



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

Master Degree Project in International Business and Trade

# **Knowledge Management during New Product Development for the Value Segment in Emerging Markets**

The case of Volvo GTT's development of the Value Truck

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## **Abstract**

The development of products for the Value Segment in Emerging Markets with its impressive number of potential customers and above average growth rates constitutes a significant opportunity for Western MNCs to escape the saturated markets in developed countries. However, limited research has been conducted in this area, as literature has predominantly concentrated on examining the Bottom of Pyramid-segment, which is not congruent with the Value Segment. As most western MNCs lack experience and knowledge about the Value Segment, this study intends to observe the knowledge creation and sourcing process during a new product development in this segment. The study is based on 13 interviews that were conducted in Sweden, India, and Japan to comprehend this process during Volvo Group Truck Technology's development of the so-called Value Truck. The results suggest the importance to effectively integrate complementary internal and external knowledge about the customers, the market and their contexts during the product development. This is in contrast to research about the Bottom of Pyramid-segment which stresses the importance of establishing local external knowledge networks with various partners. A key prerequisite for this approach constitutes a localized R&D-unit in EM, which is responsible for the product development and which must be capable of processing multiple knowledge flows.

**Key words:** Emerging Market, The Value Segment, New Product Development, Knowledge sourcing, Organizational learning, Reverse knowledge flows, Internationalization of R&D

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## Abbreviations

ATR	Advanced Technology & Research
BOP	Bottom of the pyramid
BRIC	Brazil, Russia, India, China
B2B	Business - to - Business
B2C	Business - to - Consumer
EM	Emerging Markets
FDI	Foreign Direct Investment
Glocalization	Combination of Global and Local, refers to a strategy in which a global product is adapted to a local market
GTT	Volvo Group Trucks Technology
HD-Truck	Heavy-Duty Truck
IPR	Intellectual Property Rights
JV	Joint Venture
KPI	Key Performance Indicators
MNC	Multinational Company
NGO	Non-Governmental Organization
NPD	New Product Development
OEM	Original Equipment Manufacturer
PPL	Product Planning
RPM	Range and Project Management

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# 1. Introduction

*This chapter starts by outlining the study background, thus leading to the actual problem which will be discussed throughout this study. During the problem discussion the importance of the topic will be presented both in terms of practical and theoretical relevance. This is followed by the formulation of the research question which will guide the thesis until the final chapter. This chapter is concluded with the presentation of the delimitations and the overall structure of this paper.*

## 1.1. Background

Western Multinational Companies (MNCs) are constantly looking for new growth opportunities in various markets. Although western markets offered stable and attractive revenue streams as well as growth rates in the last decades, the Financial Crisis in the US and the Public-Debt Crisis in Europe has altered the base on which various companies had relied on. Given these difficult market environments in their home base markets in recent years, western MNCs thus increasingly look out for new growth opportunities in other countries.

In 2001, Goldman Sachs coined the term BRIC that was based on the countries Brazil, Russia, India, and China, thereby underlining the countries' increasing future economic and financial potential (Goldman Sachs, 2001). Since then, the then outlook of Goldman Sachs has proved to be right, as most of the named countries have shown a strong economic performance over the last years. China, for instance, has experienced economic growth of 17.6 % each year on average since 2001 reaching a total GDP of USD 8.227 billion in 2012, while the US and Europe have merely grown by an annual average rate of 3.9% and 6.1% respectively in the same period (World Bank, 2014). Although the growth of the BRIC and other Emerging Markets (EM) has taken place on a lower absolute level compared to fully industrialized countries, MNCs have increased their activities in these EM. Since 2001, the FDI inflows to EM have risen by an annual average of about 11%, while the leading eight industrialized countries (G8) have just attracted modest growth rates of 2%, thus stressing the growing significance of newly industrializing countries for companies worldwide (UNCTAD, 2013).

In the past, MNCs primarily invested in EM, because of the abundance of cheap labor which led to the relocation of production activities from developed countries to EM. Companies initially did not focus on selling local produced products within the EM, but transferred the produced goods back to the consumer markets in developed countries (Yusuf & Nabeshima, 2010). However, with an improving economic development, EM also became attractive as sales destinations. Especially, India and China offer favorable conditions not just



due to their economic success in recent years, but also due to the fact that they account for about 37% of the global population (World Bank, 2014). The prospect of targeting markets with millions of new customers in EM bolsters the trend of increasing downstream activities of MNCs in these markets. Thereby, various researchers, such as Prahalad and Hart (2002), Prahalad (2005) and Gadiesh et al. (2007) suggest that western MNCs should target the below premium segments when producing in and for EM (and particularly in India and China), where two to three billion persons will join this segment in the next decade (Prahalad & Mashelkar, 2010). Hence, those markets constitute an attractive opportunity for western MNCs to escape the saturated and crisis-shaken markets in the developed world.

## **1.2.Problem discussion**

In order to serve the before-mentioned segments, MNCs mostly relied on their world-wide products and business models in the past. Often, this included utilizing a global product, which was adapted to the local environment, for instance, by stripping down some product functions (Prahalad & Lieberthal, 1998). However, below premium segments with names such as “The Bottom of the Pyramid” (BoP), “the Value Segment”, or the “Good-Enough Market”, however, can by no means be compared with lower and middle class segments in western markets. Customers in this segment possess significant lower purchasing power, thus increasing the cost-pressures on companies (Anderson & Markides, 2007; Prahalad & Hammond, 2002). Further, product functions must also be carefully revised and adapted, so that they fit the local environment. EM customers frequently have totally different product and function preferences, for instance, due to deviant ways of using the products compared to the same segments in developed countries. Lastly, the institutional and infrastructural environment is often also lacking behind, implying the existence of tremendous obstacles when doing business in these countries (Prahalad, 2005).

Given these differences in the market environment and conditions, various researchers and practitioners have demanded MNCs to develop new strategies in EM, including developing products for these countries locally, and specifically meeting the customer as well as market requirements (e.g. Prahalad & Lieberthal, 1998; London & Hart, 2004; Immelt, et al., 2009). Though, in most cases, western MNCs are unfamiliar with those segments, due to lacking experience as well as unknown market dynamics and characteristics. Consequently, Prahalad (2005) argues, that developing products for the middle class or the BoP requires local presence in EM, so that the company can learn from local actors, including consumers, NGOs, and domestic businesses, in order to overcome the challenges mentioned above.

However, this process is not well described in literature and features several gaps.

Firstly, most studies concentrate on the BoP-segment, that is the market for the poorest consumers. Though, Gadiesch et al. (2007) outlines that the Good-Enough-Market represents a much larger share of the market which is rapidly expanding. As can be seen in figure 1, this market segment is situated between the premium and BoP-segment and is considered to be value oriented that is demanding a good quality for a comparable low price in contrast to the BoP-segment, in which primarily a low price is the key to success. Therefore, the way knowledge is handled during a new product development (NPD) in both segments can be expected to be different from each other. In the rest of this paper, the terms "The Good-Enough-Market" and "The Value-Segment" are used interchangeably.

Premium (Narrow)	Good-Enough (Rapidly Expanding)	Low-End (Evolving Base)
<p><b>Definition:</b> High-end products purchased by discerning customers with significant purchasing power.</p> <p><b>Leading Vendors:</b> Panasonic, Philips, Sony</p> <p><b>Product Features:</b> LCD and plasma screens, many state-of-the-art user features, priced according to their status as international brands.</p>	<p><b>Definition:</b> Products of good quality, produced by local companies for a rapidly expanding group of value-seeking consumers with midlevel incomes.</p> <p><b>Leading Vendors:</b> Hisense, Skyworth, TCL</p> <p><b>Product Features:</b> LCD, plasma, and large cathode-ray tube screens, with limited user features, priced to undercut foreign brands.</p>	<p><b>Definition:</b> Products of lower quality, meeting basic needs, produced by local firms for a large group of consumers with low incomes.</p> <p><b>Leading Vendor:</b> Konka</p> <p><b>Product Features:</b> Cathode-ray tube screens with basic standard user features and low-cost components, priced to sell.</p>
<b>Share of Market in 2005: 13%</b>	<b>Share of Market in 2005: 62%</b>	<b>Share of Market in 2005: 25%</b>

Figure 1: Market Structure in EM: An example of China's Televisions Market (Gadiesch et al., 2007)

Secondly, most studies about the lower than premium segments also apply a more holistic point of view that is analyzing the business strategies or the complete value chains of MNCs in these particular segments (e.g. Immelt, et al., 2009; Radjou & Prabhu, 2012; Schuster & Holtbrügge, 2012). Therefore, although some of the literature touches upon the knowledge and learning aspect, those studies lack the details about specific flows, knowledge sources, as well as affecting factors, and instead provide rather broad descriptions.

Thirdly, on the other hand, researchers have studied single external knowledge sources on a country level in EM and provided more detailed insights (e.g. Fiaz, 2013; Li & Zhong, 2003). However, these studies fall short of perceiving the interdependencies that exist between different knowledge sources. For example, one source may not provide the required knowledge, hence a different source has to counterbalance this shortcoming, or the MNC is required to creatively solve the problem through learning. As a result, there is a need for studies that take these interdependencies in an EM context into account.

Fourthly, a new stream of literature is emerging that deals with knowledge flows within EM. Thereby, flows and spillovers from global MNCs to the local community have

been comparable well understood. However, reverse flows and spillovers that originate in the local environment and are transferred to the MNCs, where they could possibly be utilized for the MNCs global operations, are far less researched (Li, et al., 2013).

Therefore, literature is in need of a study that addresses the above mentioned gap in the literature. The gap is based on the lack of a holistic picture of the various knowledge flows that occur during the new product development process for the Value Segment. In 2013, Volvo Group Truck Technology (GTT) developed the first truck for the Values Segment in EM mainly from its R&D site in Bangalore, India. This truck constitutes a NPD and is designed to meet the segment-specific customer and market needs in terms of price and functionalities, while it also aims at overcoming the infrastructural challenges. Hence, the case of Volvo GTT's development of the Value Truck in India offers a current case that supports filling the identified research gap.

### **1.3.Purpose and Research question**

The purpose of this study is to gather and analyze empirical data in order to fill the research gap mentioned above and to provide deeper insights about knowledge creation and sourcing within this particular segment. Therefore, this study will concentrate on the knowledge management aspect during a new product development process for the Value Segment. It is important to note, that this study does not solely address knowledge flows outside the MNC, but also covers the internal situation that is how knowledge is created and transferred within the boundaries of the firm for this NPD. This allows to draw a comprehensive picture of all knowledge flows to be able to adequately describe interdependencies and underlying factors. In regard to external flows, this study also contributes to the literature on knowledge flows in EM in general, thus adding further insights about relevant actors, factors and obstacles that influence the direction of flows and spillovers.

The following research question has been formulated to cover the before-mentioned aim of the study:

***How can a western MNC create and source knowledge for the NPD in the Value Segment of EM?***

As this is still a broad question, the study primarily concentrates on the following two aspects:

firstly, before being able to analyze specific sources of knowledge, this study attempts to clarify what and which type of knowledge is required for the NPD in the Value Segment.

This is a necessary step, as the type of knowledge has implications for the way the knowledge sourcing process is conducted. Further, this can later be matched against the actual knowledge creation and sourcing activities and allows for a classification of the sources according to the required knowledge.

Secondly, the next step is to identify the relevant internal and external sources being used in the NPD. This involves the determination of why a specific source is utilized, which knowledge the source can provide, and lastly which factors and obstacles are influencing the sourcing process from the respective source.

In sum, the study draws a detailed picture of the whole knowledge creation and sourcing process for this type of NPD. Thereby, this study aims at providing a theoretical base for this process in EM, including advantages and disadvantages as well as underlying factors and enablers for the appearance of specific knowledge flows and transfers. At the same time, the study provides managers with a more detailed picture of the knowledge landscape in EM and offers an overview about managerial actions towards enhanced internal and external sourcing activities in EM, and particularly in India, as this is the country where the case takes place.

