Developed or advanced country/market (used interchangeably)**

The distinction between developing and developed markets is based on the country classification by World Bank. The World Bank groups countries based on their economic status into the following four categories: low-income, lower-middle income, upper-middle income and high income (World Bank, 2017). The high income countries can be classified as developed countries. Hence, the developed countries are those that have GNI per capita higher than $12,236 (World Bank, 2017).

The terms developed countries, developed markets, advanced countries, and advanced markets are used interchangeably, and they all refer to economies included in the high income group.

**Developing country/market**

Developing countries include all the other three income level groups. Thus, developing countries are those countries that have GNI per capita below $12,236 (World Bank, 2017). With this classification countries such as China, India, and Brazil are considered to be developing countries.

The terms developing country and developing market are used interchangeably.

# 2. Literature review

The aim of this section is to provide an overview of current literature and main theories related to reverse innovation. The chapter starts by analyzing the concept of reverse innovation after which the concept is analyzed in terms of innovation process. Finally an analytical framework that illustrates the reverse innovation process is presented.

## 2.1 Reverse innovation as a concept

Innovation can be defined as ”new way of doing things that is commercialized” (Afuah, 2003). It entails finding novel solutions to already existing problems that have not been fully solved yet through commercial means.

The enabling environment created by the abundance of resources and high level of education has made advanced countries an attractive location for innovation activities for many organizations. As a consequence many of the global innovations are created in the developed countries and companies have been using the glocalization strategy, where globally produced products are adapted to local conditions, in their attempt to conquer the markets in the developing world. The emphasis on the glocalization strategy is on the market conditions in the advanced countries. Even if the products are created for the global markets the needs and conditions in the developing markets are ignored.

Reverse innovation challenges the glocalization approach and provides an alternative strategy (Immelt, et al., 2009) that emphasizes the starting point of developing markets instead. Immelt, et al. (2009) introduced the concept of reverse innovation after GE had successfully innovated two products by using this new strategy in the Indian and Chinese markets. The definition of reverse innovation was developed to the form “innovation that is adopted first in the developing world” (Govindarajan and Trimble, 2012b: 4).

As reverse innovation has become more and more popular subject for academic research, also its definition has evolved. Authors have been using varying definitions for the phenomenon. In broad terms it is commonly understood as those innovations that were

first adopted in developing countries and later introduced to advanced markets. However, a lack of conceptual clarity still exists (Von Zedwitz, et al., 2015) and there is no agreed definition for reverse innovation.

Von Zedtwitz, et al. (2015) separate between market-based and development-based definitions of reverse innovation. They argue that the market-based definition focuses only on the location of the market and ignores the other stages that contribute to innovation development. As a response Von Zedtwitz, et al. (2015) introduce a development-based definition for reverse innovation that takes into consideration the whole innovation process and the locations of the different steps in it.

The next sections aim to provide a more thorough understanding of the concept of reverse innovation by using this separation between market-based and development-based definitions by Von Zedtwitz, et al. (2015). The first section takes a look at the definitions that have emphasis on moving an innovation between developing and developed markets, while the second section focuses on definitions that define reverse innovation through the whole innovation process.

### 2.1.1 An innovation transfer approach to reverse innovation

Perhaps the more common way of defining reverse innovation is through a market perspective. The market perspective to reverse innovation looks at innovations according to the markets in which they have been adopted. Consequently, according to this approach reverse innovations are innovations that have first been adopted in developing country markets and later introduced to advanced country markets (Immelt, et al., 2009; Govindarajan and Trimble, 2012b; Govindarajan and Ramamurti, 2011).

This definition does not take into consideration who the innovators are or to what extent developing country actors are involved in the innovation process. All that matters is to which market and in which order to these markets is the innovation introduced. Moreover, the markets are not differentiated by countries or by geographical locations but rather by their economic status, that is, whether they are developing or advanced markets. An

innovation could be developed in Kenya and later introduced to India and China and not be considered a reverse innovation since all of the countries are considered to be part of the category of developing markets.

The market-based definition of reverse innovation is used by many authors. In Table 1 I have listed some examples of definitions that have been given to reverse innovation in the existing literature. If we take a look at the definitions we can see that despite the use of varying wording the main idea behind the concept remains the same. Reverse innovation always involves transferring an innovation from a developing market to a developed market.

TABLE 1. MARKET-BASED DEFINITIONS OF REVERSE INNOVATION

| **Definition** | **Author(s)** |
|---|---|
| "A reverse innovation relates to any innovation that is adopted first in the developing world and later on transferred to the developed economy" | *Sinha, R. (2013)* |
| "Reverse innovation, the two part process whereby innovations are designed and created for emerging markets, and then brought to developed nations" | *Snowdon, A.W., Bassi, H., Scarffe, A.D. and Smith, A.D. (2015)* |
| "Innovations emerging in the developing world considering the local constraints, and later traveling uphill to find applications in the developed world" | *Shan, J. and Khan, M.A. (2016)* |
| "A reverse innovation is any innovation that is adopted first in the developing world and after [move] uphill to the rich countries." | *Garcia Miranda, I., Duran Heras A. and Giraldo Casado E. (2013)* |
| "The process of reverse innovation, where products are first designed for poor countries and then adapted for wealthier countries" | *Judge, B.M., Hölttä-Otto, K. and Winter, A.G. (2015)* |

| | |
|---|---|
| "[…] transfer of ideas developed in emerging markets to developed markets" | *Mendes Borini, F., Costa, S. and de Miranda Oliveira Junior, M. (2016)* |

The choice of wording, however, does influence the way the concept is understood as different word choices have different implications. Perhaps the biggest difference is between the use of word adopt and create or design for. The difference in the implications that the use of these words have might be small but it is still worth to look into.

Both Sinha (2013) and Garcia Miranda, et al. (2013) define reverse innovation by using the word 'adopt'. Innovations that are first adopted in the developing markets and later in developed markets fit their understanding of the concept. The use of the word adopt, however, has some significant implications as it gives a stronger focus on where the innovation is initially sold. If by definition reverse innovation is only about where the innovation was adopted first then where the innovation was developed is secondary. Additionally, what the original objective of the innovation was and even for which market it was originally developed are not given priority.

Instead of defining reverse innovation through market adoption, Snowdon, et al. (2015) and Judge, et al. (2015) give more emphasis on the creation of the innovation. They define reverse innovations as innovations that were first created or designed for developing countries. The definition by Shan and Khan (2016) also takes a similar approach but with an emphasis on the local constraints that influence the creation of the innovation. These definitions imply that reverse innovation is not only about the location of the market but also about the innovation itself. The original purpose of the innovation is more strongly embedded in the definition. It also highlights the notion that the innovation that was reversed was originally a solution created for a market where majority of customers face resource constraints.

Perhaps the most different definition is introduced by Borini, et al. (2016). They define reverse innovation as "a transfer of ideas developed in emerging markets to developed

markets" (Borini, et al., 2016: 175). They still take the market point of view to the phenomenon, but they do not limit the transfer to only consider innovations. They generalize it to concern also ideas that have not yet been developed into a value creating product or service.

An important point to understand in Borini, et al.'s definition is that they discuss the phenomenon in the context of multinational corporations. This means that ideas and innovations are assumed to stay within one organization with subsidiaries in both developing and advanced markets. Thus the transfer of ideas happens between the different organizational structures of one company. The difference between an idea and innovation might be an important separating factor if the final objective of the concept is to identify the roles played by these two different markets within the operations of a single company.

Another possible reason that the authors take this perspective to reverse innovation could be to emphasize the importance of the ideation phase in the innovation process and the fact that transforming those ideas into actual innovations might be better done in another location, e.g. a subsidiary in an advanced country. Nevertheless, the definition ignores an important aspect of the original market-based definition by Immelt, et al. (2009) which is that a reverse innovation should be initially introduced to a developing country market after which it can be transferred to more advanced markets.

### 2.1.2 A process approach to reverse innovation

Despite the prevailing role that the market-based definitions of reverse innovation have had in the literature an alternative interpretation for the phenomenon was developed by Von Zedtwitz, et al (2015). Their definition takes a more process-based approach to the concept. They look at reverse innovation through the frame of innovation flow.

Instead of defining innovations based only on the locations of the markets in which they are launched Von Zedtwitz, et al. (2015) define reverse innovation as "any type of global innovation that, at some stage during the innovation process, is characterized by a reversal

of the flow of innovation from a developing country to an advanced country, and that is eventually introduced to an advanced country's market" (pp.17). The stages of the innovation process identified by Von Zedtwitz, et al. (2015) are ideation, new product development, first market introduction, and secondary market introduction. The authors go further to note that the essential stages in the process are the first three —ideation, development, first market—while secondary market introduction is not an essential part of the flow. The process-based definition is further specified by differentiating between weak and strong reverse innovation. Strong reverse innovation occurs when an innovation "has at least two of its key innovation phases taking place in a developing country" (Von Zedtwitz, et al., 2015: 18).

While the market-based definitions are focusing on the transfer of the innovation between two markets, the process-based definition gives attention to all the phases that play a role in the development of the innovation. Consequently, the concept of reverse innovation expands. Innovations that would not be considered reverse innovations according to the market-based definition become reverse innovations under the process-based approach.

Furthemore, the process-based approach emphasizes that there is not one right way of implementing reverse innovation. Reverse innovation is not a homogeneous concept unlike many other innovation types. It cannot be defined through certain characteristics, but rather, the core of the concept is in the location of the different stages in the innovation process.

### 2.1.3 Implications of the two approaches

Both the approaches for the concept of reverse innovation provide essential insights and perspectives to the phenomenon. In the innovation transfer approach the main focus is on cross-market transfer of an innovation from developing to developed market. Process-based approach, on the other hand, emphasizes the location of all the phases in the innovation process and the dynamics between them.

The original idea behind the concept of reverse innovation was to shift the focus from advanced countries as the major source for global innovations. Reverse innovation brought attention to the potential of developing countries as a source for globally viable solutions. Therefore, the definition that I will be using for reverse innovation in this thesis stresses both the role of the developing countries as a source of the innovation and the transfer of the innovation between developing and developed markets. Hence, I define reverse innovation as those innovations that are originally created for developing markets and later on transferred to advanced markets.

As the definition has a strong focus on the innovation transfer an essential part of the concept is understanding how that transfer takes place. The next chapter examines reverse innovation from the perspective of innovation process.

## 2.2 Reverse innovation as a process

The discussions above reveal that reverse innovation as a concept is more about innovations moving between markets, rather than about specific attributes. This chapter is dedicated to understanding how reverse innovation process has been addressed in existing literature. More specifically, the purpose of this section is to take a more in-depth look at the different stages in an innovation process and to analyze them in terms of reverse innovation.

Since existing literature is still very limited with regards to reverse innovation process I will first look at a more general innovation development process introduced by Rogers (1983) in his work on diffusion of innovation. Following Rogers' model I introduce three different process based models for reverse innovation. All the three models are intended to describe reverse innovation in a different context. The first model is suitable in the context of MNCs, while the second model has a focus on global innovations in the health care sector. The third model that will be discussed in this section was developed especially with European SMEs in mind.

### 2.3.1 Innovation development process by Rogers (1983)

In addition to his famous theory on diffusion of innovation Rogers also found it was important to understand what happens before the innovation is being disseminated among users. As a consequence he identified six steps along the process for developing innovations. These steps are recognizing a problem or need, research, development, commercialization, diffusion and adoption, and consequences (Rogers, 1983). These steps are illustrated in Figure 1.

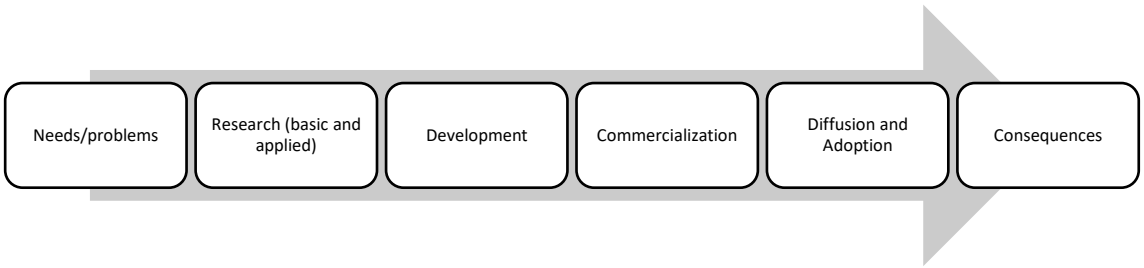


FIGURE 1. INNOVATION-DEVELOPMENT PROCESS (ADAPTED FROM ROGERS, 1983 (PP. 136))

Rogers sees problem or need identification as a stimulator for activities that will eventually lead to the creation of a solution for that specific issue. He goes further to give examples on how the problem identification may take place. There are two examples. The first example demonstrates that problem identification can occur when scientists through their work identify a problem that will take place in the future, and that will cause them to take action and initiate research to solve the problem. The second example, on the other hand, shows how political activity can have the power to give certain social problems a high priority that requires industries and private sector organizations to react to the emerged problem. (Rogers, 1983) These two examples demonstrate some good ways of identifying the need for innovations. However, they are not exclusive as companies today proactively seek to innovate and look for new market opportunities.

The second step of the process is research which is further divided into basic research and applied research (Rogers, 1983). According to Rogers (1983) basic research is “original

investigations for the advancement of scientific knowledge that do not have the specific objective of applying this knowledge to practical problems" (pp.138) while applied research refers to investigations with the objective of finding a solution to a practical problem. The dynamics with the two types is clearly complementary. Basic research is used as a basis for applied research. Rogers (1983) thus concludes that the natural structure of the process of creating an innovation is basic research, applied research, and development (pp.138), which is also the third step in the overall innovation development process.