#### **1.4.Delimitations**

For several reasons, this study involves some limitations, which will be shortly outlined below: Firstly, due to the chosen methodology, that is a case-study approach, this paper occupies some restraints in terms of reliability and validity. For example, this case takes place in a specific industry context, hence other industries may be framed by deviant environments that lead to different decisions and factors that influence knowledge flows.

Secondly, as the Volvo GTT's Value Truck development constitutes the first NPD experience of this kind for the company, the results may be biased because of the special circumstances. Nevertheless, this case is still appropriate for the purpose described above, as it is assumed that the majority of western companies possess a similar experience level and hence are confronted with the same decision to expand R&D activities on a local-for-local basis in EM.

The time aspect is another factor that should be taken into account, given the fact that NPDs are highly complicated processes within MNCs. In total, 13 interviews have been conducted, which may not be sufficient to cover every knowledge flow on a detailed level. Still, it is believed, that the most significant flows and processes have been identified and examined. This was contributed by the fact, that this study concentrated on the technological

development process within the R&D unit. Although the NPD process also embraces other functions, such as the commercial conceptualization and exploitation by the Marketing & Sales unit, those processes have not been included for simplifying reasons.

### **1.5. Research outline**

In total, this study covers six chapters, including the introduction. The next chapter deals with the theoretical background of this study. In the first part of this section, general knowledge creation and sourcing strategies are discussed, while the second part focuses on NPDs in EM more in particular. The insights of the theoretical discussion are then utilized for a conceptual framework, which is later matched and compared with the actual empirical results.

The methodological chapter follows the literature review and presents the strategies and techniques that were applied during the complete research process. This includes, for instance, the presentation of the data collecting process, the interview techniques, as well as how the research quality has been ensured throughout the research process.

The subsequent chapter is devoted to the empirical findings. Hereby, the case company as well as its NPD process are introduced. Further, the empirical part will concentrate on presenting the various knowledge sources that have been utilized during the NPD. Thereby, the section will also outline factors that influenced the creation and sourcing of knowledge during this process.

Afterwards, the results of the empirical part are analyzed and compared with the conceptual framework presented earlier. This chapter concludes with the presentation of an revisited framework, as not all empirical results match with the framework derived from the literature review.

The final chapter summarizes and highlights the main findings of this study. This will be complemented by an illustration of the study's limitations and outlook for future research.

## 2. Theoretical Background

*This chapter sets the theoretical foundation for the subsequent chapters. The chapter starts by introducing the New Product Development process as well as the function of the R&D unit. It then continues presenting how knowledge is created internally, and which external knowledge sources exist, along with strategies to access them. Afterwards, this section moves on to NPDs in the Value Segment and the opportunities which exist to manage knowledge during this process. The chapter finishes by presenting a conceptual framework that is derived from the presented theoretical base.*

### **2.1. New Product Development, Industrial Research & Development and its internationalization**

New innovative products constitute an important engine for companies' profitable growth. According to Trott (2012), in several industries it can be seen that NPDs lead to growing market shares and leadership as shown by companies such as Apple. The process of NPD is referred to as the "process of transforming business opportunities into tangible products" (Trott, 2012: 418). Different corporate functions, ranging from marketing to manufacturing contribute to this process, so that the product is first conceptually as well as technically developed, and afterwards commercially exploited. Thereby, the Research and Development (R&D) function of the company is responsible for the technical conceptualization and development of the product. Although the R&D organization of companies in most cases also fulfills other tasks, such as long-term technology development, the function is often primarily organized to develop marketable products (Trott, 2012).

Initially, it was assumed that R&D activities were solely performed close to the headquarter in the home country (Vernon, 1966). The World Investment Report 2005 claims that for a long time R&D was the least internationalized function of the MNC (UNCTAD, 2005). Although Cantwell (1995) argues that the internationalization of R&D is merely a product of the last two decades, but that the evolution of international R&D started much earlier and must be differentiated among different countries, the late 1980s and early 1990s can be characterized as the starting point of the internationalization trend that affected a broad base of industries.

For a long time, researchers have argued about the advantages and disadvantages of internationalizing and moving R&D activities abroad. Doz and Wilson (2012), for example, attribute obstacles that hinder MNCs to easily re-locate R&D units mainly to the type of knowledge involved in R&D and innovation processes. Today, innovations or new product developments require the building of complex and tacit knowledge foundations, for instance, through gaining in-depth experience of certain phenomena. As this knowledge is often

context-bound, transferring it to another location is complicated, thus leading to high communication costs and other obstacles (Doz & Wilson, 2012; UNCTAD, 2005).

However, especially since the 1990s, offshoring of R&D activities have taken off, thus reflecting the existence of factors that enable the dispersion of this high value-added activity. One of the most important reasons to transfer R&D abroad is to leverage on existing capabilities that provide the firm with a competitive advantage in foreign markets. Consequently, when applying this strategy, the foreign R&D unit is predominantly responsible for adapting the company's standardized global products to the local conditions, as this will significantly shorten the development to market time (Kuemmerle, 1997). Moreover, managers have also moved R&D-activities abroad as an opportunity to lower costs. This also fosters the trend to offshore, especially to Asia (UNCTAD, 2005). Ambos and Ambos (2011) notice that recently, research or resource-driven R&D offshoring has become an important factor. Accordingly, knowledge creation does not solely takes place at few locations anymore but it is performed at an increasing number of dispersed locations, mainly due to the fact of the rise of EM which provides industries with a vast number of skilled engineers and research personnel.

## **2.2. Knowledge Management for new product developments**

NPD is a complex process in which the exploitation and exploration of knowledge plays a significant role. In literature, there exists a whole stream, called organizational learning, dealing with both the creation of knowledge within organizations and the sourcing of new knowledge from the external environment. Hence, the following two sections discuss internal and external possibilities to create and source knowledge for product developments.

### **2.2.1. Internal knowledge creation for new product developments**

Internally, the classical streams in theory regard the organization as the unit where knowledge is created within companies. Levitt & March (1988) argue that knowledge within organizations is created through experiential learning, that is learning from past incidents. Thereby, gained experiences must be stored in an accessible way for other organizational members or have to be distributed, for example, through education, imitation, or personal movement. The two authors differentiate between two major mechanisms for knowledge creation: trial- and error experimentation, where new routines are adopted when they are linked to a successful outcome, and organizational search, that is selecting more favorable routines once they have appeared from a pool of alternative routines (Levitt & March, 1988).

Instead of creating new knowledge, organizations often attempt to acquire existing

knowledge which was unknown to the organization before. Huber (1991) provides an overview of different ways of knowledge acquisitions that also includes experiential learning. Besides, he introduces congenital learning: the knowledge that was inherited by the organization from its founders. Huber notes that this kind of knowledge greatly influences how an organization will learn after its inception. Another strategy of internal learning is in fact a hybrid between external and internal knowledge sourcing. Huber calls this method crafting: recruiting new organizational members who possess knowledge that was not available in the organization before. In later sections of this paper, this method will be considered as an internal source, since once the member is recruited, the knowledge is present within the organizational boundaries (although the knowledge may not be transferred to other members yet).

This last method is also in line with a newer approach towards internal knowledge creation, that focuses on the members of the organization rather than the organization itself, thus stressing the social aspect of organizational learning. In his article towards a knowledge-based theory of the firm, Grant (1996) outlines that knowledge is created by individuals. Thereby, the underlying assumption is that knowledge is created through the integration of specialized knowledge backgrounds of two or more persons, also called recombination of knowledge resources by Galunic and Rodan (1998). An practical example of this process within the field of R&D constitute the case of a mechanical engineer and a software engineer, that combine their respective know-how to develop a machine with superior performance that is based on the implementation of new software into the machine. As a result, the combination of machinery and software knowledge led to the creation of new product knowledge, which, in turn, has resulted in a new product.

As can be seen, knowledge creation among individuals requires social interactions within the firm, which is confirmed by Simon (1991) who outlines that organizational learning is to a great extent a social process and March (1991) advocates that the organization is learning from its members. However, to create organizational knowledge it is not sufficient to merely integrate two specialized knowledge bases, but to diffuse the newly created knowledge within the organization. This process is congruent with the term "internal learning" coined by Simon (1991). Thereby, one group or person within the organization that possesses knowledge, transfers it to another group or member of the same organization, and as a result, the knowledge is diffused throughout the organization thus leading to a larger knowledge base of the company. Hence, Grant (1996) argues that the main tasks for the organization is to design structures and procedures which ensure the integration of individual



knowledge bases as well as to permit members of the organization to utilize or access the newly created knowledge of other members of the organization. However at the same time, new innovations increasingly involve the creation of a large share of tacit knowledge, that is knowledge that cannot be spread by words or written documents, but is attained through observations of its application ("know-how") and hence cannot be codified. Therefore, diffusing this kind of knowledge within the organization is difficult and costly, and thus poses one of the largest managerial problems during knowledge creations within firms (Grant, 1996).

### **2.2.2. External knowledge sourcing new product developments**

As mentioned before, organizational learning is not only concerned with internal knowledge acquisition processes, but also with the utilization of external knowledge sources. In fact, Huber (1991) also includes "Searching and Noticing" as an additional way how organizations acquire knowledge. Thereby, companies scan the external environment for new and unknown knowledge. However, this way of gaining new knowledge was rather broadly defined by Huber. The next passages will outline strategies and the affecting factors in a more detailed way.

Historically, R&D was perceived as a function that worked to a great extent independently from other functions inside the company and from other organizations outside the firm. However, this image has changed and R&D has become a function with several ties within and outside the company in order to increase flexibility (Niosi, 1999). Therefore, researchers stress the growing importance of external knowledge sources. In fact, one of the main important reasons to disperse the R&D function, as previously mentioned, is to access knowledge sources that nowadays are spread in various locations world-wide, thus leading to an increasing number of inter-firm linkages (e.g. Dunning, 1994).

The result of including external knowledge sources into the R&D activities is in most cases considered to be beneficial for companies. For example, Almeida and Phene (2004) stress the importance of the foreign subsidiary's presence in both internal and external local networks, as this will positively influence the innovational capability of the unit. Further, Laursen and Salter (2006) found evidence that external openness of companies tend to contribute to their innovative capacity, although too excessive external knowledge seeking may also hinder the development of new ideas or products This implies the existence of an inverse U-shaped relationship between the extent of external search and innovative performance. The positive influence of external knowledge on companies can be described by

the fact that they utilize knowledge that has not been inherent in the organization so far. Hence, external knowledge often complements internal capabilities, thus enhancing the firm's innovation process (Cassiman & Veugelers, 2006). Negative implications of too excessive external knowledge seeking results from substantial use of resources that must be devoted to the task of finding partners or absorbing knowledge, for instance (Laursen & Salter, 2006). However, this does not imply that researcher neglect the importance of external knowledge, since its benefits are commonly acknowledged, for example by Chesbrough (2003), who advocates that R&D activities which are solely based within the boundaries of the firm leave out chances external environments provide.

#### ***2.2.2.1. Knowledge search strategies***

In a well respected article, Katila and Ahuja (2002) introduce the terms search depth and scope to describe internal knowledge search strategies of companies. The authors define search depth as the degree to which search revisits a firm's prior knowledge (also called exploitation) and search scope as the degree to which extent new knowledge is explored during the search process. Thereby, the authors followed the idea from Levinthal and March (1993) by stressing that companies should not rely either on exploration or on exploitation alone, but that a combination of both strategies is more beneficial (Katila & Ahuja, 2002). Laursen and Salter (2006) applied this two-dimensional concept to examine external search strategies and coined the terms external search breadth and depth. Both terms taken together represent the openness of the firm's external search which in turn, as noted earlier, is related to a higher innovative capacity. External search breadth is defined as the number of external sources and channels which are included in a firm's innovation process and external search depth is related to how deeply the firm relies on knowledge from each of the external sources. The authors demonstrate that radical innovations as well as innovations that occur early in the firm life time are linked to external search depth. In more mature markets the dominant axiom for companies is to expand their search breadth, as more actors on the market possess specialized knowledge that is worth including in new inventions (Laursen & Salter, 2006).