The development phase of the innovation process is about translating ideas into something concrete. As Rogers (1983) put it "development of an innovation is the process of putting a new idea in a form that is expected to meet the needs of an audience of potential adopters" (pp.139-140). This definition gives an essential role also to the potential users of the innovation. Thus, it requires that innovators take into consideration not only the question of how can the innovation solve the problem in hand, but also how likely it is that the target audience will adopt this particular solution for the problem.

The commercialization phase, instead, integrates all the activities that are required to bring the innovation to the market. In case of a product innovation, commercialization includes, among other things, "production, manufacturing, packaging, marketing and distribution" (Rogers, 1983: 143) of the new product

Diffusion of the innovation is the natural next step in the process after commercialization. Rogers (1983) claims that one of the most critical parts in this stage of the process is timing (pp.146). This claim does make sense as launching a product too early or too late can lead to a failure of that innovation.

The last step of the innovation process looks at the consequences the innovation has put forward. The purpose of this step is to look backwards and see if the innovation actually solved the problem or need for which it was created as a solution. (Rogers, 1983).

Finally, Rogers brings up an important point about the linearity of the model. Despite it being presented as a step-by-step process it should not be assumed that each innovation

development process follows the same steps. Hence, there can be cases where the phases take place in a different order or where some of the phases do not take place at all. (Rogers, 1983)

The innovation-development model by Rogers is used as a basis of the analysis for reverse innovation process. The next sections will introduce three different models that combine — to some extent — reverse innovation and innovation process.

### 2.3.2 Process-based model by Von Zedtwitz, et al. (2015)

The first model to be discussed was developed by Von Zedtwitz, et al. and was partly discussed already in the first section of this literature review as part of the process-based approach. The framework, however, is worth bringing up also in the context of reverse innovation process since it is one of the few frameworks that looks at the concept from the perspective of innovation flow. The focus of this section is to discuss the implications the framework has on reverse innovation as a process.

The framework by Von Zedtwitz, et al. (2015) is presented in Figure 2. The framework takes into consideration both the location and the chronological order of the different stages in the innovation flow. The model highlights particularly the location and the role developing and advanced countries take in the innovation process. The temporal and locational attributes of the model allow for the identification of different types of reverse innovations.

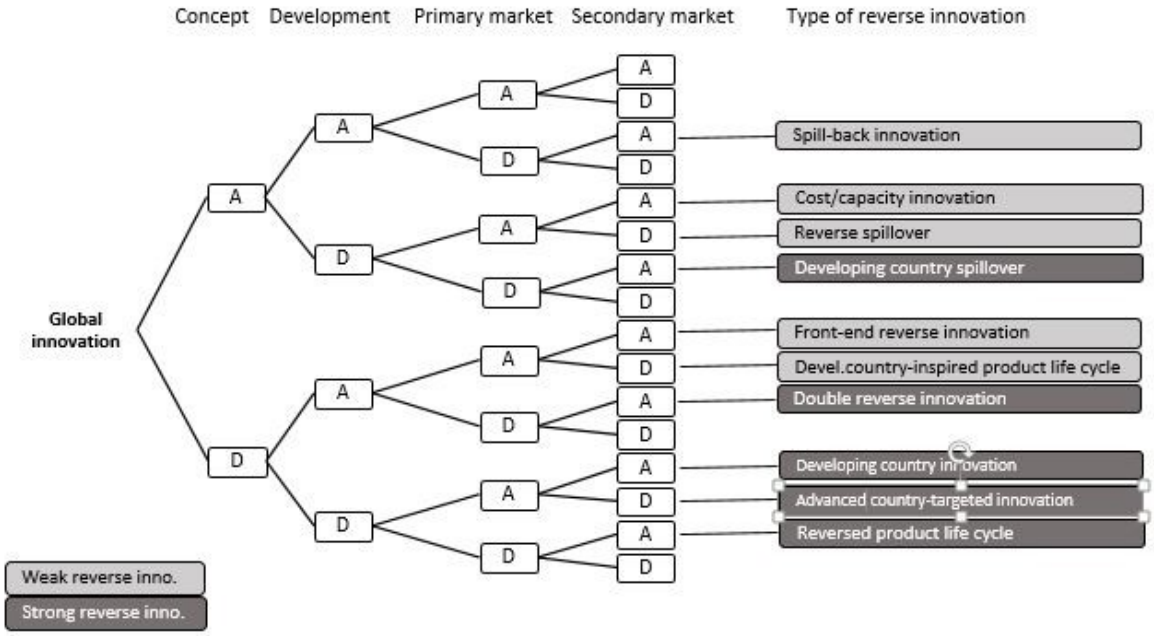


FIGURE 2. TYPOLOGY OF REVERSE INNOVATION (SOURCE: VON ZEDTWITZ, ET AL., 2015)

The steps of the innovation process included in the framework are ideation, development, first market, and secondary market. The steps have been identified based on Vernon's product life cycle model (Von Zedtwitz, et al., 2015). Although the model does not aim to provide a frame for reverse innovation process per se, it does lay out a preliminary idea of the stages that are essential in such process. However, if we look at the steps only from the perspective of innovation process then it is clear that the model is a very simplified version.

In terms of reverse innovation process, however, the important contribution that can be derived from this framework are captured by the two last steps. The presence of two market introductions reinforces the fact that reverse innovation is always a matter of two markets and that in order to be considered a reverse innovation the product or service should be introduced to both developing and developed markets. The presence of two markets is also something that has to be taken into consideration in the innovation process as these markets are characterized by customers with different types of preferences and

needs. That means that the innovation most likely will require some level of modification before entering the advanced market. Thus, adaptation of the innovation is a crucial step in moving the innovation from one market to another and should be considered in the process of reverse innovation. Furthermore, including adaptation as a separate stage in the model for reverse innovation process captures the extent to which the reversed innovation reflects the attributes of the original innovation. The degree of adaptation is likely to vary depending on the nature of the innovation and the extent of the differences between the markets.

In addition, the authors emphasize that even though their model poses an innovation flow that follows a certain order it does not pose any limitation on the temporal length of the flow (Von Zedtwitz, et al., 2015). That means, the time between the different steps could vary from weeks to years. Thus, an important implication is that an innovation that was introduced to a developing market a long time ago and that might not be considered an innovation anymore could still become a reverse innovation if it is re-introduced to an advanced market. What matters is the novelty of the product or service in the second market.

### 2.3.3 Reverse innovation process in healthcare by DePasse and Lee (2013)

The second model that looks at reverse innovation as a process is DePasse and Lee's (2013) model with a focus on reverse innovation in the healthcare sector. Their model is based on several theoretical frameworks, including dissemination of innovation, enablers of reverse innovation, and drivers of adopting an innovation (DePasse and Lee, 2013).

The authors identify four different steps in reverse innovation process (Figure 3). The process starts with identifying a common problem for both developing and advanced countries. The second step focuses on developing country innovation and its diffusion in the developing market, while the third step is the transfer of the innovation from one market to another, i.e. crossover. The fourth and last step in the process is advanced country innovation and its diffusion in the advanced market. I will take a closer look at two of these steps: the crossover and problem identification.

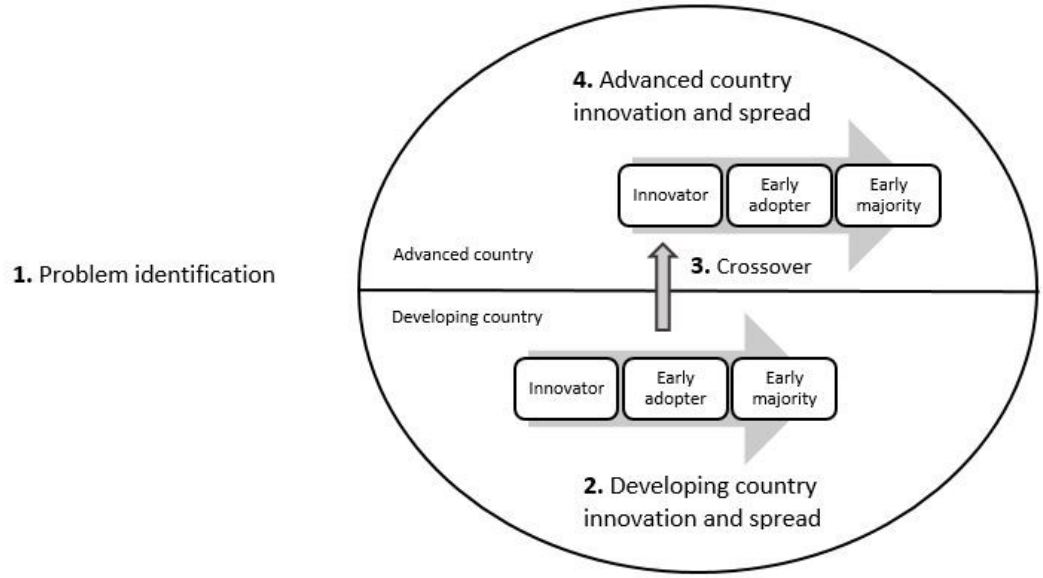


FIGURE 3. MODEL FOR REVERSE INNOVATION PROCESS IN HEALTH CARE (SOURCE: DEPASSE AND LEE, 2013)

Crossover refers to the transfer of an innovation from a developing market to an advanced market. In the words of the authors crossover is the "point where ideas begin to transition between two distinct innovation curves" (DePasse and Lee, 2013). It captures the essence of the innovation transfer approach to reverse innovation and it is a crucial part of the reverse innovation process. Therefore, it is important to include it in studies that aim to understand how reverse innovation takes place.

However, the main argument that the authors make about the crossover point is that it is more likely to take place between early adopters in developing markets and innovators in advanced markets. As a consequence the authors suggest that in order to enhance the transfer of innovation, early adopters in developing countries and innovators in advanced countries should be connected. (DePasse and Lee, 2013) This argument remains somewhat debatable. The assumption that innovation transfer happens mainly through

the early adopters and innovators limits the crossover step drastically, and consequently constraints the way the transfer of possible reverse innovations is seen. It also implies that the innovation that is going to be reversed has to be rather new for developing countries as well. This in turn means that already existing and older solutions specific to developing country markets would not fall into the category of reverse innovation even though they would be new and innovative solutions in advanced markets. This goes against the argument by Von Zedtwitz, et al. (2015) that there is no time constraint in the reverse innovation flow.

The other step that I would like to bring up from the model is problem identification. Problem identification was not included in the model of Von Zedtwitz, et al. (2015) perhaps because it is something that could be seen as being part of the ideation phase. However, problem identification is a crucial step in creating new solutions especially in the context of reverse innovation and deserves to be recognized as its own step. Problem identification in reverse innovation is based on the premise that the developing markets and advanced markets — despite their differences — face similar kind of challenges.

According to DePasse and Lee (2013) finding a problem is the starting point for reverse innovation at least in the context of health care. They set two conditions for this kind of problem. The problem should be: "(1) common to both LICs and HICs, and (2) subject to more favorable innovation conditions in the lower-income setting" (DePasse and Lee, 2013: 3). Hence, DePasse and Lee suggest that the process for creating a reverse innovation should start with identifying a problem that can be found in both developing and advanced countries. This implies that reverse innovation in the first place has the objective of being a global innovation. It seeks to solve a global problem that is present in different types of contexts.

It seems to be a fair assumption that the success of developing country innovations in advanced markets is based on some similarities shared by the two settings. Because of this it is important to understand those similarities — both with respect to needs and problems. However, assuming that recognizing those similarities should take place

simultaneously is a strong suggestion that restricts the concept of reverse innovation quite a lot. This assumption would, for example, exclude those innovations that were initially created only for the purpose of meeting a need of a developing market, and that only later on in time was found to be useful and applicable also in the advanced markets.

Despite these debatable arguments made by DePasse and Lee (2013) their model of reverse innovation process provides an essential contribution to theory on reverse innovation by introducing the crossover step as a separate stage in the innovation process.

### 2.3.4 Reverse innovation process for European SMEs by Sinha and Dell (2014)

The third model for reverse innovation process to be presented was developed by Sinha and Dell (2014). What makes this model different from the other two is the context in which it focuses on. Sinha and Dell have identified the imbalance in reverse innovation research and have developed their model particularly for European SMEs.

The model by Sinha and Dell (2014) aims to illustrate the process European SMEs go through during the development of reverse innovations (Figure 4). They identify a total of 16 phases along the process from problem identification all the way till launching the innovation. Some of the phases take place several times during the process. For example, the phase “simplify” occurs three times before the market test and launch of the innovation. The overall aim of this process is to create innovations that are simplified and directed for global markets.