Further, in a comprehensive literature review Laursen (2012) notes that primarily knowledge search is conducted in the local environment which is also confirmed by other researchers, such as Yamin and Otto (2004). Although distant search is considered by literature to result in higher innovative capacity (Rosenkopf & Almeida, 2003), there are several explanations that are brought forward by researchers to describe this phenomenon: firstly, achieving technological innovations is a complex problem-solving process, hence managers and R&D staff are unable to process every possibility to include external

knowledge, thus relying rather on sources in close spatial proximity (Knudsen & Levinthal, 2007). Secondly, companies are risk averse, thus often relying on incremental innovations that include few new features. Thereby, firms and R&D employees rather rely on technological sources that are familiar and in proximity as this enhance throughput time of new developments and reduce the risk for product failures (Laursen, 2012; Cohen & Levinthal, 1990). Finally, local search in familiar environments also reduces costs (Rosenkopf & Almeida, 2003).

#### ***2.2.2.2. Modes of external knowledge sourcing***

Literature has shown several methods of sourcing external knowledge. One principle differentiation of various knowledge sourcing modes is presented by Kang and Kang (2009) who present a framework of three methods which are based on prior research. Thereby, the authors distinguish among information transfer from informal networks, R&D collaboration, and technology acquisition and determine when and to which extent each approach should be applied by companies.

Information transfer from informal networks should be preferred over the other two methods, as this has the largest effect on the firm's innovational capacity. This method requires the creation of large informal networks, thus neglecting the inverted U-shaped relationship between knowledge search and firm benefits mentioned earlier for this method (Kang & Kang, 2009).

In contrast to that, a collaborative approach requires the firm to determine the optimal level between associated benefits and costs, which may arise from divergent interests of the participating firms (thus confirming the inverted U-shaped relationship for this method). Therefore, collaboration is solely recommended for innovation in a controllable scope (Kang & Kang, 2009). In addition, Ebersberger and Herstad (2011) argue that collaboration modes do not solely require working together with one partner, but several ones, as each partner possesses specialized knowledge which alone is not sufficient to develop one complete product. Hence, in collaborative partnerships different knowledge sources need to be combined through specialized roles, where one partner is responsible for the technological development, a second partner for the implementation, and a third partner for the commercialization of the technology, for example. As a result, the capability to assemble and manage diverse partners is necessary for successful collaborative projects (Ebersberger & Herstad, 2011).

The acquisition of technological knowledge is linked to challenges to integrate the technologies with the established systems in the firm or to commercialize it, thus making it

less favorable than utilizing information from informal networks (Kang & Kang, 2009). Further, although an acquisition may provide an ad hoc possibility to gain access to new technologies, it lacks the transfer of tacit knowledge which is built on experience gained during the development process (Ebersberger & Herstad, 2011).

### ***2.2.2.3. Potential external knowledge sources***

Although, a company can potentially source knowledge from any external entity, suppliers, universities, and customers are found to be the most common ones utilized according to the following two articles.

Santamaria and Surroca (2011) draw a link between the type of collaboration (exploitation vs. exploration) and the partner selection in a Spanish industry context. Thereby, they demonstrate that companies mostly benefit from collaborations when vertical (e.g. suppliers or customers) and institutional partners (e.g. universities) are involved, as both groups offer the possibility to engage in projects with exploitive and explorative character, thus enabling incremental as well as radical innovations. Horizontal partnerships with competitors are less frequently established, due to the competitive relationship among the two firms, that often prevents the exchange of critical knowledge that is required for innovations. As a result, these collaborations are typically used for highly specialized projects with a pre-competitive character, such defining industry standards.

Besides, literature has often focused on concentrating on high-tech industries when it comes to knowledge sourcing. However, Grimpe and Sofka (2009) found out that low- and high tech firms differ significantly when selecting partners to source knowledge. Low-tech industries tend to apply a market-oriented search that is sourcing knowledge from customers or competitors. On the other hand, source patterns of high tech industries comprise more technological sources, such as suppliers or universities. Thereby, mid-tech industries apply a mix of both market and technological search strategies (Grimpe & Sofka, 2009).

As a result, these identified partners (suppliers, universities, and customers) are shortly described on a more detailed level in the following passage. In literature, suppliers are often considered to contribute in a positive way during a NPD. Thereby, researchers, such as Bonaccorsi and Lipparini (1994) outline that suppliers help to cut costs during the development process and to bring a product faster to the market. In terms of knowledge sourcing, a recent study by Harhoff et al. (2014) found out that suppliers contribute in this process with technological knowledge, thus allowing the focal company to access specialized inputs. However, collaborating with suppliers may not automatically lead to beneficial results. Wynstra et al. (2001) showed that, among other factors, a successful collaboration during

NPDs is threatened by the supplier's low technical capability, as well as by both partners' capabilities to collaborate, and the lack of provided specification by the focal firm during the sourcing process.

Universities can provide companies with various types of knowledge. These institutions conduct classical research to create new knowledge, whereas the type of knowledge is dependent on the specialization of the respective faculty. However, in an industrial R&D context, Universities contribute mainly with technological knowledge (Veugelers & Cassimann, 2005). Unlike the industrial R&D unit, universities do not focus on the commercialization of its newly created knowledge, hence those research usually take place in the areas of basic and applied research (Trott, 2012). As universities are considered to be drivers for innovation, most developed countries have set up policies to promote university-industry ties. However, establishing and ensuring knowledge transfers from sciences to the industry is not always accomplished, as the nature of research results is uncertain and often non-codifiable, thus leading to high transaction costs and market failures for this kind of knowledge (Veugelers & Cassimann, 2005).

The article by Harhoff et al. (2014) point out that customers are not a source for technological knowledge. Still, the authors explain that customers play a considerable role in NPDs, as they are the determining factor upon which the product is designed. Therefore, several authors, including Thomke and von Hippel (2002), argue for greater customer involvement during the actual development process, for instance, by providing them with necessary tools to create own product solutions. However, a high dependency on existing customer may also have negative implications. In an influential article, Christensen and Bower (1996) provide evidence that companies' technological change is negatively related to an extensive openness towards the current customer base. Rather, companies have to seek for customers, which they are currently not serving, as these groups with their from the standard customers deviant needs constitute an incentive to development new technologies.

#### ***2.2.2.4. Factors for successful external knowledge transfers***

Although a variety of different factors influencing knowledge flows exist, the following passage outlines two key concepts, namely absorptive capacity and local embeddedness.

Cohen and Levinthal (1990) coined the absorptive capacity, hence describing the ability to exploit internally existing knowledge, to recognize the value of new information, to assimilate it, and to apply it commercially. In fact, and although demonstrated in an intra-organizational context, Szulanski (1996) showed that the lack of absorptive capacity is the greatest barrier to transfer knowledge. One key assumption of absorptive capacity is that the

organization is relying on prior existing knowledge to generate and access new knowledge foundations, e.g. making sense through the application of specialized knowledge. This results in the perception that learning is a cumulative process and its success is highest when “the object of learning is related to what is already known” (Cohen & Levinthal, 1990: 131). Therefore, the speed of learning from an external source and resources required to spend on this activity are influenced by the size of the gap between the knowledge bases of the partners involved in the knowledge transfer process. Hence, a higher similarity between both bases results in faster transfers and less to be utilized resources.

However, even if the subsidiary or R&D unit in the host country has developed a certain degree of absorptive capacity, this is not the only factor leading to successful local knowledge sourcing. Another essential driver of success is the embeddedness of the unit within the local environment, which allows it to access and share knowledge. For example, Andersson et al. (2002) show as a prerequisite for knowledge spillovers from local firms, foreign subsidiaries have not merely to establish long-term ties with these firms, but also must adapt their business conduct. The results further illustrate the enhancement of the unit's competence building when successfully being placed in the local environment. This is in line with research conducted by Frost (2001) who concluded that membership in the local community increases the chance of new technological innovations within the subsidiary. However, achieving this state is not an easy process as the MNC must overcome the liability of foreignness, which increases costs of doing business abroad, e.g. through the subsidiary's unfamiliarity with local conditions or the discrimination of foreign firms in a country (Zaheer, 1995). Furthermore, it is not the liability of foreignness anymore, but rather the liability of outsidership from business networks that hinders foreign subsidiaries to perform successfully in their host-country environment (Johanson & Vahlne, 2009). In order to overcome these challenges, Cantwell (2009) emphasizes that an extensive amount of time and resources for trust-building is required, whereby the degree of efforts is determined by the institutional distance between host- and home location of the subsidiary.

## **2.3. NPDs for Value Products in Emerging Markets**

### **2.3.1. The Market for Value Products in Emerging Markets**

As mentioned in the introduction, Emerging Markets can be described by using the analogy of a pyramid whereas there is a small premium segment, a larger fast growing middle segment, and an even larger bottom segment, which comprises mainly poor consumers. This structure is not just applicable to a Business-to-Consumer-market (B2C), but is also appropriate when

characterizing the market in a Business-to-Business context (B2B) (Gadiesh, et al., 2007). In the early phase of this concept, researchers, such as Hart and Christensen (2002), Prahalad and Hart (2002), or Prahalad (2005) focused on the Base or Bottom of the pyramid-segment (BoP). Thereby, they concentrated on the poorest customers, which, for instance, live from less than \$2 per day. Later, instead of dividing the market solely into the premium segment and the bottom of the pyramid, Gadiesh et al. (2007) coined the term “The Good Enough Market”, which is congruent with the segment between premium and BoP- segment. Figure 2 displays the different segments within EM graphically.

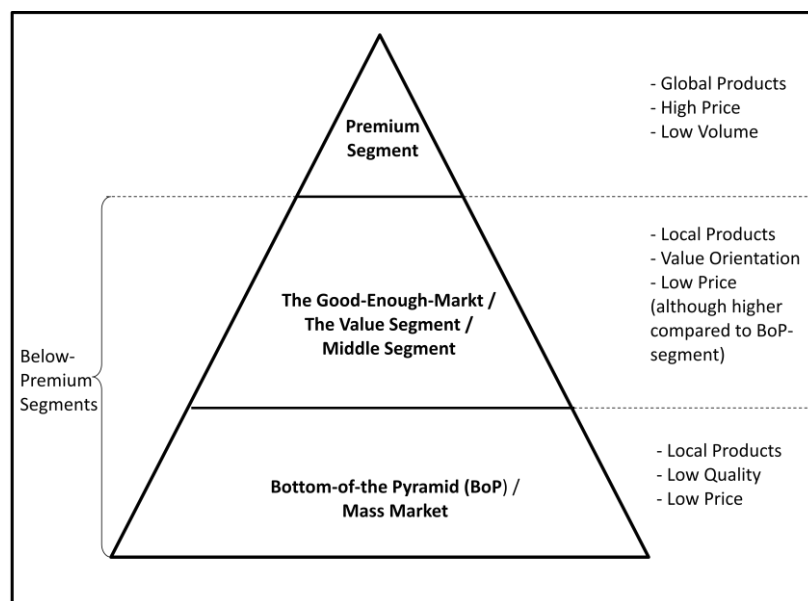


Figure 2: Market segment names and basic characteristics in EM; Source: Own conceptualization, partly derived from Arthur D. Little (2008)

The Value Segment can be defined by rising incomes of potential customers which demand good quality products that provide real value. Another characteristic of this market is the presence of local competitors, which often moved up from the lower product segments. These firms possess in-depth knowledge of the customers in the lower and middle segments as well as low cost manufacturing capabilities, implying that they develop affordable products that perfectly fit the customer preferences in the value segment (Gadiesh, et al., 2007). Besides, it can be assumed that some characteristics of the BOP-segment as well as special EM-country characteristics lead to implication for the value segment as well. A useful and comprehensive overview of the BOP-segment including the competitive as well as institutional environment is provided by Rivera-Santos and Rufín (2010). Besides the before mentioned challenges, the two authors present the poor financial, informational, and physical infrastructure, such as

unstable energy supply and weak formal institutional environments as constraints when doing business in this segment as a Western firm.

### **2.3.2. NPDs in the Value Segment**

While premium products may possess features that help to overcome the voids mentioned in the previous section, they also drive the development and production costs of the product. This creates a challenge when aiming to offer affordable value products. Consequently, researchers and business professionals have pointed out that the prevailing glocalization strategy (strategy in which a global product is adapted to a local market) of MNCs is not appropriate when targeting the value segment, implying that different and new approaches are required (e.g. London & Hart, 2004; Prahalad, 2005; Immelt, et al., 2009; Ramamurti, 2012). Mohr et al. (2012), for example, note that using existing products at a lower price "frequently did not achieve corporate targets and were discontinued". Thereby, one argument is almost identical across all articles dealing with this issue: When aiming at below premium segments, western MNCs should design completely new products that perfectly fit the customer preferences. Therefore, companies must comply with two prerequisites: building up a bottom-up product development process, where the customer preferences are determined before the creation of a new product (Prahalad, 2005), and the access to local context-bound knowledge to be able to comprehend customer preferences and to design customer-oriented products in EM (London & Hart, 2004). Especially the latter was heavily discussed in literature and mainly two strategies were identified to access this context-bound knowledge and which will be further presented below. Thereby, it must be noted, that most research that has been done in this perspective is directed towards the BoP-segment.

First, it is argued that a MNC should establish a completely localized value chain, as this will provide the MNCs with the necessary knowledge base to master the market (Immelt, et al., 2009). The authors show that General Electric (GE) built a completely new business, including product development, sourcing, manufacturing, marketing, sales and service in order to establish its new health-care unit in China. Hereby, GE recruited local employees to provide the company with the required technical and market knowledge. This strategy of investing in the creation of tremendous local resources is confirmed by Shankar and Hanson (2013) who argue that foreign firms that are willing to compete in EMs cannot simply extend their global strategies and organizational set up to these countries.

Secondly, London and Hart (2004) emphasize that MNCs need to attain a new capability, namely social embeddedness. This capability includes teaming up with local non-



traditional partners (e.g. NGOs), that can counterbalance the MNC's limited understanding of the segment and which supports the foreign firm to overcome institutional or other voids. In criticism of London and Harts division between traditional and non-traditional partners, Schuster and Holtbrügge (2014) provide a more comprehensive classification of potential partners in EM: they divide among Business partners (e.g. suppliers, competitors), partners from the civil society (e.g. NGOs), and national and local governments. They conclude that these partners help the firm to build knowledge of customers, market conditions, and the institutional environment.

Particularly at the BoP segment the involvement of external stakeholders such as NGOs or local governments seem to play a significant role as Schrader et al. (2012) notice: according to this idea, companies collaborate with these partners in order to include them in the value chain, for example in the product development process, or to overcome external market deficits, such as the lack of physical infrastructure.

Radjou and Prabhu (2012) provide examples of firms, including GE, Xerox, and Nokia, that employ a vast network of local partners in order to target different segments in EM. Xerox, for instance, heavily relies on local universities and start ups to co-invent new product solutions for the Indian market. The authors conclude with three suggestions for MNCs to exploit similar opportunities. They stress the importance of including non-classical partners in R&D, such as NGOs, universities, and end users into the product development process. Instead of engaging those partners in a project-per-project basis, MNCs should collaborate with those partners strategically. That is, following a long-term joint vision, such as designing affordable and accessible health care for everyone in India, that comprises several projects and initiatives. Although, trust is essential in the relations to partners, this should be backed up by transparent performance based contracts, in order to keep track during the collaboration. Lastly, MNCs should assign local managers, who are open-minded and possess interpersonal skills, the responsibility for setting up relationships and taking care of them.

In short, operating successfully in the value segment is not linked to transfer global premium products developed by a transnational network of R&D centers, but requires western MNCs to develop new skills in order to be able to learn from the local environment.

### **2.3.3. Knowledge flows in EM**

The trend to learn and source knowledge locally in EM suits the overview provided by Li et al. (2013). The authors distinguish among three evolutionary phases of knowledge flows that

took place in China. During the first phase, MNCs entered EM by opening subsidiaries and transferring knowledge to these newly established units. This was due to the fact that the economic development of EM was still at an early stage and local firms lacked technology or management skills that were potentially attractive for MNCs to absorb, as Lyles and Salk (1996) showed in a Hungarian context. The second phase is characterized by the increasing number of knowledge flows from the MNC subsidiaries to local firms, also called knowledge spillovers. As the international subsidiaries in EM were superior in terms of technologies or management practices, domestic firms started to learn from them or imitated their practices. Hence, domestic firms are catching up which can be considered to be successful, as local firms are increasingly competing against MNCs on the domestic and international level. This is indicated by a survey of the Economist Intelligence Unit (2011) in which 35% of global managers considered local competitors as a major obstacle to do business in China. This confirms, that Chinese firms were able to learn and to upgrade their capabilities. The development might also be similar for other large EM, such as India or Brazil. Therefore, rather than simply classifying domestic companies as recipients of knowledge from global MNCs, they have accumulated a significant knowledge level, especially in their home markets, thus posing an attractive source for western MNCs. Therefore, knowledge is recently also transferred from local companies back to foreign MNCs, which is considered to be the third phase of knowledge flows in EM according to Li et al. (2013) and labeled reverse knowledge flows by Immelt et al. (2009). However, Li et al. note in their study that, so far, limited research has been conducted on how reverse knowledge spillovers and flows or the search and sourcing for it happen in an EM context. Particularly, as reverse knowledge flows have just occurred recently, there is little understanding of how this process takes place and which organizations are involved, for instance. Figure 3 shows this evolution of knowledge flows graphically.

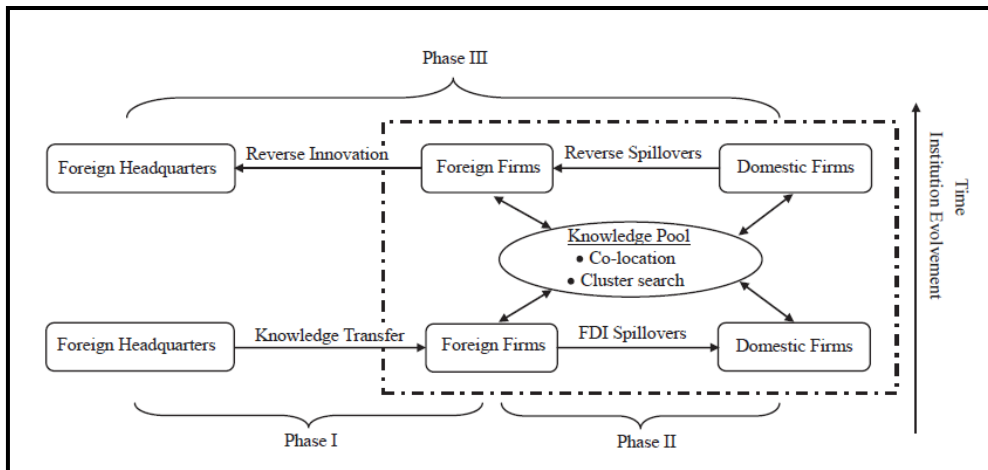


Figure 3: Evolution of knowledge flows in EM (Li, et al., 2013)

## 2.4. The conceptual framework

The following framework is derived from the theoretical discussion and results in an own conceptualization. As literature about the Value Segment is limited, the literature used for the framework primarily concentrates on the BoP-segment. Still, it is believed that this allows for a first conceptualization of knowledge management during NPDs for the Value Segment, which can be later refined through the empirical results. The conceptual framework is displayed in figure 4.

One key assumption of the framework is that the foreign subsidiary is to a large extent responsible for the local product development in the value segment. This requires a local R&D center, thus following Immelt et al.'s idea (2009) of a fully localized value chain. Thereby, this study adopts argumentation of Almeida and Phene (2004), that knowledge-wise, the R&D center is embedded into the R&D operations of the global organization, as well as the local external environment. Although the distant or global external environment (e.g. suppliers outside Asia) may also constitute a potential knowledge source, this study follows the argumentation by Laursen (2012) as well as Knudsen and Levinthal (2007) that companies prefer to conduct local knowledge search, as this poses an easier and faster option to obtain knowledge. Hence, it is expected, that the global external environment merely plays a marginal role as a potential knowledge source. Taken together, these three networks are available for the local R&D knowledge sourcing activities. Besides, it is believed, that the local R&D unit also learns through gaining experience in local NPDs that is congruent with the primary knowledge creation process within organizations described by Levitt and March (1988).

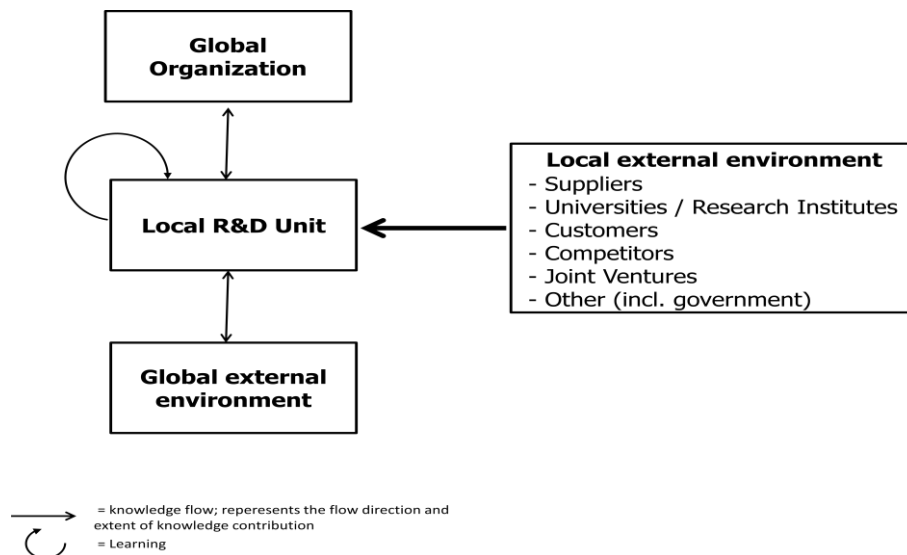


Figure 4: Own conceptual framework based on literature review

Although, it is beneficial to balance the input of internal and external knowledge sources, as shown by Almeida and Phene (2004), literature about the BoP and the Value Segment emphasizes the importance of local networks for knowledge creation within the product development process of the foreign R&D subsidiary (e.g. Prahalad, 2005; Radjou & Prabhu, 2012). This argumentation is reinforced by Li et al. (2013), who outline that learning from local companies constitutes an important input for MNCs in a Chinese context. Therefore, a higher share of local external flows compared to those flows that originate from the global organization and global external organization is expected (indicated by the size of the arrows in figure 4).

As the product development is a complex process, that often requires the utilization of context-bound knowledge, it is believed that the majority of the flows represented in figure 4 are comprised of a high degree of tacitness. As a result, following the reasoning from several researchers, (e.g. Birkinshaw, et al., 2002), it can be assumed that those flows are not merely founded on the exchange of mails or documents, but that the local R&D unit and the respective source have to establish close personal interactions with each other. Given the market requirements mentioned above, it is assumed, that the flows entail information about the market and customer demands, as well as technological knowledge about how to design affordable product solutions.

In regard to the local environment, suppliers and universities in the local environment likely contribute with technical and product knowledge, thus following the reasoning of Harhoff et al. (2014) as well as Veugelers and Cassimann (2005), although it can be expected

that the contribution of universities is rather long-term oriented. Understanding the market and the customer context is a key prerequisite to succeed with a NPD for the EM. Therefore, this study adopts the argumentation of Thomke and von Hippel (2002) to incorporate customers as much as possible during the actual development process. Besides, in literature about the BoP-segment, it is often argued that NGOs play a significant role in gaining insights about customers and their behaviors in EM (e.g. Schuster & Holtbrügge, 2014). However, given the fact that this case takes place in a B2B context in the Value Segment, it is assumed that NGOs do not play an extensive role in this context. Further, given the argumentation by Santamaria and Surroca (2011), it is unclear to which extent competitors and a JV-partner contribute knowledge-wise.