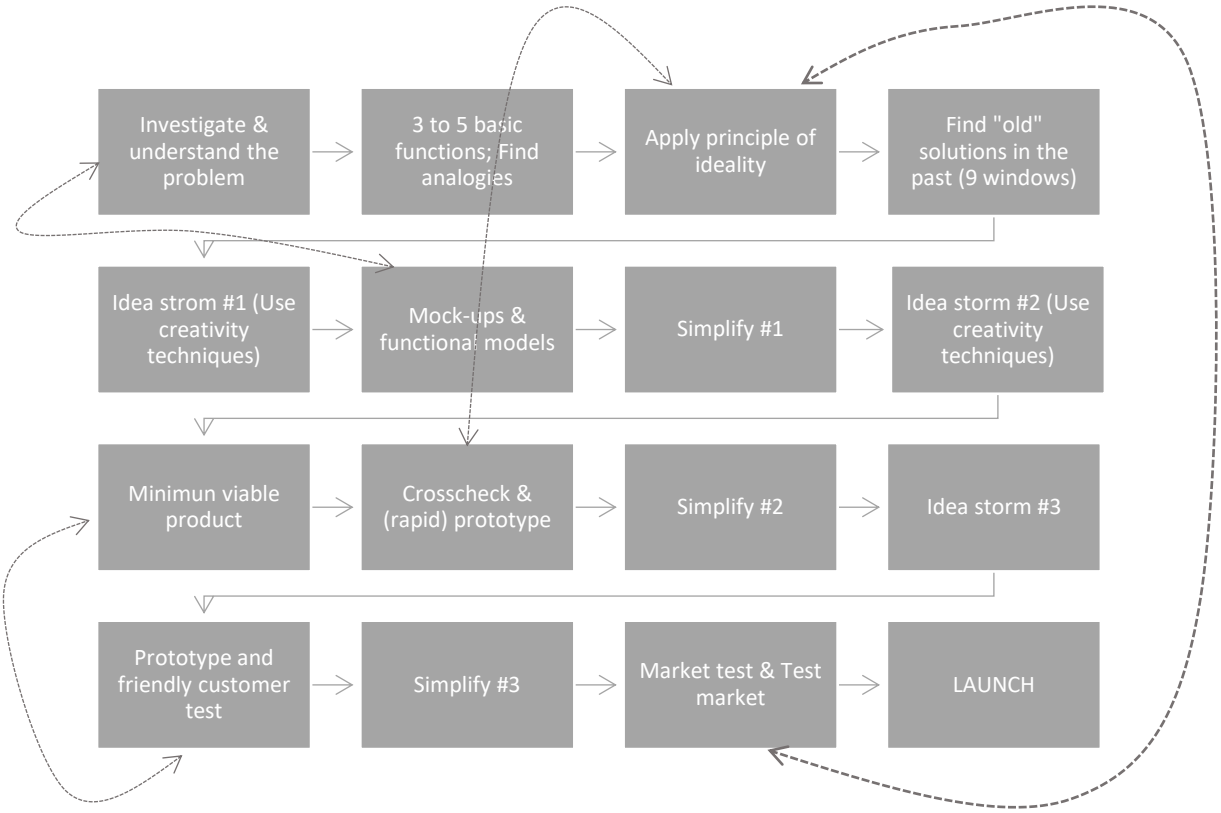


FIGURE 4. REVERSE INNOVATION PROCESS FOR EUROPEAN SMES (SOURCE: SINHA AND DELL, 2014)

Unlike the other two models discussed above the SME reverse innovation process is only concerned with one market: the global market (as described by the authors) (Sinha and Dell, 2014). According to the authors reverse innovation is about developing solutions in developing countries for global markets. This diverges a lot from both the market-based approach and the development-based approach to reverse innovation. The differentiation between the two markets play an essential role in both the approaches and in fact it is the presence of the two different markets that distinguishes reverse innovations from other developing country innovations. This differentiation does not exist in the model of Sinha and Dell and consequently, the innovation process model is more concerned of how European SMEs can create products with global applicability in developing markets.

One of the limitations of the model is its detailed outline for the innovation process. Is it plausible to assume that all European SMEs would go through a similar process? The

authors have tried to solve the issue of linearity by adding "loop backs" in the model. These loop backs illustrate other possible process structures and allow for a more agile development process. However, the model still remains rather rigid by suggesting quite detailed 16 steps that SMEs should go through when developing reverse innovations.

In order to simplify and make the model more agile the 16 steps could be divided under broader stages. At least four different stages can be identified: problem identification, ideation, product development, and market introduction. The steps could be divided under these new stages in the following way (Table 2):

TABLE 2. RE-ALLOCATION OF THE STEPS IN THE REVERSE INNOVATION PROCESS BY SINHA AND DELL (2014)

| **Stage** | **Steps from Sinha and Dell (2014)** |
|---|---|
| **Problem identification** | • Investigate and understand the problem |
| **Ideation** | • 3 to 5 Basic Functions; Find Analogies<br>• Apply Principle of Ideality<br>• Find "Old Solutions in the Past"<br>• Initial Idea Storm |
| **Product development** | • Mock-Ups and Functional Models<br>• Simplify (1-3)<br>• Additional Idea Storms (2-3)<br>• Minimum Viable Product<br>• Crosscheck and (Rapid) Prototype<br>• Prototype and Friendly Customer Test |
| **Market introduction** | • Market Test and Test Market<br>• Launch |

Dividing the steps into these four broader phases facilitates the analysis of the reverse innovation process. It also helps innovators to identify the overall structure while giving a more suggestive role for the 16 steps by Sinha and Dell. The more detailed steps work as sort of a guideline for the innovators to understand what type of actions and methods can be applied.

This allocation might provide some clarifications and agility to the steps proposed by Sinha and Dell (2014), but it also highlights the strongest limitation present in the model. The model illustrates the steps that European SMEs can take when they seek to develop new products for developing markets, but it forgets to integrate the most essential part of the concept of reverse innovation, which is the introduction of these products later to the advanced markets. Without this step, the model only describes the process of creating frugal innovations.

### 2.3.5 Comparison of the models

By using Rogers' model as a representation of a classic innovation development process we can see that all the three reverse innovation models share some similarities with the classic model. The model by Von Zedtwitz, et al. (2015) is probably the most similar. The model starts with the ideation phase which could be understood to include problem identification and initial research about the concept of the innovation. After ideation comes development and market introduction, which in the process by Rogers (1983) is captured by commercialization and diffusion. The biggest difference between these two models is the second market introduction presented in the framework by Von Zedtwitz, et al. This is also the biggest differentiating attribute between reverse innovation process and a "normal" innovation process.

DePasse and Lee (2013) on the other hand take a different perspective in their model and do not have that many similarities with Rogers. The strongest connections to Rogers' model are demonstrated in the presence of problem identification as the first step and the inclusion of diffusion of innovation as an essential part of the process. However, DePasse and Lee (2013) do not include any of the other steps in their model. The fact that DePasse

and Lee have emphasized the diffusion of innovation more than the creative phases of the process shows how the transfer of innovation from developing to advanced markets is in the essence of reverse innovation.

The third model, by Sinha and Dell (2014), shares many similarities with Rogers's model. If we allocate the 16 steps into broader phases, as I did above in Table 2, the model follows Rogers' steps almost perfectly until the market introduction, or commercialization phase. However, the framework by Sinha and Dell does not really provide anything that would be particular to reverse innovation — other than being more detailed — and thus it should not surprise that it fits with the more classic view on innovation development process.

What can be concluded from the comparison between these three models and Rogers's model is that reverse innovation process does share similarities with more classic approach to innovation development process. However, reverse innovation process has one big difference with other type of innovations. Reverse innovation always requires two market introductions in two very different markets. Due to this, transfer and adaptation of an existing innovation or idea are critical steps along the process. This "crossover" point represents the journey developing country innovations go through before being launched and adopted in advanced countries.

## 2.3 Analytical Framework

On the basis of the above discussed models for reverse innovation process I have developed an analytical framework that illustrates the reverse innovation process from the point of view of advanced country organizations (Figure 5). As the aim of the thesis is to identify ways developing country innovations can be brought to advanced markets the model focuses only on identifying steps that take place during this transfer. Hence, there are some underlying assumptions that need to be taken into consideration.

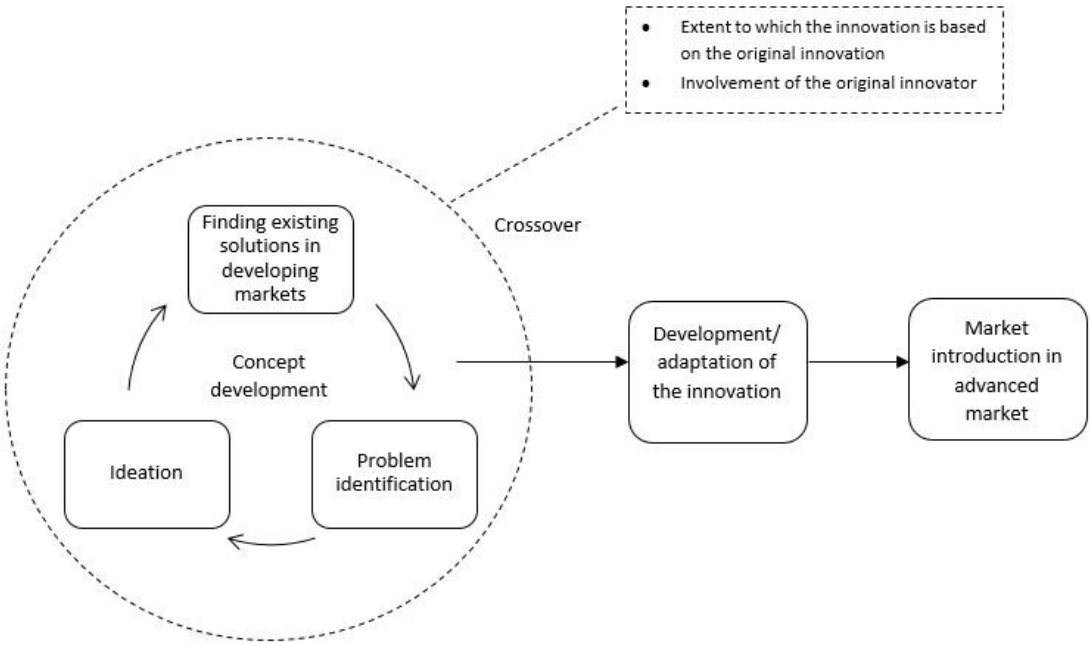


FIGURE 5. REVERSE INNOVATION PROCESS FROM THE PERSPECTIVE OF ADVANCED COUNTRY ORGANIZATIONS

### 2.4.1 Assumptions behind the framework

The model does not seek to illustrate the process that advanced market firms go through when innovating for developing markets. The focus is only on transferring and adapting developing country innovations to advanced markets. Hence, the first underlying assumption is that the developing country innovation has already been created and exists.

Above I argued that reverse innovation process differs from a typical innovation process because there are always two market introductions taking place when an innovation is being reversed. The second underlying assumption in the analytical framework is that the first market introduction has already taken place and thus is not visible in the model. This is due to the focus on advanced markets and not on innovating for developed markets.

### 2.4.2 The framework

The analytical framework incorporates the innovation development model by Rogers (1983), the framework by Von Zedtwitz, et al. (2015) and the model by DePasse and Lee (2013). Rogers' model has been used as a starting point for the identification of the most common steps in an innovation process, while contributions from the models by Von Zedtwitz, et al. (2015) and by DePasse and Lee (2013) have been integrated into the framework as specific attributes of a reverse innovation process.

The analytical framework consists of four stages:

**Concept development**

The first step in the innovation process illustrates the development of the concept behind the innovation. The step actually consists of three steps: ideation, problem identification, and identification of existing developing country innovation. The reason why these three steps are all considered to be part of the first stage in the process is to reduce the linearity at the start of the process. The concept for the innovation is not always a result of brainstorming, but it can follow a problem identified by the innovators, or in the case of reverse innovation, learning about an already existing developing country innovation. Therefore these steps are put together in a loop to illustrate the fact that any of the steps can occur as the first step.

**Crossover**

The second step, and perhaps the most important one in this framework, is the dash lined circle that illustrates the crossover point. The crossover point is defined as the step during which the innovation is transferred from developing market to a developed market. The step was contributed by DePasse and Lee (2013), however this model rejects their suggestion that this step takes place between early adopters in the developing countries and innovators in advanced countries. The crossover step in the analytical framework merely captures the transfer of the innovation between the two markets.

The crossover differs from the other steps as it is less concrete. Despite being an abstract and fuzzy step in the process it is the most critical and crucial step if we want to understand the different ways developing country innovations can be reversed and introduced to advanced markets. In order to get a better grasp of what the crossover step entails I have identified some preliminary aspects that are important to consider and that define the nature of the reverse innovation process.

The first thing to consider is to what extent is the reversed innovation similar to the original developing country innovation. By definition it is not required that the innovation that is introduced to an advanced market is an exact copy of the original innovation. Especially in the case of a service or business model innovation the level of adaptation required might be high, and thus, the only similarities between the innovations could be the idea.

The second important aspect of the crossover is the involvement of the original innovator in the reverse innovation process. Majority of the existing literature examine reverse innovation in the context of MNCs and the assumption is that the owner of the original developing country innovation is also the one that introduces the innovation in advanced markets. However, this should not be taken as given. Reverse innovation is not an option only for MNCs and it is important that its possibilities are also considered in other contexts. Therefore, the crossover step also seeks to analyze whether innovation can be reversed by someone else than the innovator of the original innovation.

**Development and adaptation**

The third step in the framework is the development and adaptation phase. As reverse innovations are based on innovations that were initially created for the needs of a developing market, before being introduced to the advanced market some of the innovation features may have to be modified to fit the new context and the expectations of advanced market customers. Whether this step involves full development or just adaptation of the original innovation depends on the extent to which the innovation is based on the original one, which is captured by the crossover step.

The crossover step strongly influences what happens in the development and adaption phase. After the crossover step the innovators have an understanding of how much of the original innovation they are going to use in the reversed version. Hence, this phase captures the aspects that facilitated either the development or the adaptation of the innovation to a product or service that meets the needs of the new target market.

**Market introduction**

The last step in the process is market introduction. This step refers to the market introduction in the advanced market. As mentioned above the framework assumes that the developing country innovation already exists and thus, that it has already been introduced to a developing market. Therefore, the market introduction phase in this framework refers only to advanced markets.

In the market introduction phase the focus is on understanding what the factors that play a role in the success or in the failure of the reverse innovation are. It is critical to understand what kind of issues, for example in the organizational or market structure, could make the launch of the reverse innovation easier or more challenging.

# 3. Methodology

This chapter describes the methods that were used to conduct the empirical part of this thesis. Furthermore, the chapter introduces the research methods, data collection and data analysis processes.

## 3.1 Research methods

Considering the nature of the research I decided to conduct a qualitative study. The aim of the research is to gain deeper understanding of the reverse innovation process and to identify the different aspects and factors that influence the development of the innovation throughout the process. Qualitative methods provide the most suitable tools for collecting the type of data that is required to gain such understanding.