As the local environment poses an essential knowledge input and the MNCs is likely inexperienced in the Value Segment, it is assumed that the Global MNC organization plays a comparable minor role during the NPD. This is shown by the fact, according to the literature a local business and value chain should be established for the EM (e.g. Immelt, 2009), thus even reducing the foreign subsidiary's dependency on the global organization. Still, it is likely not in the interest of the MNCs headquarter (HQ) to have a fully autonomous subsidiary, especially, in case of an industry, such as the truck industry, which is usually faced with global uniform demand and that thus strives for efficiency. Therefore, it can be expected, that the global organization attempts to standardize processes and to leverage on its existing capabilities as much as possible (Bartlett & Ghosal, 1998). Therefore, knowledge flows from the global organization are also assumed to occur, however to a lower extent than flows from the external environment, given the argumentation from literature about the BoP-segment. In sum, when applying the frameworks of Katila & Ahuja (2002) and Laursen & Salter (2006), it can be expected that both search depth and breadth is large for the external environment and relatively small for internal knowledge sources. In other words, it can be expected that knowledge is sourced from various external parties, whereby a frequent interaction takes place with each of the partners. In contrast to that, existing knowledge from within the company is used to a much lower extent.

Although, Li et al. (2013) note that reverse knowledge flows and spillovers are not well-researched, it can be assumed that absorptive capacity of both knowledge source and receiver is integral for ensuring the transfer. Further, also the local embeddedness is likely playing an essential role, given the importance of local environment and the relative unfamiliarity of the MNCs in this segment.

## 3. Methodology

*This chapter outlines the research methodology of this study in detail. It describes the research strategy and approach, as well as the different methods applied to gather the required data and to ensure quality throughout the whole research process. This chapter concludes with an overview of the analytical process of this study.*

### 3.1. Research approach

This study aims at examining how western MNCs create and source internal as well as external knowledge to develop a Value Product in EM. This implies, that this paper focuses on the identification and evaluation of diverse knowledge flows that take place within and outside the boundary of the firm in this particular segment. As shown in the literature review, the knowledge aspect during NPDs in the Value Segment has merely attracted modest interest of researchers. Besides, Li et al. (2013) outline that external knowledge flows and underlying factors, especially those that are of reverse nature, need further examinations.

Therefore, this study adopts an exploratory approach, thus trying to shed more light into the process of knowledge creation and sourcing in EM from an western MNC perspective. Methodologists argue that in an early phase of exploration with modest insights of a certain phenomenon, a qualitative approach should be favoured (Ghuri & Gronhaug, 2005). The results of a explorative and qualitative study, such as in this case, are not predefined at the beginning, but rather indefinite until the data is gathered and analyzed. Thereby, this type of study helps to build a more solid knowledge foundation, that can be used in subsequent research (Sreejesh, et al., 2014). Further, as the study aims explaining the behavior of a company which is shaped by decisions taken by its employees and the characteristics of its environment, a case study approach is employed. This approach allows to provide a rich description of a contemporary event in which the contextual factors play an essential role (Yin, 2003).

While applying the case-study method, this paper employs both deductive and inductive reasonings to increase the understanding about MNCs' knowledge management during NPDs in EM. Thereby, this study derives a first conceptual framework (see chapter 2.4) based on the literature discussion, that was used as a foundation for the initial study interviews. However, during the interview process, the gathered data was used to critically reflect upon the first conceptual framework. As the initial findings did not completely match the presented framework, questions were adapted to the new situation, thus leading to a revisited framework that is outlined at the end of the final analysis (see chapter 5.4). This process can be characterized by a "double movement of reflection" (Dewey, 1910: 79), in

which the deductive approach, testing, is connected to the inductive approach, discovery, thus leading to valid results based on critical thinking.

### **3.2. Research design**

As mentioned earlier, this paper adopts a case-study design. Hence, this section will describe why this specific case was selected, and how the required data to build up the case was gathered in a qualitative manner.

#### **3.2.1. Research unit and sample**

As mentioned before, the examination of how western firms create and source knowledge for the NPD in the Value Segment has not been described in detail before. Therefore, the study intends to provide a comprehensive picture of such a process, thus a single-case study design is adopted. The unit being researched is Volvo Group Trucks Technology (GTT), the R&D unit of the Volvo Group, which is a suitable research unit for several reasons.

Firstly, the Volvo Group is a MNC that has been active in Asia for several years, but which has been mainly concentrated on the premium segment in those countries. As it is a company, that is known for its premium trucks that comply with highest ambitions for quality and safety, for example, it can be assumed that the company possess little experience to develop a value product in the middle segment in EM. Therefore, the company matches the profile of a western MNC drawn earlier, that faces challenges during this process in regard to its knowledge base.

Secondly, GTT's development of the Value Truck took several years and was finished only last year. Therefore, the experience made during the development are still fresh and most of the managers involved are still responsible for the areas which they also had been involved during the actual development phase and hence simplified and enhanced the data gathering process.

Lastly, the access to Volvo GTT has been facilitated through close relations between the University's faculty and the Volvo Group, which posed another factor to choose GTT as the research unit.

#### **3.2.2. Data collection method**

The empirical part of this study is based on gathering of various primary and secondary data sources. Thereby, interviews constitute the primary data source employed in this study, which in some cases were complemented by follow-up questions that were transmitted via email to the respective interviewee. Besides, secondary data sources, such as industry reports or

internal company presentations were also utilized.

The interviews were conducted with key managers of GTT, that were involved in the Value Truck development. As the product development is of international nature, that relies on the contribution of several unit in different countries, the interviews took place at three different sites in Gothenburg in Sweden, Bangalore in India, and Ageo in Japan. The reason for selecting these sites lies in their greater contribution to the Value Truck development, compared to other GTT sites. In order to gain the data from several perspectives of the development process, nearly all units involved in this process were represented in the interviews. The contacts for the initial interviews were provided by the primary contact person for this study at GTT. Through snowball-sampling, which constitutes the deliberate act to gain further contacts through the interviewed persons (Bryman & Bell, 2011), the number of interviews in GTT was increased. Besides of the interviews at GTT, one interview was conducted with the Indo-German Chamber of Commerce in Bangalore. This interview is considered to be significant, as the Chamber of Commerce possesses insights into various foreign companies, not necessarily solely German ones, and local businesses. The purpose of this interview was to obtain a more general view about the situation in India's Value Segment, and to be able to verify some of the information that were gathered during the GTT interviews, especially about the external environment.

In total, 13 interviews were conducted, of which 11 were conducted by face-to-face contacts and two via phone. A full list of all interviews is displayed below, while appendix nr. 1 comprises a more comprehensive overview including interview length and date.

Manager	Area of Responsibility	Location	Manager	Area of Responsibility	Location
Manager A	Long-term Innovation Strategy Asia	Göteborg	Manager H	Key Account Management for Value Truck (internal and external)	Bangalore
Manager B	Global Product Planning HD	Göteborg	Manager I	Chief Engineer Chassis for the Value Truck	Bangalore
External Manager C	Representative of Indo-German Chamber of Commerce in Bangalore	Bangalore	Manager J	Product Planning UD Trucks	Ageo
Manager D	Plattform Manager Value Trucks	Bangalore	Manager K	Advanced Technology Research UD Trucks	Ageo
Manager E	Manager Range- and Project management for the Value Truck	Bangalore	Manager L	Manager Asian Purchasing Projects	Bangalore
Manager F	Advanced Technology Research; involved in the early phase of the Value Truck development	Bangalore	Manager M	Product Planning China	Shanghai
Manager G	Chief Project Officer for Value Truck	Bangalore			

Figure 5: List of interviewees and their responsibilities



### **3.2.3. Interview protocol and interview process**

The aim and case-study approach of this research paper require the creation of a detailed account of the situation and decisions taken at GTT. In order to comply with these conditions, the study adopted a semi-structured interview approach. This allows to follow a certain interview path that is determined by the pre-gained understanding from the literature review, while it also provides flexibility in the interview process, thus leaving room for not anticipated issues (Bryman & Bell, 2011). This is in accordance with the simultaneously conducted deductive and inductive research approach.

Beforehand the interviews, a short description along with key questions were sent to the interviewees, thus allowing the respondent to prepare. This also reduced the risk of interviewing persons, that were not involved in the Value Truck development or that had merely limited insights, as the aim and key questions pointed directly to the issues being researched. Consistent with the semi-structured approach, key themes to be analyzed were defined and a couple of questions related to these themes were developed. After each interview, the questions of the interview guide were analyzed and, if necessary, revised, in case the respective question proved to be ineffective or new important issues to be examined in the subsequent interviews were discovered.

The interviews started with some general and open question about the responsibility of the respondent at GTT and the employee's contribution to the Value Truck development. With increasing advancement of the interview, the question being posed became more specific in order to cover the interview areas. Consistent with the semi-structured approach, the selection of the issues covered were flexible, also implying that most interviews became unique, thus enabling to investigate the interviewee context-specific situation. This implies, that in case of a purchasing manager, for example, the first questions were of general nature, but subsequently more specific questions about suppliers and their role during the development were posed. The GTT interview guide can be found in appendix nr. 2.

Besides of the GTT interviews, a special interview questionnaire was created for the interview with the Indo-German Chamber of Commerce in Bangalore. This was necessary, as the aim of those meetings was to capture more broad and general knowledge about the Value Segment and the automotive industry. This interview guide can be found in appendix nr. 3.

All but one interviews were recorded with the permission of the respective interviewee. One interview was not recorded, as this interview was conducted by a phone, where the loudspeaker system did not work properly. In this case, the interviewer took notes

to capture the relevant information. All other interviews were transcribed with the support of the recordings and thus facilitated the process of writing and analyzing the empirical findings.

#### **3.2.4. Qualitative assessment**

The concepts of reliability and validity constitute important criteria, when it comes to assessing the quality of a study. However, these constructs can be mainly applied when conducting quantitative research, as they assume the existence of absolute truths in the social world (Bryman & Bell, 2011). Therefore, Lincoln and Guba (1985) present an alternative more naturalistic framework with which qualitative studies can be evaluated. One of the key parameters of this framework is trustworthiness.

Trustworthiness refers to the question whether the study was conducted in a competent and ethical correct manner. In order to guarantee trustworthiness, this study adopted several strategies: first of all, the received data was triangulated mainly through two ways. On the one hand, significant findings of one interview were tried to be verified through subsequent interviews. Hence, this particular aspect was illuminated through different perspectives. On the other hand, in regard to findings about the EM environment (e.g. about local companies, universities, etc.), the interview with the Indo-German Chamber of Commerce constituted a significant step to add a third-party view and to verify comments made by GTT managers. Both strategies increased the credibility of the study, that is about drawing the right picture of the social world based on the interviews and hence contributed to the level of trustworthiness. Secondly, based on the data collection a thick description was written to describe the situation along with the context as detailed as possible. This leads to a higher transferability of the study, thus allowing judgments whether the results are also applicable in different contexts. Lastly, the relevant research steps, such as the interview protocols, transcripts, and analysis are documented and stored in order to be accessible for further auditing, if necessary. This allows other researchers to reconstruct the study process (Bryman & Bell, 2011).

#### **3.3. The analytical process**

This study involved the gathering of a rich material of data. For the analysis of all data, no electronic data analysis tool was employed. Instead, all gathered data materials have been clustered according to different labels. These labels were founded on the different knowledge sources that were identified during the literature review and the theoretical framework. After this process has taken place, each cluster thus contained all relevant data about a knowledge source, including the process, factors, or obstacles. Based on this work, the case-study was

written and the results were matched against the conceptual framework introduced in section 2.4.

## 4. Empirical part: The case of the Value Truck Development of Volvo GTT

*This chapter assembles the primary data gathered through the conducted interviews. Thereby, the aim is to provide a detailed picture of GTT's development experience and the management and sourcing of knowledge. The chapter starts with a short background of Volvo Trucks and GTT, before it moves on to a presentation of the Truck Value Segment and the actual Value Truck development process. The empirical section concludes with a rich description of the knowledge sources utilized during the truck development.*

### 4.1. Introduction of Volvo Trucks and GTT

In 1926, Volvo Group started developing and producing the first trucks. Since then, the company has grown to become one of the largest truck manufacturers in the world with a global presence and that is well-known for its premium vehicles that represent innovative, safe as well as ecological transport solutions (Volvo Trucks, 2014). With a share of 65% of the total net sales in 2013 of about USD 42 billion, Group Trucks is the largest unit among the company's main business areas such as Volvo Buses, Volvo Construction Equipment, or Volvo Penta (Volvo Group, 2014).

The operations of Group Trucks are based on five different brands. Thereby, the original Volvo Truck Brand was complemented by acquisitions (Renault Trucks, Mack, and UD Trucks) or through the creation of joint ventures (Eicher) in the past (Volvo Group, 2014). In recent years, the organization of the Volvo Group has been changed to increase the overall efficiency of the organization. Unlike before, when the brands had run several functions on their own, such as Operations or the Marketing & Sales, these were bundled to cater their services for all brands. This step also included to merge all R&D-activities into one unit and led to the foundation of Volvo Group Trucks Technology, in short GTT, which, since then, has been responsible for the Group's Research and Technology Development. One key assignment of GTT is not 'merely' to create new technologies, but to develop new and complete vehicles that are ready for full scale production (GTT, 2014).

Therefore, the organization of GTT covers all relevant areas for the tasks mentioned above, ranging from Product Planning (PPL), Advanced Technology & Research (ATR), Range & Project Management (RPM), Complete Vehicle Engineering, Powertrain Engineering, Vehicle Engineering, to Purchasing. In total, GTT employs about 9,500 persons at several sites with the largest ones in Gothenburg (3,800 employees), Lyon (2,200), and Bangalore (1,000) (GTT, 2014). Figure 5 displays Volvo GTT's global R&D network.

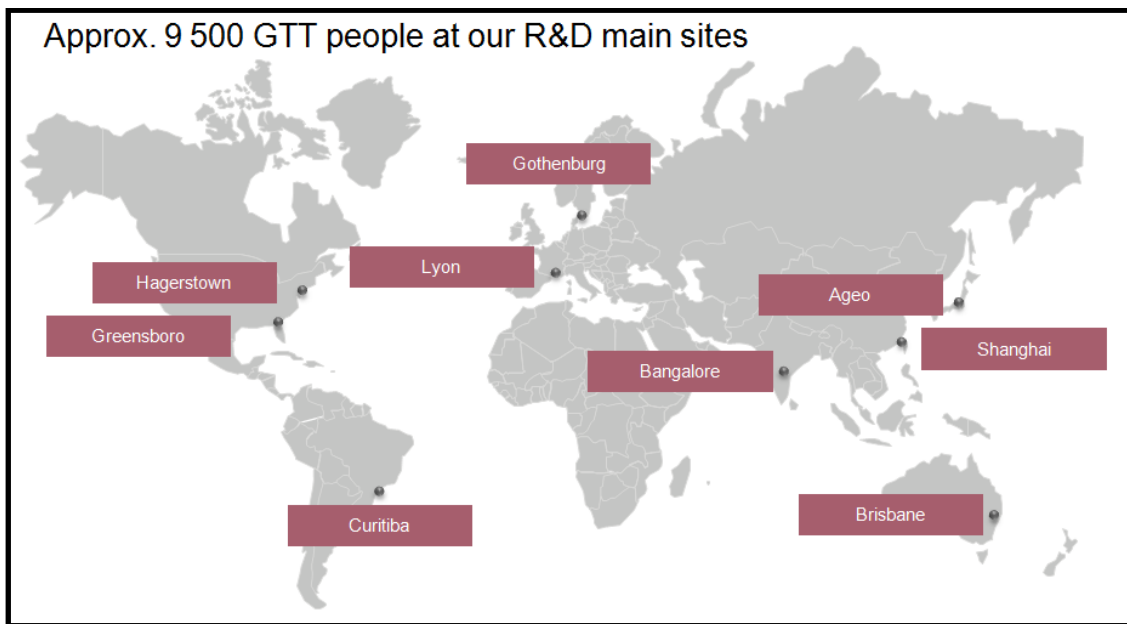


Figure 6: Volvo GTT's global locations (GTT, 2014)

## 4.2. Volvo's Truck Development in the Value Segment

This section covers the Volvo Group's strategic motives to enter the Value Segment in EM, as well as a presentation of this particular market segment. Afterwards, the section finishes with a presentation of the development process.

### 4.2.1. Volvo's strategic motives for the Value Truck Development

During the Mid- 2000s, Volvo Group Trucks noted that it had reached a strong market positions in its main markets in Europe and North America, which offered stable growth rates. However, at that time, Asian markets started to gain momentum and particularly India and China had reached a considerable market size. Volvo realized that these regions would become important for the Group's future development and decided to take steps towards a growth strategy on a broad base in Asia. These steps included, for instance, the acquisition of Nissan Diesel (today: UD Trucks), which simultaneously opened up the opportunity to get a foothold into Dongfeng Motor Co LTD., one of the largest Chinese truck producer (Volvo Group, 2005; 2006). These inorganic strategic growth initiatives were accompanied by internal plans to create an "Asian Truck-Project" in 2005. The new truck project did not target Volvo's premium segment in which the company was traditionally active, but the Value Segment. The reason for this strategic move is the fact that a premium truck is solely able to capture a fraction of the whole truck market in those countries, because it is not affordable for many customer groups and not perfectly adapted to the local market conditions. Therefore,

segments situated below the premium segment constitute a huge market opportunity in which Western Truck producers can grow.

#### **4.2.2. The Value Segment of Asia's truck market**

The Value Segment for trucks in Asia is very different from what Volvo is used to in their traditional markets, for instance in Europe and the US. In general, the customers in this segment demand a product which offers functionalities that perfectly fit their requirements at a price level that is significantly lower compared to the premium segment. In short manager D describes: *"The customer in EM don't demand fine functions, but they are rather value-oriented: they look for the amount of load, fuel efficiency - simply what is a single penny worth that I am spending. This is very important. They do not pay for functionalities that do not add any value for them."* Therefore, most managers agreed that one large challenge during the development of the Value Truck was to meet the right balance between the demanding functionality and the final costs of the truck. In terms of functionality, it is not the level of technology that is demanding (so the final solution does not have to comprise of the latest technology), but to use technologies which perfectly fit the market requirements. The price of the Value Truck is determined on the one hand by the lower purchasing power, and on the other hand by the predominantly local competitors that have the production volumes and capability to manufacture trucks in a very cheap way. Hence, Volvo had to lower the costs for the Value Truck by about 40% compared to the next cheaper model of the Volvo Group. However, achieving a good balance between costs and functionalities becomes even more complex due to factors that reinforce the trend of rising feature requirements at remaining low prices.

Firstly, the truck buyers are often much different from Volvo's 'traditional' customers in developed western countries. For example, Asian EM markets often lack large logistic firms one can find in Europe and the US. The markets are rather dominated by small owner operators, who solely possess one or two trucks. Although some managers foresee a consolidation in the future, the current fragmented market situation is likely to remain for the coming years. As a result, dealing with a high number of smaller customers with diverse needs is often more complicated than serving a smaller number of large logistics companies that have more uniform demands. Besides, different customer behaviors and mentalities can lead to higher demands on the developed trucks. For example, sometimes, the trucks are used in a manner that was not anticipated during the development phase. Manager I explains: *"You cannot say that a particular truck is not useful for mining. In Indonesia, there is a lot of*

*mining, and any type of truck is used for mining".*

Besides, the demands of the customers are shifting fast, thus adding to a dynamic and complex market environment. Although the transport industry is usually more conservative than, for instance, the car segment in terms of new technology, new product solutions are quickly adopted by the customers in the value segment, thus becoming the market benchmark within a short time period. Manager D states: *" If you design a truck this year, it will be obsolete within two years."* However, this market characteristic does not allow truck producers to raise their prices with increasing features requirements, as the price level remains on a low level. Therefore, the Value Segment exhibits a negative relationship between market prices and truck features which will likely become even more challenging in the future.

Secondly, the competitive landscape is another challenging aspect of the value segment. As the attractiveness of this segment is increasing, new local and western Original Equipment Manufacturers (OEMs; Truck Producing Companies) are appearing, hence leading to rising market pressures. Still, the markets can be characterized by a high number of competitors with local roots. In China and India, local truck manufacturers in the Heavy-duty Market (HD; commercial vehicles with a maximum weight above 11,974 kg) account for 97% and 99.5% of the total market volume respectively (Volvo Group, 2013). This leads to high pressures for OEMs to adapt their product to the local market and customer requirements.

Thirdly, the local infrastructure and institutional environment is often by no means comparable with the situation in Europe or the US. Manager I explains this issue in detail: *" But in many cases you even have to add features, [...], the durability, because of the bad road conditions, a better filtering system, so that the engine is not getting damaged, because of bad fuel."* In regard to the institutional environment, the legislation is another essential aspect. For example, possible changes of the regulations must be anticipated during the conceptualization and development process. In some countries the regulators increasingly push the companies in certain directions, such as China, where *"every week you have new environmental regulations for air quality"*, as noted by Manager A. Opposed to that, the situation is much different in India, Manager F explains: *"In India, for example, the regulation drafts stay in that stage for a long time, and then they could be implemented in a sudden way."* Both, the demands in the local infrastructure and the institutional environment require the companies to build up extensive local market knowledge in order to foresee or to be able to handle certain situations as well as to build a truck according to the local requirements.

These two aspects also contribute to the fact, that many Asian countries cannot be directly compared with each other. Therefore, targeting large parts of Asia implies not just to

develop one standard product, but to take the different market requirements, such as the divergent infrastructure or regulations of the various countries into account. This aspect poses another significant challenge when trying to curb the costs of a new truck for the Value Segment. Manager E, who is an expatriate, outlines an example: *"So, maybe you develop a truck that survives the Indian market, because of the terrible road conditions, but you overdue it probably in other countries, like in China, where that much durability is not required. That is why when you want to reduce costs, you still have to customize the truck to every country. "*

Although the Value Segment for trucks in Asia presents itself as an attractive market with above average growth rates, it is far from being an 'easy to cash in'-market for companies. Aspects, such as the value for money-requirement, the not-familiar and fast-changing customer demands with implications for the features design of the trucks, the vast number of local competitors with low cost structures, infrastructural and institutional gaps, and divergent market requirements among Asian countries pose tremendous challenges when developing a truck for this segment. This is summarized by Manager I: *"In the value segment it is a challenge, because in a premium segment you can charge the premium price. [...]. In the mass segment [lowest segment in the market pyramid], the product is low priced, so the customer are fine with some failures, because they pay less. [...]. The difficulty in the Value Segment is that you are stuck in between these two [segments]. So, for example, they [customers] still want a low price, although a bit higher than in the mass market, but they expect no failures. And you cannot provide a high price, because nobody wants to pay that much."*

#### **4.2.3. The development of the Value Truck**

Volvo's initial Asian truck project in 2005 put an emphasis on using existing premium trucks as a starting point for the new truck development. Manager F from India reports that among others, he was assigned to work on the project with the aim *"to slim down the premium trucks into a minimum configuration"*. However, several managers noted that this strategy of downsizing a premium truck has not proven to be successful. The main problem with this approach lies in the cost-side, implying Volvo is not able to reach a price level similar to local competitors in the Value Segment. One reason for the higher cost-level can be traced back to the expensive platforms system of the premium truck, which relies on a sophisticated electronic system and powertrain, for instance. Therefore, Volvo GTT has realized that it has to tackle these areas by considering a bottom-up product development, in which they have to start from the basic market needs and are able to upgrade the product functions afterwards, if



required. As a result, the original plan to slim down a premium truck was abandoned, and instead a new product development project was launched in 2008.