The research was conducted as a case study. Considering the research questions and the objective of the study case study method appeared to be the best option to find the answers and increase knowledge on the topic. The theoretical concept of reverse innovation emerged from real-life practices and it is strongly linked to the context in which it is applied, both of which comprise a premise for using case study method (Yin, 2009). Moreover, the limited theoretical background regarding reverse innovation process makes empirical data an important instrument for bringing in new knowledge to the topic area (Marschan-Piekkari and Welch, 2004).

While the decision to use case study as a research method was quite clear, the decision on what type of case study to conduct was not as straightforward. Some limitations regarding data compelled me to give up on the original method of choice. Below I describe the reasoning behind it.

### 3.1.1 The initial method

The initial idea for the methodology was to conduct an intensive case study where the focus is on only one case. The objective was to understand reverse innovation in the context of Finnish SMEs in order to study the phenomenon from a new perspective. The

case that was selected as the subject was Megamalli, an innovative model for production process in dental care

Intensive single case study was chosen as the initial method due to the uniqueness of the case (Yin, 2009: 47). Reverse innovation is still quite unknown in Finland and there are not many known cases of companies that would have reversed an innovation. Thus, considering the novelty of the phenomenon in the context of Finland and the small number of available cases and the difficulty to identify them I found that studying one case intensively and collecting more detailed and in-depth data would be a suitable method for reaching the research objectives and bringing in new knowledge to the topic area.

In the course of the data collection I faced some challenges that affected the chosen research method. The more I started to understand the nature of the selected case the more evident it became that intensive case study was perhaps not the ideal way of conducting the research. One of the challenges that arose was the small number of available and relevant interviewees. Even though today the company has several employees, there were only two innovators involved in the innovation process of Megamalli.

Moreover, while going through existing cases of reverse innovation I realized that the innovation processes of those cases are not very consistent. As I also mentioned above, how reverse innovation occurs varies depending on the context. Thus, it no longer made sense to focus only on one case but instead it seemed to be a more interesting approach to compare the innovation processes of different types of cases. Therefore, the final research was conducted as a multiple case study with the context not limited to only Finnish SMEs anymore.

### 3.1.2 The updated method

After the realizations identified in the section above the research approach was modified. Two more cases were included in the research with the aim of finding differences between the ways reverse innovation has occurred in different organizations. By conducting a

multiple case study instead of a single case study it was possible to examine the underlying factors that affect reverse innovation process and to observe whether there are any common or differentiating factors that determine the nature of the process.

The unit of analysis selected for this study is the innovation process. An important thing to consider when selecting the cases is to make sure that they have clear boundaries. The start and end points should be identifiable. (Eriksson and Kovalainen, 2008: 117). Thus, before using innovation process as the unit of analysis it is necessary to define where the process begins and where it ends.

The boundaries of the reverse innovation process, particularly in the context of this thesis, were defined in the analytical framework that was introduced in the literature review. The process starts when the idea or concept for the innovation is conceived and ends when the final innovation has been introduced to the second or advanced market. What happens after the market introduction is no longer relevant to the innovation process itself. In terms of the process it is more crucial to understand what were the methods used and what were the barriers faced by the innovators in the advanced market introduction. Hence, the analysis of reverse innovation process ends in the examination of the opportunities and challenges reverse innovations have in the advanced markets.

Furthermore, in order to identify what type of cases can be included in the research we have to look at the definition of reverse innovation. Hence, the cases must include innovations that have first been introduced in the developing market and later introduced to a developed market. The cases must be innovation processes of innovations that fulfill both the requirements in the definition.

### 3.1.3 Selection of the cases

As there were no other known cases of Finnish reverse innovations I had to expand my geographical context. However, in order to keep the cases as comparable as possible I selected the additional cases by using particular criteria. First of all, as mentioned above, the innovation process had to be complete and fulfill the criteria set by the definition. That

means, that the innovation in the potential cases had to have been introduced to both developing and developed markets. Second of all, the innovation had to be from the same sector as Megamalli that had already been chosen as a case. Hence, the additional cases had to be innovations in the health care sector. Lastly, the innovations had to represent different types of innovating organizations in order for the analysis to capture similarities and differences among varying cases.

On the basis of these criteria the following three cases were selected:

*Megamalli:* a Finnish process innovation for dental care sector that has been partly inspired by the production process by Aravind Eye Care in India. The case represents an innovation by an SME.

*Prevention and Access to Care and Treatment (PACT):* a health care service innovation developed in Haiti by Partners in Health (PIH). The innovation spread to Peru after which it was also adapted to the US market. It represents a service innovation developed by an NGO.

*MAC 400*: a portable electrocardiogram (ECG) machine developed by GE for the Indian market. It was initially adopted in India after which it was launched in the advanced markets and sold globally. The case represents a product innovation by an MNC.

## 3.2 Data collection

The study was conducted by using both primary and secondary data. Primary data was collected for the case of Megamalli since the case has been less studied in the past and thus the data that was needed to understand the innovation process was accessible only by collecting primary data. For the other two cases only secondary data was used.

### 3.2.1 Collection of primary data

This section describes that data collection for the case of Megamalli. Majority of the data was collected through interviews. Also email correspondence between myself and the

interviewees was included in the data sources as well as some secondary data (see Appendix 2).

Megaklinikka was founded by two Finnish innovators who will be referred to as Innovator A and Innovator B. Innovator A is no longer involved with the firm, while Innovator B is currently the clinical director and one of the owners of the clinic. The co-founders were identified with the help of the New Global project team and a previous publication by Aalto University in which Megamalli had been used as an example of Finnish reverse innovation. The first contact with the interviewees was made via email and all the correspondence with the interviewees took place either via email or phone. Also the pre-interview correspondence is considered in the case analysis.

After preliminary discussions with Innovator A it turned out that the number of potential interviewees was very limited. There were only two people involved in the innovation process and thus the collection of primary data was restricted before it even had started. Both the co-founders were interviewed but due to these limitations the number of interviews was restricted to two.

Both the interviews took place on the phone. The interviews were held in Finnish and they lasted between 30 and 50 minutes. In addition to the two interviews a set of questions was sent to a third person who was not involved in the innovation process itself but was following it closely due to his role as the doctoral thesis supervisor of Innovator A. His responses were included in the analyzed data.

The interviews were conducted as semi-structured interviews. The aim of the interviews was to collect information on the different steps and the specific features of the innovation process. Semi-structured interviews were chosen as the most suitable method for collecting primary data since it allowed me to focus the interviews on themes related to the innovation process, but at the same time it did not limit the interviews to follow only pre-determined questions. It provided the flexibility needed to make follow-up questions on issues that arose during the interviews and that way gain more relevant information on the themes.

The preliminary questions in the interview questionnaire were allocated under three themes. The questionnaire can be found in Appendix 1. These themes consisted of the different steps in a typical innovation process that were identified from existing literature. The themes were titled as ideation and problem identification, development and adaptation, and market introduction. Under each theme there were preliminary questions that acted as a guide during the interview. However, as the interviews followed a semi-structured format the questions were used flexibly. The aim was to collect data on what happened during all the stages of the process and how they were implemented. Hence the questions asked during the interviews varied based on the answers given by the interviewees.

### 3.2.2 Collection of secondary data

While for the case of Megamalli mainly primary data was used, the two other cases, PACT and MAC 400, were constructed and analyzed by using secondary data. I perceived the use of secondary data sufficient since both the cases had already been quite well documented and existing case studies from the perspective of reverse innovation were available.

The data used for the two cases included academic articles and books as well as news articles and other web sources. More specifically, data sources for the case of PACT included one case study, two academic articles, one newspaper article and the websites of PACT and PIH. Data sources for the case of MAC 400 included three case studies, one working paper, one book chapter, four newspaper articles, and the 2007 annual report and the website of GE. The data was retrieved by using search engines such as Google Scholar and the library search engine of Aalto University. List of the secondary data sources can be found in Appendix 2.

## 3.3 Data analysis

The case data was analyzed by using thematic analysis. As the objective of the thesis is to understand what constitutes a reverse innovation process I found thematic analysis to

be the suitable approach for data analysis since it allows for identification of patterns that can be used in understanding different sides of the subject that is being studied (Boyatzis, 1998: 29).

Themes and codes can be developed by using a deductive or inductive approach. Deductive code development means deriving codes from the theory and using the theory-driven codes in analyzing the data. Inductive approach, on the other hand, involves code development from the data itself. (Boyatzis, 1998: 29) In my data analysis I have used a mixture of these two approaches. The themes were derived both from theory as well as from the data itself. I used the deductive approach to derive the main themes from the theory on reverse innovation process. This allowed me to have a common starting point for the individual case analyses and make sure that the cases follow a similar structure. These themes stem from the analytical framework and capture the different steps in the reverse innovation process. Hence, the main categories used in the data analysis are concept development, crossover, development and adaptation, and market introduction.

Each case was analyzed based on those main categories. After having coded the data according to the main themes, inductive approach was used to identify sub-themes for each main category. By identifying the main categories from the existing theories the data analysis contributes to the existing knowledge on innovation processes. However, since reverse innovation process is a specific type of innovation process and there does not exist many theories or studies on it, the sub-categories had to be derived from the data itself. This way the data provides new knowledge about the phenomenon and at the same time contributes to already existing theories.

The coding was done manually by using color coding. Each main theme was allocated a different color and the data was carefully browsed through several times in order to identify the most relevant codes. The color coded data was then re-organized and analyzed again with the aim of identifying sub-categories for each theme. These sub-categories are used as the basis for the case comparison.

## 3.4 Limitations of the research

The strongest limitation to this research concerns the type of data used. First of all, the data was collected both in the form of primary and secondary data. While the primary data was collected with the objective of this research in mind, the secondary data was based on existing case studies and articles with different objectives. Although the case descriptions used as secondary data provided a sufficient amount of information for the analyses, it is necessary to note that the decision to use secondary data might be a shortcoming. Some information that could have come up during the collection of primary data, might not be included in the secondary data.

Secondly, the amount of data available to be collected was quite limited, especially in terms of primary data. The fact that the number of possible interviewees was restricted even before the data collection started means that the amount of information available from the interviews was also restricted. This in turn impacted the data analysis and made it harder to make robust conclusions especially on matters where the information received from the interviewees differed. Moreover, the availability of the data also restricted the possibilities for methodology and did not provide many choices on how to conduct the study.

# 4. Case analyses

This chapter presents the analyses of the three cases selected for the empirical part of this thesis. Each case was analyzed individually. Each case description first presents the reverse innovation and its connection to a developing country innovation. After that the analysis of the reverse innovation process is presented. The process analyses are divided into four sub-sections based on the four main themes that were used as the starting point in the analysis. These themes reflect the innovation process and are titled as concept development, crossover, development and adaptation, and market introduction.

Under each section I have identified factors that played a role in the respective step of the process. Only for the crossover step I have identified sub-categories prior to the analysis. This is because the two sub-categories for crossover (extent to which the innovation is based on the original innovation, and involvement of the original innovator) were identified already in the analytical framework.

## 4.1 Case 1: Megamalli

Megamalli is an innovative operating model and an enterprise resource planning system developed by Finnish innovators and implemented under a private dental care clinic called Megaklinikka. Megamalli aims to transform the way dental care services are operated while making them more efficient and more affordable; the initial objective was to offer private dental services at the same price level as the public sector providers do.

The key to the innovation is optimizing the use of resources. The main resource that is being optimized is the time of the dentists. Workload in the clinic is organized in such way that the most expensive resources, the dentists, are only allocated tasks that are in the scope of their specialization. Thus, all other tasks, such as customer service and simple procedures like cleansing, are conducted by nurses or dental hygienists who are also the first touch point with the customers.

In practice implementing Megamalli implies changes from two perspectives: the service provider's and the customer's. From the customers' point of view Megamalli provides a completely new approach to the traditional appointment system. In Megamalli patients are the ones to select the date and timeframe during which they prefer to receive care. In the typical service model patients are given appointments according to the availability of the dentists. The duration of the appointment is usually fixed and in many cases patients have to visit the dentist several times. In Megamalli both these conditions are eliminated.

First of all, patients are given the freedom to select the most suitable timeframe for them through an online booking system. The patients are not given an exact time for the appointment. Instead, they are given a timeframe of one hour during which it is guaranteed that the appointment will start. Half an hour before the appointment begins the patient is notified via text message the exact starting time.

Second of all, the duration of the appointment has no limit. All the treatments needed by the patient will be taken care of during one visit. In the original model those patients that could not be treated in one visit for clinical reasons were directed to conventional dental care clinics.

From the point of view of service providers the changes brought about by Megamalli are related to the way work is organized and allocated. The dentists at Megaklinikka do not have their own treatment rooms. Typically it is the patients that move from one room to another depending on the care they need. With Megamalli this norm is challenged. The patients are allocated into one room where they receive all the treatments needed. The dentists are the ones to move between the rooms. To make this possible all rooms are standardized and equipped with the same instruments.

Moreover, patients are not allocated to dentists prior to the appointments. Whichever of the dentists becomes available first will take care of the next patient in line. As the appointments do not have a fixed time limit this type of allocation model requires that there is a sufficient number of dentists available and that the appointments made available per day are calculated according to the number of rooms and dentists present.

Megamalli can be considered to be inspired by the operating model implemented by Aravind Eye Care System (from now on referred to as Aravind) in India. Aravind was founded in 1976 with the objective of eradicating needless blindness in India. During the years it has expanded to cover various eye related diseases, however, at the beginning it focused on cataract surgery. (Prahalad, 2006)

The production process of Aravind relies on optimization of time usage and keeping the patient flow smooth and running. Before seeing the doctor patients go through several check-up points where different information of the patient's condition is collected. The information is collected by other staff than doctors. After all the information has been collected the patient goes to see the doctor who right away can see the results from the different check-ups and thus can make the diagnosis.

The doctor then divides the patients into two categories: standard and non-standard procedures (Mikola and Lillrank, 2015). After that the patients are put in line for surgery, if needed. While in the waiting room patients are prepared for the surgery, so that once their turn comes they can right away be operated without the doctor having to do anything else except the procedure.

The process is organized in such way that wasteful use of resources is eliminated. All the possible procedures are standardized and the whole production process is operated similarly to an assembly line.

The reverse innovation status of Megamalli has been disputable. While the idea behind Megamalli has been considered to stem from the model of Aravind, the innovators have not agreed on the origins of the idea. Megamalli was developed by two Finnish innovators with very different backgrounds. Innovator A is no longer involved with the company but played an essential role in the innovation process. Innovator B, on the other hand, is still part of the company as the clinical director and an owner. The views of both the innovators have been taken into consideration in this analysis and as Megamalli has been linked to Aravind in other publications, the starting point for the analysis was to consider Megamalli as a reverse innovation.

The quotations from the interviews have been translated from Finnish and the original quotations can be found in Appendix 3.

### 4.1.1 Concept development

The background of the innovators played a big role in how they perceived the origin of the idea. Due to the above mentioned dispute it can be claimed that in the case of Megamalli the ideation phase followed two different paths. Both the co-founders started their individual ideation process already before their collaboration started and both experiences impacted the final outcome. The following factors played a role in either the ideation or problem identification phase of the process of one of the innovators.

**Benchmarking**

In the ideation process of Innovator A Aravind's model played a big role. Innovator A had been benchmarking eye clinics in Finland. In that process he also ended up in India to benchmark Aravind that had been known for its efficiency. The trip to India did not only allow for a thorough step-by-step analysis of Aravinds's process but it also made it possible to learn about the contextual and cultural differences that contributed to the success of the innovation in the developing country environment.

During the benchmarking trip Innovator A analysed Aravind's processes carefully. In order to understand where the difference between Aravind's process and the process of Finnish eye clinics stems from, he studied how much time it takes for each step along the process; how much time is needed for waiting, for doing the diagnosis, for talking with the patient, and so on and so forth.

The thorough analysis of the existing innovation helped in finding the factors that enabled the efficiency. It also made Innovator A understand that if Aravind's process was to be introduced in Finland, patients would run out over one night.

> ”if Aravind's cataract process had been brought to Finland, it would have meant 96% unemployment rate for Finnish cataract operating surgeons, and

> err, we would have needed four surgeons to operate all the cataracts in Finland."[1] (Innovator A, 9.2.2017)

The process was too efficient for the Finnish context and would have destroyed the market for eye surgeries in almost no time. If the Aravind model was going to be used in Finland it needed a completely new market. However, at this point it was not obvious to Innovator A that a suitable market would be found in dental care.

**Personal experience**

On a different note, the ideation phase for Innovator B was strongly based on his decadeslong experience in the field of dental care. Innovator B had followed the innovation trends in the health care industry as well as in other industries for years and had noted that health care still remained as one of the only industries where the delivery process had not been changed in a long time.

Through his personal experience Innovator B had gained knowledge on what was and what was not working in the provision of health care services in Finland. The inefficiencies and problems stemmed from the way health care services were provided and operated. He saw lack of production control and health care providers' lack of interest to manage productivity as a source of those inefficiencies.

> "Let's say you go to any company and you ask them, err , the CEO that what is the productivity that you are operating today, what is happening here, he can reply to you. He knows all the numbers and everything. You go to a hospital and ask the directors what is going on here. You have surgeries, you have inpatient wards, so at what kind productivity are you operating today. They have no clue." [2] (Innovator B, 20.2.2017)

**Identifying similarities between different sectors**

Identifying that there are similarities between such different areas of health care as dental care and cataract surgery made it possible to understand what aspects of Aravind's model could be used in the development of Megamalli and to what extent it could contribute.

Technically and clinically cataract surgery and dental care are very different. However, in both cases many of the procedures are simple and routine-like. These treatments could easily be taken care of over one visit if there does not exist any clinical barriers for it. Therefore, the logic of optimizing the use of the most expensive resource and minimizing the time that it takes to switch between patients could work in dental care as well.

While in the case of Megamalli the identification of the similarities was partly due to luck, actively seeking to find applications for an existing developing country innovation in other sectors could enhance the expansion of reverse innovation opportunities.

### 4.1.2 Crossover

**The extent to which the innovation is based on the original innovation**

As was mentioned above the origin of the idea behind Megamalli is rather disputable. Both the innovators contributed to the idea but only one of them based their brainstorming on Aravind's model. Therefore, in the case of Megamalli, the crossover took place in the form of idea transfer. The reverse innovation was not fully based on the original developing country innovation but rather on implementing the same logic in the form of a different type of service model and in a different market.

The logic-based crossover is evident, for example, from the way Innovator A emphasizes the same logic when talking about the extent to which Megamalli is based on Aravind's model.

> "It is required to change the logic in such way, that in order for dentists, in the same way as eye doctors in India, to be able to do only diagnosing and repairing, then you have to switch so that the patients are in their own rooms and the doctor moves."[3] (Innovator A, 9.2.2017)

> "The logic is that there is no clinical reason to have the same doctor or to treat in two visits. The logic is the same [as in Aravind's model] that the basic procedures are screened and treated in their own process, and then

when they become more complex they are moved to another process".[4] (Innovator A, 9.2.2017)

**Involvement of the original innovators**

Aravind's owners or innovators were not involved in the creation of Megaklinikka. This further strengthens the fact that the crossover was limited to idea and logic. The crossover was based on the results of the benchmarking trip and on the analysis of Aravind's processes by Innovator A. Consequently Megaklinikka was established as a new organization with no affiliation to Aravind.

### 4.1.3 Development and adaptation

**Understanding the industry**

The contextual differences turned out to be the biggest obstacle in bringing the Aravind model as such to the Finnish market; both the market and the culture were different. The demand for eye surgeries in Finland was too low for the efficiency levels of Aravind. In addition, Finnish patients most likely would have not accepted to go under a surgery in same conditions as the poor patients in India did. Due to these factors Aravind's model could not be adapted to fit the Finnish context, and therefore, it only remained as a reference point in the background while Megamalli was developed from scratch in a completely different health care sector.

Understanding the local context in Finland was one critical factor that had to be considered in the development phase of the innovation. Innovator B thought it was crucial to understand the interests of all the stakeholders and to optimize those interests. One crucial factor affecting the whole dental care process was time; dental care workers continuously work against time and within time limits. The single-visit model was seen as a solution since it reduced the time pressure for the dentists, saved time of the patients, and reduced waiting times for dental appointments.

**Analysis of existing processes**

Another activity that was important in the development of Megamalli was understanding and analyzing how the current processes in dental care work. Thus, in order to develop a service model that would optimize the time use of different actors, rethinking the existing processes was required.

The analysis was done by measuring the time it takes to operate typical dental care procedures and analyzing them in terms of how many cases could be done in one day and how many dentists and hygienists are needed to conduct them. This comprehensive analysis of the existing processes provided the innovators with data that was crucial in the innovation development process. The data enabled the innovators to develop a new type of process that allowed a transfer from the traditional multiple-visit model to the single-visit model.

### 4.1.4 Market introduction

**Existing attitudes**

Megaklinikka's market introduction was challenging. Both innovators identified that the industry was not ready for such drastic change. Existing attitudes among dentists were risk averse and not supportive. Especially the belief that patients always seek to use the same dentist was prevailing the mindsets in the industry. It was seen as an insurmountable barrier.

It is important to note that the skeptical attitudes did not stem from the reverse innovation background of the innovation. The innovation is considered Finnish. Rather, they were caused by other industry actors not being ready to envision the change the innovators were seeking to make. If the nature of any reverse innovation is such that it seeks to change the way an industry operates, then it could be assumed that it could potentially face similar kind of attitude barriers when introduced to the market.

**Recruitment**

The doubtful attitudes towards this new operating model resulted in even more challenges. The biggest obstacles turned out to be the recruitment of dentists and hygienists, and keeping the patient flow steady so that the newly-founded clinic could keep its business running.

The attitudes of dental care professionals were risk-averse and thus it was difficult to find people that would be willing to become part of a company that was not yet a strong player in the field. This tendency to avoid risks could result from the way the dental industry has developed in the past. The innovations in the industry have been technology related while the operating model has been untouched for a long time. As a consequence Megamalli, while still at the beginning of its journey, found it challenging to convince the industry of its model.

**Winning the approval of the industry**

After couple of years of existence Megaklinikka demonstrated that it was in fact capable of surviving in the market. At this point the doubtful attitudes towards the new operating model were reduced. The approval of the industry was gained only by showing the viability and functionality of the model in practice.

Moreover, the public sector showed their interest towards the model. Megamalli was introduced to the public dental care first in the city of Jyväskylä in Central Finland. The test unit showed great results in reducing the queues in the public dental care. Now there are total of 68 units (chairs) in approximately four to seven public sector clinics that are operated by using Megaklinikka's model.

## 4.2 Case 2: Prevention and Access to Care and Treatment (PACT)

Prevention and Access to Care and Treatment, PACT, is a Boston-based program that aims to tackle the non-medical issues that cause HIV treatments to fail. PACT targets the most marginalized HIV/AIDS patients who face the greatest challenges to take care of

their own health. The program seeks to address the social conditions that affect the patients' lives and that influence their capability to follow treatments. This is done by assigning a community health worker (CHW) for each patient.

The services provided by the CHWs are home-based and include assisting the patients in issues related to taking their medication as well as in coordinating and getting to the appointments with the doctor. Each patient faces different challenges in their lives. Some might live in poverty or with addiction and some might have other medical conditions or mental illnesses on top of everything else. CHWs help the patients to deal with these issues and guarantee that they will not intervene with the HIV treatment.

This type of CHW-centric model was initially implemented by Partners in Health (PIH) in Haiti with tuberculosis patients. PACT was initially launched under PIH.

In the core of the CHW-model is the understanding that treatment is not only a medical concept but it is impacted also by the wider social context. Diseases can be cured with medication but in order for the medication to cure the disease it must be taken by the patient. There are plenty of issues that may intervene patient's compliance with the treatment program and while these issues are often out of the control of doctors the solution was found in community workers who were assigned with the special task to make sure patients take their medicine. (Govindarajan and Trimble, 2012b)

### 4.2.1 Concept development

The idea behind PACT stems from the CRW-model that Partners in Health developed and implemented in Haiti. Even though PACT was launched under PIH it was not the original innovators of the model in Haiti that introduced it to the US. Dr Heidi Louise Behforouz played the main role in the development of PACT (Govindarajan and Trimble, 2012b). The factors that facilitated Behforouz's journey in the development of the concept behind the reverse innovation are personal connections, and prior research.

**Prior research**

The initial objective of PACT was to tackle the issue of low success rate of treatments for HIV/AIDS. In Boston the rates varied between patients according to their socioeconomic status. The poorest areas in Boston showed higher mortality rates among AIDS patients than the richer areas. Behforouz had become very aware of this issue and she had also demonstrated the problem through her own research. (Govindarajan and Trimble, 2012b: p.180-181).

The research Behforouz conducted as a medical student played an important role in providing her the understanding of the HIV/AIDS context in Boston area. While the problem had been brought up also by media, without her own research efforts PACT may have never been founded as it affected her contextual knowledge as well as the knowledge on the prevailing problem. Contextual knowledge is critical in identifying problems in the society that require innovative solutions. In the case of PACT this knowledge was obtained through prior research by the reverse innovator.

**Personal connections/network**

Another factor that enabled the idea behind PACT's creation was Behforouz's personal connection to the original innovator, Paul Farmer. Farmer and Behforouz connected through Boston's Brigham and Women's Hospital while Behforouz was doing her training there. Later on Farmer invited Behforouz to work at their clinic in Haiti. (Govindarajan and Trimble, 2012b)

The idea of using PIH's model in the USA to treat HIV/AIDS patients was enabled by this personal connection with the original innovator. Through the professional connection and the opportunity to work at Farmer's clinic in Haiti Behforouz gained access to the original innovation. She learned how PIH operations in Haiti are run in practice, which together with her awareness of the problems with HIV patients in Boston generated the idea of applying the methods of PIH in the US.

### 4.2.2 Crossover

**Extent to which based on original innovation**

PACT was initially launched as a programme under PIH in 1998 (Govindarajan and Trimble, 2012b: 181). The innovation was strongly based on the CHW-model developed by PIH. In fact, the objective of Behforouz was "to build an organization that fully understood the CHW-centric model and was fully capable of executing it" (Govindarajan and Trimble, 2012b: 181). However, Behforouz also realized that the model could not be implemented in the US without adapting it to the local conditions first.

The crossover of PIH's model was a transfer of organizational values and methods. (Govindarajan and Trimble, 2012b). While PACT was clearly originating from a developing country innovation, the need to adapt the model to the local conditions made it impossible to transfer it as such. Hence, the crossover involved integrating the methods and values of the original innovation into an adapted version of the model that was developed with the new developed country context in mind.

**Involvement of the original innovators**

Despite the fact that PACT was initially launched by PIH, Behforouz was the main actor in establishing PACT in Boston. The original innovators were not actively part of the crossover, however, they did play a role in enabling it. Behforouz received guidance and support from Farmer and from others that were involved with PIH in the developing world.

### 4.2.3 Development and adaptation

**Research on the existing innovation**

As mentioned above a crucial aspect of the development of PACT was adapting the CHW-model for the local conditions in the US. Before the adaptation could be done, however, it was necessary to fully understand the way the original innovation worked. Research was Behforouz's way of doing it.