The new project focused on the Value Segment, hence the new truck class was named Value Truck internally. For the first product development within this new truck class, GTT was asked to develop a HD-truck with the focus on South-East Asia, China, and India. The complete task was organized as a multinational project, in which several GTT sites were involved. Thereby, the majority of the tasks were carried out in Asian GTT sites, while western GTT sites took a minor responsibility share in the development. For example, the site in Ageo, Japan, was mainly responsible for the product planning, where the production volumes are planned and the initial product requests are created, that is the specification of the "product content", e.g. which functionalities the truck must possess. The reason was the fact, that the new Value Truck is branded as a UD truck, for which the Ageo site is responsible. The product requests are then forwarded to the unit Range- and Project Management in which the product development project is initiated and managed. This step along with the main engineering activities were situated in Bangalore, where the majority share of the product development took place. This R&D site in India was established in 1998 and in the past it was handling work packages as parts of product development projects for which the western sites in Lyon or Gothenburg were responsible. This implies that the development of the Value Truck in Bangalore was the first complete NPD-project, the site was responsible for with all linked opportunities and challenges (this will be further outlined in section 4.3.1).

The main goal of the Value Truck development was to build a truck that is fulfilling the market expectations regarding the price and feature level, while not ignoring Volvo Trucks' core values. Accordingly, Manager I summarizes: "*We created solutions that are good enough, and we don't give something which is a surplus for the customers. At the same time, we don't compromise with the core values of Volvo. [...], like the emission norms and quality of the truck*". In addition, the truck was designed to target the upper half of the value segment by trying to slightly add to the feature level of the truck. This was considered to be a competitive advantage for Volvo, as the company is more experienced in more sophisticated product solutions compared to the local OEMs. Still, the new truck is not merely a 'smaller' copy of Volvo's premium trucks, because the built-in functionalities vary considerably in some cases. Manager E notes: "*[...], we don't have all prime features that you have in Europe, US, or in Japan.*" As a result, one major challenge for Volvo's engineers was to decide which features to add to the truck in order to create an attractive product from the

customers' point of view, while framing the costs of the truck, so it fits the targeted market price.

The complete development was finished after five years in 2013. In autumn 2013, the truck was launched in Thailand and South-East Asia for which a Thai production facility is responsible. Later at the end of the year the truck was presented in China for the first time. and in 2014, Volvo planned to sell the truck India as well. In both countries, China and India, a local production facility is responsible for manufacturing the Value Truck respectively.

### 4.3.Sources of knowledge

The last chapter introduced the strategic motives and the organizational set up for the Value Truck development, while it also shed light to the general market characteristics of the Value Segment in the truck industry in EM. In the following sections, the results of the interviews were clustered into the different knowledge sources presented in the conceptual framework in chapter 2.4 and that are derived from the literature review. Each section describes the respective source in detail, unveils the motives for utilizing source, outlines how the respective knowledge flow was managed as well as organized, and identifies factors or obstacles that influenced the knowledge sourcing.

#### 4.3.1. Internal knowledge sources

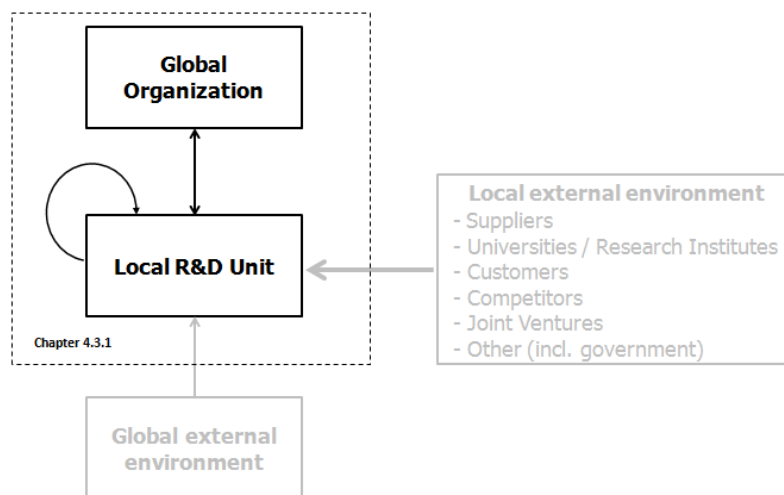


Figure 7: Overview Chapter 4.3.1

The utilization of internal knowledge sources played an important role during the development process of the Value Truck. Overall, three different internal sources of knowledge were used: the Global R&D-network, local employees, and the Western Organization.

### *Global R&D network*

The technological development of the truck was conducted with the aim of minimizing the costs and meeting the market requirements, while the engineers were supposed to reduce the risks of new or unknown technology at the same time. In order to fulfill these requirements, GTT decided whenever possible, to utilize proven and reliable technologies that are available within the Volvo Group. Therefore, Volvo's first Value Truck constitutes a new truck design, that in most cases is based on existing and known technologies. Manager G outlines the main reason for this decision: *"Because we have the full range of technologies under the roof of the Volvo Group. And especially GTT has the knowledge about all brands of the Volvo Group. You can always use that."* And expatriate Manager E adds: *"We don't want to jeopardize the global Volvo brand and we wanted to utilize known technical solutions and technologies."* Hence, for the truck development Volvo took advantage of its technological knowledge foundation of its global R&D-network which in many cases was sufficient as Manager G explains: *" Sometimes it was take a step back and was used in the Volvo Group for many years. [...]our advantage is that we have a global organization, so we can utilize the technology from Europe, for example, and I don't think that the local requirement will be higher than the European solutions. So we can always pick from Renault, Volvo, UD."* The process of developing the truck was thus a mapping of different existing technological solutions of which those were selected that complied best with the project and market requirements. For example, GTT's platform development takes place in Lyon, thus French engineers came to Bangalore to apply their knowledge and to transfer it to the Indian GTT site. Another example is the competence of the Ageo site in engine and related components-projects, which was also utilized in this development. Therefore, the actual technological development was not considered to be complicated. The challenge rather resulted in determining the right cost-feature balance. Thereby, it was critical to decide for those features that the market expects most, while keeping in mind that the complete product had to be finalized with a price that is about 40% lower than the next Volvo Truck product.

### *Local Employees*

During this demanding process the utilization of local employees played a key factor. From the beginning, employees were regarded to play a critical part, hence the start of the project consisted of the selection of local employees with considerable experience within the Value Segment. However, as the GTT site in Bangalore had not developed a complete product before, there was not sufficient experience in the local organization. As a result, employees

from local truck producers and suppliers were recruited to join the Value Truck development. In total, this group of newly recruited employees constituted about 85% of the complete staff involved. The managers in charge in the initial phase of the project started to conduct job interviews with internal employees and interesting external candidates with focus on prior job experience in the Value Segment. Manager D explains the process: " [...], *we handpicked the people with such an experience, those that really worked with the segment, whether it was in the car or truck development. There are a lot of engineering commodities from OEMs in India where the people have worked, but we not only concentrated on those people, but also on those from suppliers, where they have real hand-on experience on the components' side.*"

The importance of gathering local employees was confirmed by several interviewed managers and two benefits of this approach were generally acknowledged: Firstly, those employees provided rich information about the local market conditions and manager G reported in regard to this aspect: " [...], *you get the pulse of the customer, but also a feeling how fast the market is changing. Then, it is a quicker reaction time, rather being in a remote site, and trying to imagine how the market is developing.*" In regard to the risks associated with abdicating from a having a local presence with local employees, manager G explains: " *They [employees from remote site] have a white sheet of paper and just follow that. In that case, you miss a lot of opportunities in this market segment. You are not going where the competition is, and it is taking away your market share.*" Secondly, due to their experience in the Value Segment, the selected local employees brought in engineering knowledge relevant for this market segment and were able to critically reflect on the technologies used, e.g. in regard to their cost-effectiveness.

Although local employees posed a rich source of essential know-how for this market segment, their utilization did not conform to the Volvo's expectations in the beginning. The local recruited employees had worked for other Indian OEMs or suppliers before and were used to those companies' working style and mentality, that strongly deviate from the ones within Volvo. Manager H reports about the different attitudes of those employees and their reasons: " *For example, the truck development from scratch takes five years in Volvo, whereas in local OEMs it is the need for the market, to be at the right time in the market. Probably the attitude is more like quick and dirty. It is like that you be there when it matters, so you try to seize the opportunity. To make that happen, you have to have different decision processes or governance structures. [...]. When it comes to the team working here, it is a conflict between 'should I align to the Volvo Processes and the entire group, or can I apply a quicker way of doing something', which might involve some more risks.*" Therefore, those people were

considered to be a risk for implementing Volvo's core values, such as high quality or safety levels, into the Value Truck development.

### *Western Organization*

As a result, GTT decided to train and support local employees not in terms of engineering knowledge, but in Volvo's values, processes and product concepts, such as the complete product-life-cycle model which most new employees were unfamiliar with. Besides the lack of knowledge in the Volvo's values and processes, the GTT unit in Bangalore also had not sufficient experience in a complete product development, which resulted in another challenge for the locally driven operations.

Therefore, support from Volvo's western organizations constituted another important source of knowledge to offset and minimize short-comings in the local knowledge base. In order to integrate local employees neither familiar with the values nor with important processes, Volvo made use of its western organization. Manager B describes how this process works: *"When you build this [Volvo] up, you have certain values in the company. It is important to transfers these values to other regions as well, because they are the backbone of the company. For that reason, you take people from headquarter and put them out in that organization to get the structure in place and train people to utilize the structure in a good way. And when that is done, you can have local people doing their job."* Therefore, a high number of expatriates from the main sites in Gothenburg and Lyon were sent to Bangalore to train and support the local employees. One example is given by expatriate Manager E: *"Because before, this organization has done jobs for the global organization, and suddenly they go from work packages to new truck development. [...].They have to think about the whole solution and tasks. And especially the certification was a huge challenge and the local organization needed great support from Europe. So, we had a lot of expats staying in Bangalore to support the team to comply for the certification, including safety, features and legal demands."*

Although most managers stress the importance of support from the European organization in regard to processes and values, the help was not always considered to be useful. For example, initially Europeans strictly applied their guidelines and processes as well as perceived the situation from a European point of view. Manger E comments: *" [...], as they assumed that the European situation was also true for Asia. But that has not worked here."* This has created some tensions between the local site and HQ, however, during this process the complete organization learned that it is not functioning either way, but that both the Volvo

and local mentality as well as knowledge base must be integrated in order to develop a successful Value Truck. Manager E concludes: " *No doubt, it would never work getting this specifications that we have in the Volvo organization for the prime segment, when developing the truck for the value segment. But in the end, you have to get a truck out of the factory, that is qualified in an acceptable level, with the right level of features, the right durability, the right fuel consumption, right quality-impression, and the right price.*"

#### 4.3.2. External knowledge sources

This chapter now moves on to knowledge sources in the external environment. Again, the structure follows the logic of the conceptual framework presented in chapter 2.4. This can be also seen in figure 8.