Behforouz studied the methods by visiting PIH in Haiti and Peru (Govindarajan and Trimble, 2012b). Seeing how the model was implemented in practice and how the work of the CHWs was organized provided her with knowledge that would have not been possible to obtain from the US. In addition, Behforouz thoroughly studied different materials related to PIH and its method (Govindarajan and Trimble, 2012b). Again the personal connection that Behforouz had to the original innovators turned out to be essential in having access to the innovation.

**Learning by doing/Experimenting**

One way that PACT adapted to the local conditions was through experimentation.

> "The program learned from experience, fine-tuning its methods for determining the intensity of treatment and for assessing when and whether a patient could be discharged." (Govindarajan and Trimble, 2012b: 181)

This type of learning by doing-approach allowed for PACT to become a service that truly took into consideration the needs of its clients. Testing different ways to meet those needs provided answers to questions for which the answer could not be found during field visits to the developing countries or directly from PIH's methods. Moreover, experimenting with the different possibilities to implement the CRW-model led to the creation of new approaches for providing the services.

**Organizational culture**

The third factor that influenced the development of PACT was related to organizational culture, more specifically, to the creation of an organizational culture that supported the type of work CHWs were doing. To quote Govindarajan and Trimble (2012b) "community health work is compelling, intense, and draining" (p.185). In order to avoid fatigue and burnouts among the CHWs PACT created a working environment in which employees would act as each other's support by openly communicating about their experiences (Govindarajan and Trimble, 2012b: 185).

Also, the backgrounds of the clients impacted the approach that PACT applied in recruitment of CHWs. To reduce any possible barriers, e.g. cultural or language-based, the community workers had to come from a similar background as the clients. Some of the hired CHWs were even former clients themselves and usually lived in the same neighborhood. (Govindarajan and Trimble, 2012b: 184-185)

Due to the background of the community workers they were usually people with low level of education. Thus, PACT invests in frequent training and supervision of the CHWs.

> "[…] one of the things that shocks people is that our community health workers probably have four to five hours of training or supervision a week. In most other models, they're lucky if they get an hour a month." (Govindarajan and Trimble, 2012b: 185)

Organizational culture is an important part of the development of an innovation. If the culture does not match with the objectives and values of the innovation, it can result in poorer performance. Especially in the case of a service model that also depends on the motivation and well-being of its employees. Matching organizational culture can be an issue of do-or-die for the innovation. In case of PACT the organizational culture truly reflected the value that the organization wanted to provide for its customers, and possibly influenced the success of the program as well.

### 4.2.4 Market introduction

**Existing market structure**

Perhaps the most essential part of the market launch of any new innovation is knowing the market into which you are making the entry. This was also the case for PACT. The Boston health care sector already had a great variety of service providers operating in the market. Despite PACT entering the market with something completely new to offer, it still needed to understand where exactly it would fit in. More specifically, it had to define whether it would enter as a substitute or complement to the existing services.

PACT's approach did not fit into the traditional way the health sector in the US saw community workers. Community workers were more likely to be considered as social workers, while PACT considered them as health interventionists (Govindarajan and Trimble, 2012b). The existing institutional structures thus influenced the way PACT was received by the market. PACT sought to make a transformative change with this approach whether or not the market was ready for it.

Overall, to overcome the barriers caused by the existing market structure understanding the context and challenging the prevailing traditions were crucial for a successful launch of PACT's model.

**Organizational flexibility**

In addition to the structural barriers in the health care sector in Boston, PACT faced some other challenges. The initial approach of PACT was to provide its services through case management. Problems however arose from the fact that PACT was not the only service provider following this case approach. As a result clients could have several "overlapping case-management agendas" (Govindarajan and Trimble, 2012b: 182) which could potentially have a negative impact on the client.

The key to overcoming this challenge was in the ability to re-adapt the model without changing the end goal of the program. PACT moved from case management approach to health promotion approach which targeted those "patients who were failing treatment in hospitals with Western-style methods" (Govindarajan and Trimble, 2012b: 182). This kind of organizational flexibility turned out to be necessary for PACT to find its own place among all the different service providers and to become a provider of a complementary service rather than just another competitor in the market.

**Winning approval of the industry**

PACT's innovation had the aim of changing the prevailing market structures and of transforming the existing systems to include also those patients that the traditional system had failed to help. While PACT's founders knew that the solution for the problem was

not only in medical response but in a broader intervention into the patients' lives, it was not evident for everyone.

Due to these prevailing attitudes PACT had to prove to the industry the kind of impact it was capable of making. PACT demonstrated excellent results and showed that it was able to improve the lives of the most challenging patients. Due to the success of the program PACT became a respected player in the sector. (Govindarajan and Trimble, 2012b)

## 4.3 Case 3: MAC 400

MAC 400 is a fully portable ECG machine originally designed with the purpose of making ECG testing accessible for Indians living in poverty. It was developed by GE at its global research and development center in Bangalore, India and it was designed on the basis of specific requirements collected from customer reviews (General Electric, 2008). The characteristics of the machine have been designed to reduce income and infrastructural barriers that people in rural areas face with respect to health care.

MAC 400 is small in size and weighs little to guarantee that it is easily carried to the most rural areas as well as to patients' homes. By including a simple two-button operation, the usage of the machine has been made as simple as possible in order to guarantee that it can be used also without specific training for it. Moreover, to address the issue of irregular power supply MAC 400 can be run both on battery power as well as through mains current when available. The device does not have the capacity to store test results, but the built-in printer provides the results on paper. Finally, the cost of the test varies between 1-2 USD eliminating the potential income barrier faced by the poor patients (Govindarajan and Trimble, 2012b).

After being introduced to the Indian market, for which it was developed, MAC 400 was also sold globally in the advanced markets. Therefore, the original developing country innovation also became the reverse innovation without any specific modifications to the product.

### 4.3.1 Concept development

**Location of R&D**

GE has a long history of developing and manufacturing ECG machines for the global markets. India has been one of location of those activities since 2000 when GE decided for the first time to establish an R&D center in a developing market (Ramdorai and Herstatt, 2015). This decision to locate health care related R&D activities to India played its role in the creation of MAC 400. It provided GE with access to local talent and knowledge and was the first step towards identifying the problems that Indians face with access to health care.

The initial objective of the R&D center in India was not to focus on product development for the BOP market in India but to continue the strategy of developing premium products while capturing a share of the local market (Ramdorai and Herstatt, 2015: 80). Locating the R&D activities to India also meant hiring staff from the local talent pool. The Indian engineers employed by GE understood the local realities and swiftly learnt that the products they were developing did not address the needs of local customers; the prevalent economic and infrastructural limitations were not considered in the product designs. The enthusiasm of the local engineers to create an ECG machine that would specifically serve the needs of the local customers was the push GE needed for realizing it had to adjust its strategy for the Indian market (Govindarajan and Trimble, 2012b).

**Failing business strategy in the Indian market**

GE entered the Indian market with the so-called glocalization strategy (Govindarajan and Trimble, 2012b). In glocalization global products are adjusted to be sold locally in different markets. In case of India this meant that the ECG machines that GE developed and provided were high-end products that were sold at the lowest possible price range (Govindarajan and Trimble, 2012b: 145). The adjustments took place by de-featuring the premium products so that prices could be decreased. However, these products still used some high-level technology that kept the prices relatively high with respect to the income level in India.

The glocalization strategy did not achieve much and the results were poor (Govindarajan and Trimble, 2012b). The local adaptation of the products was not sufficient and the price still remained too high for the Indian clients. Meanwhile the local competitors were taking over the market share (Govindarajan and Trimble, 2012b). It was evident that the current strategy was failing hard and that there was a need for a new approach. The employees in India understood that in order to capture the markets it was necessary to develop new products that above all would address the needs and conditions of the local market and customers.

**Internal push**

While it was clear for the local team in India that a product designed specifically for the local market was a necessary premise for success, it was not as straightforward to convince the global leadership. There were two internal forces that pushed the idea forward.

First of all, the sales team in India had a difficult task of selling the highly priced products for the Indian customers. Therefore, they started to push for products that had a lower price (Govindarajan and Trimble, 2012b; Ramdorai and Herstatt, 2015). Second of all, the Indian R&D team started to promote the idea of developing an ECG device particularly for the developing markets. At that time the share of the Indian market within GE's operations was very small and it took several years before the idea gained the approval of the global leadership (Ramdorai and Herstatt, 2015).

The effort of the individual innovators/employees was a defining factor in pushing the idea through within the global organization. It shows that while MNCs have all the necessary resources to create new solutions, to do something out of the ordinary may require individual effort from innovators within the organization.

### 4.3.2 Crossover

**Extent to which based on the original innovation**

The MAC 400 was initially developed solely for the purposes of the Indian market and to address the needs of the local customers there. Despite this specific target market during the product development, the final version of the innovation also found its niche market in the developed world. The crossover of the innovation was a transfer of the product itself. The product was not adapted to the conditions in the advanced markets, but the same version of the product was sold in both markets. Therefore, the original innovation also became the reverse innovation.

**Involvement of original innovators**

The original innovator in the case of GE is considered to be the organization as whole. Despite the innovation being created by a local team in India, the efforts to develop the original innovation were supported by global resources. Hence, for the purpose of this study I do not separate between individual employees and the organization. This is also because the proprietary rights for the innovation are owned by GE. Therefore, the innovation remained within the same organization throughout the whole reverse innovation process, also meaning that the original innovators were strongly involved in the crossover stage.

### 4.3.3 Development and adaptation

In the case of GE's reverse innovation process the development phase was analyzed from the point of view of the original developing country innovation. The product that was later launched in the advanced market was the same as the original innovation. Hence, the innovation did not go through an adaptation process before it was introduced outside India, and the development stage took place before the crossover.

**Understanding the local conditions/market**

> "Raja's team would fully have to understand just how distinctive the Indian health-care market was." (Govindarajan and Trimble, 2012b: 147)

After pushing through the idea of low-cost ECG device targeted solely at the Indian market, GE established a local team that was given the task of turning the idea into something concrete. The development of an ECG machine for the particular purpose of rural India had to start from understanding what kind of conditions and constraints prevail in the market and in the lives of the customers and patients. What caused the other GE products to fail in India was exactly not addressing these conditions and thus, not meeting the needs of the customers.

Income and infrastructural constraints were seen as the biggest obstacles. The innovators had to make sure that these constraints did not turn into barriers for using the final product. The constraints formed the premises for the product development activities. By being aware of the constraints the team understood that the final product had to be more than just low-cost and low-price. It also had to bring down barriers related to limited power supply, inability of patients to pay visits to health care clinics, and low skill level of the potential user of the device. Therefore, the final product also had to be portable, battery-operated, and as simple to use as possible. (Govindarajan and Trimble, 2012b)

**Exploiting standardized technologies**

One of the criteria that the product development team had for the innovation was affordability, both for the health care professionals who are the direct customers of the product and for the patients who are the end-users of the service enabled by the product. As a global company with a variety of existing products GE also has a line of proprietary technologies that are used in the high-end ECG machines. However, using them would have easily increased the costs and made the product more expensive. Thus, using these technologies was not an option and the team had to find another way to keep the costs down. (Govindarajan and Trimble, 2012b)

The team opted for standardized components and technology widely used in other devices. As an example, the printing system in MAC 400 is the same as used by the bus system in Bangalore, India (Govindarajan and Trimble, 2012b). Standardized

technologies provided a way for lower costs as well as for low maintenance and repair costs in the future, which in turn reduced the barriers for using the product.

**Organizational adjustments/flexibility**

In order to succeed in its attempt to create something specifically for a developing market, it was crucial that GE realized that substantial adjustments had to be made also to the organizational structures. The organizational flexibility and the readiness to implement a new approach to product development played a big role in making the creation of MAC 400 possible.

GE implemented two major adjustments. First of all, the team that was working on the ECG device for Indian market consisted of members from different business areas. This was not a typical organizational structure for GE since normally the different business areas did not collaborate with each other. (Govindarajan and Trimble, 2012b) However, the development process for MAC 400 was not typical either and collaboration between the different functional areas was seen as necessary.

Second of all, in addition to creating a cross-functional local team GE had a completely different attitude towards the team and its work. While still having access to GE's global resources, the team was allowed to challenge the traditional way product development was implemented at GE. The team was given lot of freedom and even exempted from fulfilling the short term performance criteria that other units had to focus on (Govindarajan and Trimble, 2012b:149). The leadership of GE understood that the returns from the innovation would be long term rather than short term (Ramdorai and Herstatt, 2015).

### 4.3.4 Market introduction

**Positioning the product**

After being launched in India, MAC 400 found its market also in the developed countries. The target market for the conventional ECG machines in developed countries had typically been the hospital sector since the product features were more suitable and

attractive for bigger players in the health care market. Introducing a new product line for that same sector could have led to a situation where MAC 400 would have not increased the market share of GE but reduced the sales of the existing products instead. Therefore, it was crucial that MAC 400 targeted a different sector of the market.

GE found out that the potential market for MAC 400 was actually the opposite of the hospital sector. The target market was identified to be in smaller clinics and offices of individual doctors (Govindarajan and Trimble, 2012b: 154). This way the positioning of the product established MAC 400 not as a competitor for GE's existing products, but rather as an additional source of potential market growth.

**Product extensions**

Creation of MAC 400 inspired a line of product extensions that targeted either more upmarket or downmarket customers (Govindarajan and Trimble, 2012b). These product extensions were adaptations of MAC 400 that had features that were either improved or simplified even more. An example of a downmarket product extension is MAC India, a lower cost version of MAC 400. The low-cost of MAC India was achieved by installing a smaller printer that reduced cost related to material and power consumption (Govindarajan and Trimble, 2012b). Other iterations included MAC 600 and MAC 800 that were targeted to more upmarket customers at a slightly higher price and improved product features. MAC 800 was developed by a different team located in China and with the aim of designing a product that met the needs of the Chinese market. Later on also MAC 800 found its niche in the developed world and introduced in the USA.

# 5. Discussion

The case analyses identified the main determinants of the innovation processes of the three cases. The objective of this section is to further discuss and compare the results from the analyses and to discuss their contribution to the existing knowledge on reverse innovation. The chapter is divided into two parts. First I compare the results from the case analyses to the existing theories on reverse innovation process, after which I discuss the characteristics of reverse innovation and its potential impact.

## 5.1 The reverse innovation process

As reverse innovation is more about the transfer of innovation an essential part of the concept is the innovation process. The three cases were analyzed with respect to their innovation process and the results of the analyses are compiled in Table 3.

TABLE 3. RESULTS OF THE CASE ANALYSES

| Phase | Megamalli | PACT | MAC 400 |
|---|---|---|---|
| **Concept development** | • Benchmarking<br>• Personal experience<br>• Identifying similarities in contexts | • Prior research<br>• Personal connections | • Location of R&D<br>• Failing business strategy for developing market<br>• Internal push |
| **Crossover** | • Transfer of idea<br>• Independent transfer by the reverse innovator<br>• Established as a new organization | • Transfer of model and core values<br>• Original innovators as support<br>• Established under original innovator | • Transfer of product<br>• Innovators as part of the wider global organization<br>• Sold by the original innovator |
| **Development and adaptation** | • Understanding the industry<br>• Analysis of existing processes | • Research<br>• Learning by doing/experimenting | • Understanding local conditions/market |

| | | | |
|---|---|---|---|
| | | • Organizational culture | • Exploiting standardized technologies<br>• Organizational adjustments/flexibility |
| **Market introduction** | • Existing attitudes<br>• Recruitment<br>• Winning approval of the industry | • Existing market structure<br>• Organizational flexibility<br>• Winning approval of the industry | • Positioning the product<br>• Product extensions |

The typical reverse innovation process from the perspective of a developed country organization involves at least the following four stages: concept development, crossover, development and adaptation, and market introduction. The factors that impacted these stages varied across the cases. However, there are a few common aspects that have characterized two or more of the case innovation processes.

First of all, in the cases of Megamalli and PACT visit to the developing country to see the original innovation in action was an important part of the innovation process. While the visits took place in different stages, in both cases they contributed to the final outcome of the process. In Megamalli it contributed to the ideation and knowledge of the other innovator, but in the case of PACT the visits to see the original innovation were part of the development phase and contributed to the final reverse innovation more directly.

In those cases of reverse innovation where a developing country innovation is not being transferred as such, but where it acts as a basis for a new version of the innovation, it is essential to know how it functions in the original context. By visiting the original innovation on the spot and seeing it in action provides the reverse innovators with information on what the cultural and contextual factors that impact and enable the original developing country innovation are. This information, in turn, reveals to what extent is the innovation dependent on those contextual factors, and thus, how easily it could be implemented in the advanced markets where the context and culture might vary a lot.

Second of all, organizational flexibility was evident at least in the cases of PACT and GE. The conditions in developing and developed markets can be very different. When a reverse innovation is introduced to the advanced market it is hard to predict how it will be received. Therefore, the innovator's flexibility and readiness to adapt can become the deal-breaking factor behind the success of the innovation.

After being launched in the US PACT adapted its position in the market in order to better respond to the needs and to differentiate itself from other providers of similar services. GE, on the other hand, demonstrated flexibility towards the innovation team throughout the whole process by applying unusual methods and allowing them more exceptions. Organizational flexibility and adaptability played a key role in making the innovation process successful for both organizations. Therefore, whether it is a question of innovating for developing markets or bringing a developing country innovation to the advanced markets, organizations that understand the differences between the two markets and are willing to adjust their strategies along the innovation process have a stronger chance for success.

The similarities among the case results demonstrate that there are certain aspects that play a role in making the process successful. Nevertheless, the more essential contribution of the empirical analyses can be found in the differences prevailing among the cases.

The most significant differences between the cases were found in the crossover phase. DePasse and Lee (2013) introduced the crossover step in their framework for reverse innovation process in health care (see Figure 3, p.19), which, on the basis of the empirical findings, has demonstrated to be one of the determining factors of the reverse innovation process.

DePasse and Lee (2013) argue that the crossover takes place between early adopters of the innovation in developing countries and innovators in advanced countries. They use Rogers' theory on diffusion of innovation to justify their claim. While the diffusion theory might be applicable for spreading innovations within one market, spreading across two different markets might not be as straightforward, especially when it is an issue of

diffusing the innovation from developing to developed market. In fact, from the analysis of the crossover stages of the three cases it can be concluded that the cross-market diffusion was mainly the result of the efforts of the advanced country innovators, and that the level of diffusion in the developing market did not play a substantial role.

In the cases of Megamalli and PACT the developed country innovators played the most critical role in ideating, implementing and developing the "reversed" version of the original innovation. PACT spread to the US after it had been adopted in Haiti and Peru. It could be argued that this can be considered to be a case where the innovation spread from early adopters to advanced country innovators since the innovation already had diffused within the developing country setting. However, there is no evidence that the level of diffusion would have affected the spreading of the innovation to another market. The same conclusion can be drawn from the case of Megamalli. The diffusion of MAC 400, on the other hand, was the result of the efforts of the innovating organization. Again, either in this case the success of the product in the original market did not show any influence in the cross-market diffusion.

The cases show that the dissemination of the developing country innovation to an advanced market should not be looked from the point of view of adopters of the innovation as is the case in Rogers' diffusion theory. Instead, what matters more for the cross-market diffusion of reverse innovation is what kind of connection and access the advanced country innovators have to the original innovation, and what kind of effort they make to facilitate the launch of the innovation in the advanced market.

Each of the three cases presented in this thesis went through a different type of crossover phase. Megamalli was partly inspired by the logic behind the efficient operating model developed by Aravind Eye Care in India, PACT transferred the methods and organizational values of PIH from Haiti to the US, and GE created a solution to the Indian market which was later transferred to markets all over the world. By using the empirical findings from these cases it is possible to identify at least three archetypes of reverse innovation: idea transfer, method transfer, and full innovation transfer.

### Idea transfer

The first type of reverse innovation process is the transfer of idea. In this type of process a developing country innovation is not transferred to an advanced market as such but the new innovation is developed from scratch. The innovation is developed using the resources and within the constraints of the advanced market. Therefore, the final version of the reverse innovation might differ greatly from the original developing country innovation, for example in terms of quality.

But can an innovation that is only based on the same idea and logic really be counted as a reverse innovation? The consequence of the concept of reverse innovation is to look at developing countries as a source for global solutions. However, the contextual differences between developing and developed countries might not make it feasible to apply those solutions directly in different types of markets. Hence, I claim that even innovations that are only based on the same logic and that are not necessarily fully based on the original developing country innovation can be considered reverse innovations, since the original developing country innovation contributed to the idea and thus to the final version of the advanced country innovation.

The original innovation does not necessarily provide any concrete technology or methods on which the reverse innovation is based on. In the idea based crossover the role of the original innovation is to be a source for new ways of doing things and a reference point in the development of the reverse innovation. The final reverse innovation will depend on how the innovators decide to implement the ideas that derive from the original developing country innovation. For example, in the case of Megamalli, one of the innovators learnt from Aravind's model that it is possible to obtain efficiency and optimize the use of resources by re-organizing the workload of the health care workers. Aravind's model was a good-case practice and inspiration in the background throughout the innovation process.

The case of Megamalli also suggests that the reverse innovators do not have to have any official affiliation to the original innovators. The fact that the reverse innovation is

developed from scratch and it does not adopt any proprietary technology from the original innovation makes it possible. Therefore, in the cases where the crossover of the innovation is based on transfer of an idea it is possible to have more than one group of innovators involved. I would even claim that it is more likely that the idea-based reverse innovations are developed by different entities than the original innovations are.

**Method transfer**

The second type of reverse innovation process is transfer of methods. It differs from the first type mainly from the point of view of the extent to which the reverse innovation is based on the original innovation. In the method transfer the innovation is more extensively based on the developing country innovation. However, it still has to be adapted to fit the needs of the advanced market before being introduced there.

The original innovation works as a foundation for the new innovation. The aim is to apply the same innovative features and methods that the original service or product has but in a different context. The contextual differences between markets play a role here as well. The level of adaptation needed will depend on the extent of the differences as well as on how strongly the original innovation is dependent on the specific features of its original context.

In the case of PACT the reverse innovator was linked to the original innovators. Some level of connection between the innovators is necessary when the reverse innovation is based on an existing solution. The role of the owner of the original product or service is to act as a source for all the information that is needed in the development of the reverse innovation. However, there is no reason why the original innovators should be different from the reverse innovator.

In the method-based crossover the critical matter is access to the developing country innovation. Therefore, in some cases it might be more likely that the original innovators expand their operations from developing to developed markets if they are not willing to give access to externals. Moreover, it might be a reason why some feasible solutions created in developing countries never find their way to new markets.

### Full innovation transfer

The third and the last type of reverse innovation process is the full transfer of a developing country innovation. In this type the original and the reverse innovation are the same. There is no separate development stage or a need for adapting the innovation for the advanced market. The first two types could apply for both service and product innovations. However, the full innovation transfer is more likely to involve only product (or technology) innovations, as services typically require some level of adaptation.

Unlike in the other two types of reverse innovation process, the full innovation transfer is more likely to involve only one innovating entity. As the innovation is not modified or adapted there is no need for another development stage. Like in the cases of Megamalli and PACT the development and adaptation phase of the process differed from the development phase of the original innovation. In the case of MAC 400, however, the development of the original innovation was directly followed by market introduction both in developing and developed markets.

TABLE 4. ARCHETYPES OF REVERSE INNOVATION PROCESS

| | **Idea Transfer** | **Method Transfer** | **Full Innovation Transfer** |
|---|---|---|---|
| **Connection To The Original Innovation** | Developing country innovation as reference | Developing country innovation as basis | Developing country innovation same as the reversed innovation |
| **Level Of Adaptation** | Development of new innovation | Adaptation of the original innovation | No modifications to the original innovation |
| **Involvement of the original innovators** | Different innovators | Different or same innovators | Same innovators |

Table 4 summarizes the main characteristics of each archetype of reverse innovation process. At the same time it concludes the main differences between the three cases.

While these three archetypes of reverse innovation process help to understand the different approaches for organizations to take, they do not provide information about what happens after the innovation has been introduced to the advanced market. As reverse innovation is about cross-market transfer the potential impact these innovations could make is defined by other factors. The next chapter looks into what determines the features and impact of reverse innovation.

## 5.2 Characteristics of reverse innovation

As discussed at the very beginning of this thesis, there are two approaches to defining reverse innovation: through innovation transfer and through innovation process. The innovation transfer approach is more common and was also used in this thesis as a premise for identifying the suitable cases for the empirical analysis. Therefore, all the three cases were innovations that were initially created in and for the needs of developing countries. This market-based definition focuses on the location and the transfer but not the characteristics of the innovation. As reverse innovations are initially created for developing markets also its characteristics are defined by conditions in those markets.

If we look at the characteristics of the original innovations in the cases we can see that there are some similarities. For example, MAC 400 was developed for a customer group that was living in very resource constraint conditions, and therefore the features of the innovation had to reflect those conditions as well. As a result the final product was a low-cost, portable, and durable version of technology that before had not been accessible to people living in poverty and rural areas of India. The same story is repeated with the original innovation in the case of Megamalli. Aravind Eye Care created a process model that allows it to use resources in the most efficient way, which in turn, allows it to make cataract surgery accessible even for the poorest people.

Both the innovations are examples of frugal innovation, and in fact, Zeshcky, et al. (2014) have found that "reverse innovations [are] always built on cost, good-enough, or frugal innovations" (pp.21). This has also been noted by Hossain, et al. (2016) who assert that "all reverse innovations are also frugal innovations" (pp.134). Thus, in order to understand the kind of features that can be associated with reverse innovation it is necessary to first understand the characteristics of these other type of innovations.

Since frugal innovation seems to be one of the most common concepts prevailing in literature on developing country innovations I examine the characteristics of reverse innovation through the attributes of frugal innovation.

Frugal innovations are created in an environment that is characterized by scarce resources (Agnihotri, 2014; Brem and Wolfram, 2014). The purpose of these resource-constrained innovations is to solve problems and provide solutions to the unmet needs of customers that live in poverty and face constraints (Brem and Wolfram, 2014; Zeschky, et al., 2014). Thus, the initial motivation for innovating stems from the needs of poor customers (Brem and Wolfram, 2014). As a consequence of this resource-constrained starting point the solutions are often simplified products that provide only the core functions that are essential to the functioning of the product (Agnihotri, 2014; Brem and Wolfram, 2014). The elimination of non-essential functions lowers the costs of the innovation but keeps the quality on the level of similar solutions with additional functions.

Moreover, Weyrauch and Herstatt (2016) have found that "the discourse about frugal innovation mostly occur within the three main categories cost reduction, functionality, and performance level" (Weyrauch and Herstatt, 2016: 6). All the specific attributes that frugal innovations have fall into one of these three categories. For example, using less resources or aiming to minimize the purchase cost would count as cost reduction, while cutting down the number of functions would relate to the functionality category (Weyrauch and Herstatt, 2016). The authors further transform these categories into criteria that innovations should fulfill in order to be considered frugal innovations. These criteria are "substantial cost reduction, concentration on core functionalities, and

optimized performance level" (Weyrauch and Herstatt, 2016) with respect to the context. Those innovations that meet all the three criteria simultaneously are frugal innovations (Weyrauch and Herstatt, 2016).

Both MAC 400 and Aravind fulfill these criteria. The case of MAC 400 might be more clearly a case of frugal innovation, since the criteria set by Weyrauch and Herstatt (2016) are also the criteria that the innovators at GE sought to fulfill in the development process of the innovation. However, since Aravind is a process based innovation the criteria are not as directly observable. Yet, cost reduction, focus on core functionalities and optimized performance level are all intertwined in the core of Aravind's process model. Aravind's model is based on reaching process efficiency by optimizing the patient flow and by optimizing the use of resources, for example, by allocating doctors with tasks that only they can perform, which means their work load is reduced to "core functionalities". These optimization efforts in turn impact the cost level of the services. The same process features are reflected in Megamalli, albeit in different context.

PACT, on the other hand, does not clearly fulfill the criteria mentioned above. The service model of PACT, or PIH, is a completely new approach to the conventional way of treating certain illnesses. The aim of the service is not to reduce costs and it does not have functionalities that could be optimized, but it seeks to increase the probability of success of medical treatment by tackling the social issues prevalent in patients' lives, which are often the consequence of poverty.

According to Nari Kahle, et al. (2013) another essential feature of frugal innovation is inclusiveness, meaning that solutions provided by frugal innovations should increase the opportunities for the poor (Nari Kahle, et al., 2013). In order to be inclusive the innovation should be affordable, accessible, and meet the needs of the poor (Nari Kahle, et al., 2013). Unlike the rather concrete attributes identified by Weyrauch and Herstatt (2016) these features do not provide strong insight into the specific characteristics of frugal innovation. The emphasis is more on the impact that it has on the low-income population to whom

the innovation is targeted. From this perspective also the PACT/PIH model could be considered to be a frugal innovation.

On the basis of these empirical cases the claim that reverse innovation is in fact based on frugal innovation can be reinforced. Organizations in developed countries could therefore use reverse innovation as an approach or strategy to develop and introduce frugal solutions to the advanced markets, which could have implications on many different aspects. While the case analyses do not provide information on the possible impact of reverse innovation, since it was not their objective, there exists theoretical knowledge that can be used to speculate the kind of impact reverse innovation could have. For example, Corsi and De Minin (2014) argue that one way to understand reverse innovation is through the concept of disruptive innovation.

The theory on disruptive innovation differentiates between two types of innovations: sustaining and disruptive. Sustaining innovations seek to improve existing technologies and products in the market. As a consequence the outcomes of such innovations are more and more sophisticated and targeted at the higher end of the market. (Christensen and Raynor, 2003) This seems to be a typical example of innovations targeted to advanced markets, where people are constantly looking for the newest improvements to technologies.

Disruptive innovations, on the other hand, are new solutions that seek to realize the opportunities available at the lower end of the market. Due to this, disruptive innovations compete against sustaining innovations with solutions that are "simpler, more convenient, and less expensive products that appeal to new or less-demanding customers" (Christensen and Raynor, 2003: pp.34). These attributes are very similar to what Weyrauch and Herstatt (2016) associate with frugal innovations.

In addition to the sustaining and disruptive innovations that often refer to technological innovations, Christensen and Raynor (2003) identify another type of disruption: the new-market disruption. The new-market disruptions consist of providing solutions to a new customer segment that had not been served by the existing products and services in the

market. This new customer segment is characterized by lack of resources and capacity which are issues that can be solved by solutions that are similar to existing ones but that fill the gap by being simpler, portable, and low cost (Christensen and Raynor, 2003: 44-45). Again, the similarities with frugal innovation are clear.

The evident similarities between disruptive and frugal innovation could be the reason why reverse innovation has been associated with disruptive innovation. Whether or not reverse innovation has the power to disrupt markets in advanced countries depends on the original innovation. If the original innovation is a frugal one then at least in theory there is a possibility for the innovation to become disruptive once it is introduced to the advanced market. However, how strongly the reverse innovation is based on the original frugal innovation could also determine the level of disruptiveness that the innovation has. For instance, idea-based reverse innovations might lose part of their frugalness and disruptiveness in the course of the adaptation phase, since the original innovation is only an inspiration for the new version.

Moreover, it is also important to be careful before making the assumption that all frugal innovations have the potential to disrupt markets in the developed world. Markides (2012) emphasizes that not all innovations that are affordable and serve the underserved consumer group have the power to disrupt. Instead, Markides claims that disruptive innovations are those that initially provide lower performance and lower price in comparison to existing solutions and that overtime evolve to have an acceptable performance level but still at a lower price (Markides, 2012). Disruptiveness is not only a matter of innovation having certain characteristics but it is more about the source of the cost advantage that is behind the low price of the disruptive innovation (Markides, 2012). Hence, only the frugal innovations that have a strong focus on the cost aspect can potentially be disruptive.

Disruption is only one possible impact that reverse innovation has in advanced markets. If companies are interested in creating disruptive innovations, then reverse innovation could be one approach to achieve that. However, reverse innovation can also be used as

a means for achieving other kind of impact. Due to the above mentioned characteristics frugal innovation is often associated also with more sustainable solutions. The low and efficient use of resources, and the objective of inclusiveness and of providing solutions for people living in a resource constraint conditions make frugal innovations a potential source for sustainability. Basu, et al. (2013) note that while sustainability issues are growingly a global problem advanced countries have not been able to use frugality as a strategy for creating new innovations. Therefore, if the claim that reverse innovations are based on frugal innovations is true, then organizations in the developed world could use reverse innovation as an avenue also for bringing more sustainable solutions to their home markets.

On the basis of these theoretical aspects it is possible to identify at least two ways reverse innovation can impact the advanced markets. Nevertheless, in the absence of proper empirical evidence no strong conclusions can be made on the matter. The impacts of reverse innovation still require more investigation.

# 6. Conclusions

Reverse innovation can entail opportunities for both developing and advanced countries. While the concept is still rather fragmented and authors have used various definitions to describe the phenomenon, it is clear that the potential of reverse innovation to bring new solutions to the developed world is substantial.

Reverse innovation is about transferring developing country solutions to advanced markets. Despite the transfer of the innovation being in the core of the concept, existing literature has had very little emphasis on reverse innovation as a process. Therefore, the objective of this thesis was to provide a better understanding on what the reverse innovation process is like. This final chapter provides answers to the research questions that were formulated at the very beginning of the thesis and suggestions for future research avenues.

## 6.1 Main findings and answers to research questions

The main question to which this thesis sought to provide an answer was 'how can innovators from developed countries use reverse innovation to bring new solutions to their home markets?' I also posed three sub-questions to facilitate finding the answer to the main question. Each sub-question is examined below on the basis of the theoretical and empirical research discussed above.

**What kind of innovations can be reversed?**

The aim of this question is to provide an insight into the characteristics of reverse innovation. Reverse innovation as a concept does not associate any specific characteristics with the innovation itself, and consequently, reverse innovations are typically based on another type of innovation, such as frugal innovation. Thus, the attributes of reverse innovation are always dependent and defined by the features present in the innovation that is being transferred.

Frugal innovations are developed in resource-constraint environments and the target customers are from the low-income population. Because of this the development process for frugal innovation is very different from the innovation development in advanced countries. The typical attributes associated with frugal innovations are low cost and affordability, accessibility, optimized performance level, and simplified functionalities. When frugal innovations are being transferred to advanced countries also these features will be reflected in the reversed versions of the original innovation. They will also define the kind of impact reverse innovation will have.

**What are the different stages in the reverse innovation process for a developed country organization?**

The answer to this question was illustrated in the analytical framework of this thesis. In the reverse innovation process there are always two markets present: the original market of the innovation in the developing world and the second market in the developed world to which the innovation is transferred after being launched in the first market. However, from the point of view of an innovator from an advanced country the first market may not have that much of importance.

As reverse innovation is a concept of innovation transfer, the focus of the innovation process is on how to bring existing solutions from developing markets to advanced markets. While some companies may initiate their reverse innovation process by innovating for developing markets first it is not a necessary step in the process. Some companies may be able to exploit already existing developing country innovations and either transfer them directly or use them as a basis for development of a new innovation.

Therefore, perhaps the most crucial aspect of the reverse innovation process is the crossover stage. The crossover stage captures the elements of the innovation transfer and aims to describe the extent to which the innovation is based on the original developing country innovation and the involvement of the original innovators. The crossover stage is also the differentiating factor between a typical innovation process presented in existing theory and the reverse innovation process.

The three cases showed that reverse innovation can take place in various ways. The process varies particularly with respect to the extent to which the reversed innovation is based on the original developing country innovation. The transfer of the innovation can be based on idea or methods, or be a full transfer of the original innovation. The type of innovation transfer will further impact the level of adaptation that is required before the innovation is introduced to the advanced market.

**What are the factors that have to be considered along the reverse process?**

The context between developing and developed countries differ a lot in terms of cultural, economic, and societal aspects. Therefore, in the process of reverse innovation it is essential to understand the contextual and cultural background of the original innovation and to what extent the innovation is relying on those aspects. Not taking into consideration the contextual differences between the two markets can become a barrier for the success of the reverse innovation.

In the cases of PACT and Megamalli the possible obstacles caused by contextual aspects were eliminated by thoroughly examining the original innovation. The research allowed the innovators to understand which elements of the original innovation could be universally applicable and which elements were strongly linked to the specific context in the developing country. Visiting the original innovation on the spot is essential when the reverse innovator has not been involved in the creation of the original innovation.

In conclusion, understanding the different aspects of reverse innovation process has important implications to managers, innovators, and to whomever is interested in finding ways to take advantage of the innovation potential of developing countries. Innovating for developing markets is not the only option but innovators can actually learn and find new solutions for their home markets from the existing developing country solutions. The three archetypes of reverse innovation suggest three different approaches innovators can take.

Companies can use existing developing country innovations as a source for new ideas. This might be a more plausible option for small organizations that do not have the

capacity or interest to first engage in innovation activities in the developing market. On the other hand, companies could also take an existing solution and adapt and apply the same methods in the advanced market. This type of transfer may be easier if there are already established connections to the original innovator, since the original innovation functions as a basis and is modified only to the extent to which it is necessary. Finally, the third way companies can use reverse innovation is by first innovating for developing markets and then transferring the innovation as such to the advanced markets.

## 6.2 Suggestions for further research

As a rather novel topic area reverse innovation provides plenty of opportunities for new research. I have identified some possible research avenues based on the results of this thesis.

The focus of reverse innovation has been on MNCs. However, the case studies presented above show that reverse innovation provides opportunities also for other types of organizations. Both SMEs and NGOs can find reverse innovation to be valuable source for new solutions. The main findings of this thesis include the identification of three different ways reverse innovation can take place. While the cases represented different types of organizations, the organizational type was not considered in the analysis. Therefore, a possible avenue for further research is in examining how the different process archetypes go together with different types of organizations, for instance, what is the capacity of SMEs to implement the full transfer. Furthermore, an important contribution could be made by researching what the organizational requirements to implement the different reverse innovation process types are.

On a more general note, research on reverse innovation has several research gaps that still remain to be addressed. The existing research has had a strong focus on reverse innovation from the point of view of strategy. One aspect that has been left quite untouched is the impact that reverse innovation can have both in developing and developed countries. Some studies have addressed the potential of reverse innovation as a source for

sustainable solutions. Therefore, an interesting topic for research could be to study whether the existing reverse innovations have provided more sustainable solutions for the developed world.

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# Appendices

## Appendix 1: Interview questionnaire

**Background**

- The interviewee:
    - Name
    - Current role/job title
    - Role in the innovation process

- Can you describe the innovation and its main features?

**Innovation process**

1. Problem identification and ideation

    - Where did the idea for the innovation stem from?
    - What kind of problem is the innovation seeking to solve?
    - How was the problem identified??
    - Who was involved in the ideation phase?
    - How/where did the ideation take place?

2. Development / adaptation

    - How was the idea developed into a final product/service?
    - How was the idea implemented?
    - Who was involved in the development? What other actors? What kind of role did they play? (Were the innovators of the original idea involved in any way?)
    - How was the development of the innovation funded?

3. Market introduction

    - How was the innovation received by the market? (By customers, competitors?
    - What kind of business model was developed for the innovation? Why?
    - What kind of challenges did the innovation face in the market introduction?
    - How much time passed from getting the original idea until the market introduction?

# Appendix 2: List of secondary data sources

| Megamalli | PACT | MAC400 |
|---|---|---|
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# Appendix 3: Original quotations for the case of Megamalli

[1] ”Jos Aravindin kaihiprosessi olisi tuotu Suomeen, niin se olisi tarkoittanut 96% työttömyysastetta suomalaisista silmälääkäreistä, ja tota, olisi tarvittu 4 silmälääkäriä leikkaamaan kaikki Suomen kaihit” (Innovator A, 9.2.2017)

[2] Sanotaa et sä meet vaikka johonkin yritykseen ja kysyt siellä että miten, tota, toimitusjohtajalta että, millä kannattavuudella tänään tehdään töitä, mitä tääl tapahtuu, niin se osaa vastata sulle. Se osaa kaikki luvut ja kaikki. Sä meet sairaalaan kysyt sieltä johtajilta, et mitä tääl tapahtuu. Teil on leikkauksia, teil on vuodeosastoja, et millä kannattavuudella te toimitte tänään. Ei mitään hajua.” (Innovator B, 20.2.2017)

[3] ”Se vaatii logiikan kääntämisen niin päin että, jotta hammaslääkäri, samalla tavalla kun silmälääkärit siellä Intiassa, saisi vain ja ainoastaan tehdä sitä diagnosointia ja paikkaamista, niin silloin täytyy kääntyä niin päin, että ne potilaat ovat omissa huoneissaan ja lääkäri liikkuu.” (Innovator A, 9.2.2017)

[4] ” Eli siin on se logiikka että ei ole kliinistä syytä tehdä, tai niin kuin, pitää samaa lääkäriä tai tehdä kahdella käynnillä. Se on sama logiikka [kuin Aravindin mallissa], että seulotaan vain peruskamat ja tehdään se omassa prosessissaan ja sit kun tulee vaikeempaa niin siirretään se toiseen prosessiin” (Innovator A, 9.2.2017)