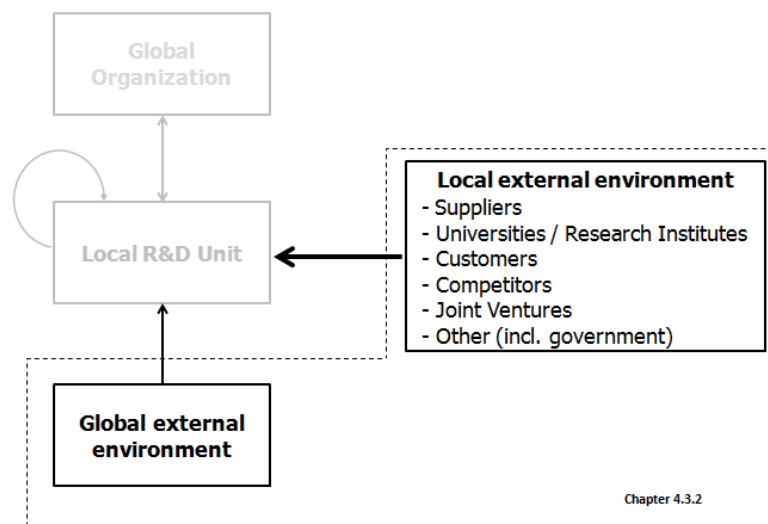


Figure 8: Overview chapter 4.3.2

##### 4.3.2.1. Suppliers

As mentioned earlier, the main technologies came from within the Volvo Group and past truck developments, as this saved developments costs and reduced the possibilities or component failures. Therefore, the supplier involvement in new component developments was limited during the Value Truck development. Manager H states: "*I think, in the premium segment, you will collaborate much more with the suppliers, as the feature and quality requirements are that much more. There you need to rely on specialized supplier knowledge. [...] In the value segment, there are very few cases, where you work with a supplier from the beginning until the end, most often that takes plays in niche areas. Rather, you will do the development work internally within the company and then you just ask the supplier to produce the component accordingly.*" Merely, in some areas Volvo where the in-house solutions were too expensive for the Value Segment or where the components did not exist internally, GTT

had to rely on external support for the creation of the respective solution.

Rather than to utilize suppliers for extensive development work, the GTT's main aim was to benefit from their low cost bases in producing parts which result in a less expensive truck development. Therefore, the prime requirement for sourcing parts for the Value Truck was to establish a local supplier network, as this strategy was linked to several advantages: first of all, in Asian EM often high import duties for fully manufactured components exist that can add up to 30% of the cost for a specific part. Hence, a local supplier network supported Volvo to avoid duties which otherwise would constitute a large part of the costs for the Value Truck. Secondly, local suppliers possess significantly lower production costs, e.g. through the use of cheap labor. Thirdly, regulations regarding a specific rate of local content for products intended to be sold in some countries also pushed the local sourcing strategy.

In general, GTT was able to choose between completely local suppliers and global suppliers with a local footprint. Often, GTT started to look for collaborations with global suppliers with a local footprint. These suppliers can generally offer a better product quality, as they can draw on their global experience, although at a higher price compared to the local suppliers. However, this was not always the case, as noted by Manager H: "*Because we went with them in the intention that the global parent company would bring in their knowledge to the local subsidiary. But that has failed in three, four cases.*" As a result, Volvo was also increasingly approaching local suppliers. Those companies were able to supply the components in an even cheaper way, but sometimes lacked the experience to show consistency in providing the required quality or quantity. Still, some local suppliers showed a good performance and even qualified for supplying the global organization: "*But the good thing is that we have some local suppliers, which have done quite well. And it is helping also our European organization, as we are able to send back some parts to Europe from the local suppliers, which helped us to reduce costs there as well.*" However, not all experiences with local suppliers have been positive and until today, Volvo is investing extensive resources to develop the local supplier base, as outlined by Manager I: "*It is now four years, that we focus on the suppliers. Now they come up, but four years back it was very tough situation. But even today, still we work with them very closely to make sure that they meet our quality requirements. [...]. I think technology-wise we support them, because we cannot accept the technology what they have, but what we can learn from them is how to produce components in a cost-effective way. With low tooling investment, quick. These are the areas where the suppliers are good at in this part of the world.[...].*"

In sum, GTT had a mixed experience with selecting the right suppliers for the Value

Truck. Thereby, the creation of new technologies and components is perceived to be less challenging, as most of the development work was done within Volvo GTT. Therefore, instead of extensively involving the local supplier base in the development of parts, those suppliers helped Volvo to dramatically reduce the costs of the components by applying cost-efficient production methods. More problematic was the establishment of a complete new supply chain in the targeted markets that had not existed before with all linked challenges, such as selecting suppliers from at least 250 potential companies and organizing the logistic flows.

#### **4.3.2.2. Research institutes and Universities**

During the development of the Value Truck, GTT in India has not extensively sought the support from universities or research institutes. Instead of utilizing the technological knowledge of those institutions, GTT merely relied on them in two cases for collecting and analyzing market data. Manager D comments this aspect: "*We have not extensively collaborated with the universities in this project. There were just few collaborations, in order to investigate the market demands, for example by interviewing the drivers, truck owners. [...]. So we received a report from them.*" However, in general, the managers acknowledge the significance of establishing closer links with the academia. Manager D states: "*[...] There are Engineering competitions for all engineering colleges across India. The shown results were really good, and there are so many new talents. This will help us to create the foundation for the future and not just for the value segment.*" Besides general technological knowledge, those universities may also provide access to inside information on the government's development strategies of the country, as Manager F explains: "*Then they also are government-sponsored centers, so students really are applying their research on them. And they also part of the decision forums, like what technology, what has to be implemented in infrastructure, what requirement should we have in products in infrastructure.*"

GTT's motives not to have established closer links with research institutes or universities so far are based on several factors. First of all, although the R&D site in Bangalore was already established in 1998, it is still in the development phase. As mentioned before, the Value Truck is the first complete product development that is led by the site and so there was no urgent need to set up those collaborations. Accordingly, manager I argues: "*As I said, we started new, so we are in the initial stage*" and Manager E complements: "*We are not there yet, but I think it is important to start looking into that.*" Besides this internal factor, there are also external reasons that act as a barrier for close company-university ties in India. First of all, most of the Indian universities are based on public funding that is not sufficient to



conduct high-quality research or lecturing. Therefore, the universities are mainly not offering free services to companies. The representative from the Indo-German Chamber of Commerce in Bangalore explains: "*[...], it is the academia that does not appreciate the connection to the industry in any other form than getting money to run their institutes.[...] They [universities] do approach the companies to get money, but it is not in the same spirit like in Europe, so that academia and the industry can grow together and that the best students can be recruited.*" This obstacle to create links with universities is further enlarged by the fact that the curriculum of University-study programs is often based on a purely theoretical foundation with little focus on real-life problems. Therefore, a collaboration with the universities might not be always beneficial for the company, as Manager I outlines: "*[...], in general they want your money, so they will charge you. But then you have to see the whether the costs for this are beneficial for you. Because sometimes the students here are not much exposed to the commercial world [implies lack of practical insights], like our engineers. So, we have to be careful.*" Another major challenge is the handling of Intellectual Property Rights (IPR) which remains unsolved in many cases. The representative of Indo-German Chamber of Commerce in Bangalore gives a global problem description: "*For example the Indian School of Sciences, they would also like to collaborate with foreign companies. But the IPR poses a huge challenge, since when the Indian School of Sciences works together with someone else in India, the School also to a certain extent wants to own the patent and property rights of the work. But often, the MNCs, like Mercedes, Bosch, and anyone else, want to take the full share of the patent in order to register it in Germany. So it is a question, who owns the patent. So, my feeling is that the Indian School of Science is not getting partners, because of its own and the companies' rigidity.*" And Manager E provides his opinion on IPR in India from a company's perspective: "*[...]. They [IPR] are not that much developed and applied like in the western world. And if you work together with universities and students, the next month they will start collaborating with the competitor, like with Tata.*"

In sum, certainly most managers would like to strengthen the ties to the local universities, as they can provide important technological or market know-how in the future. However, obstacles, such as theoretically oriented curriculums and IPR pose essential barriers for the effectiveness or establishment of those ties.

#### **4.3.2.3. Customers**

As mentioned before, determining the right features for the truck is a crucial part of the development work for the value segment and all managers confirmed the importance of local market knowledge as a prerequisite for this process. Thereby, particular attention is paid to

meet the customer needs, thus taking account the rapid market development while at the same time not over-engineering a specific component. A not needed new function or a component that is too sophisticated for the segment may not just fail to cope with the customer preferences, it also quickly increases the development costs and should thus be avoided. Hence, insights into customer preferences are one of the most important types of knowledge within the Value Truck development and is considered to pose a required area for organizational learning. Manager D draws a comparison between premium and value segment: *"In a premium truck segment, you can bring a new truck with a lot of new features without asking the customer before. But in the value segment, you cannot do that. Here, you need to identify what the customer is looking for."*

The units within Volvo Group that are responsible for building up knowledge related to customers and to provide the insights to the product development teams are the Marketing & Sales organization, as well as the GTT's Product Planning team. Both are primarily utilizing surveys and customer interviews that were conducted in all relevant markets in order to build up the necessary facts to determine the feature level of the truck. Manager J describes one example of this process: *"Every time I'm going to the different markets, I try to meet as many customer as possible. [...]. Sometimes, we ask the customer to sit in the truck for us to conduct the interview. And then it is not just about positive answers, but also complaints."* In addition, consultancies were engaged to provide information about the market and its participants. The results of the customer analysis together with the strategic and competitor analysis led then to the first conceptualization and truck request, which constitutes the initial and prime input for the actual product development.

However, GTT managers involved in the actual engineering of the vehicle also point out that they not solely aim at being reliant on the data and information provided by the sources mentioned above. The reason for this attitude is the belief in better engineering results when being independent and critical towards provided information. Therefore, the engineers are encouraged to gain in-depth experience in the market rather than just relying on a written concept. Manager I explains: *"In Volvo, engineering is not a consulting company, we are part of the organization. Our believe is when we just rely on the data provided by the Marketing & Sales as well as PPL [Product Planning], we will become an engineering solutions company. Then we just get a specification, without knowing the market. Obviously, our engineers are encouraged to know more about the market."*

There existed several initiatives to build the knowledge base of the market and customers and there are still ongoing activities. A project to increase the market knowledge of

the different countries was launched in the beginning of the Value Truck development. Within the project a team of three people was assigned to visit the targeted countries and to gather relevant information. The search for information included identifying the main competitor truck brand and model, the customer requirements and the general market conditions. The team applied several methods to collect the intended data such as interviews and observations. One important method comprised imitating the daily experience of the truck drivers. Manager I outlines this process: "*And the colleagues travelled thousands of kilometers, literally sitting in the trucks, talking to the drivers, observing the road conditions, and the duty cycle.*" The several reports and photographs of technical components and other important observations were carefully documented and stored in an internal database, which can be accessed by every Volvo engineer around the world. Later on during the project, further measures were applied to foster engineers involved in the Value Truck development to increase their knowledge of the customers and the market segment. For example, this aspect was implemented in Volvo's key performance indicator (KPI)-system, that requires 50% of all employees of an engineering unit have to have at least one 'customer-contact' during the year. Thereby, the engineers utilize various ways to meet customers, dealers and other market actors, including field trips, industry exhibitions, and personal interviews.

Although, these measures to increase insights about the customers appear extensive, some manager critically reflect on this process not to be sufficient enough. Manager F, for example, states: "*We should have done more on the customer insights - not just in India, but also for China, for example. Then we would have known that we won't succeed with just one product or we would have known that we have to care about the variability of the product.*"

During the interviews, the managers identified two factors that have implications for how knowledge was sought from customers. Firstly, as mentioned before, the market is quickly changing, thus requiring closer connections with the important actors on the market as well as continuous efforts in this area. Manager D shares his point of view: "*[...]. in the next years, we need to add more features to the truck, but on a low cost basis. We need closer market connections. [...]. As I said, we have to establish closer links to drivers, fleet managers, truck owners, etc.*" Manager F demands more regular interactions with customers: "*But the market is changing fast, so we cannot use the information from two years ago. So we need to do that [meeting market participants], but continuously.*" Secondly, the customer structure sometimes posed a challenge, because as opposed to Europe, where large logistic firms dominate the market, in the Value Segment in EM, most fleet owners are small with just two to three trucks in possession. When trying to increase customer involvement in the

product development, the small size poses an obstacle compared to logistic firms with a larger market power and bigger truck fleets.

#### **4.3.2.4. Competitors**

As mentioned earlier, the competition in most EM and particularly in the Value Segment is, to a large extent, localized, hence, Volvo considered local players in the respective country as the benchmark. Thereby, GTT did not directly interact with any of those competitors, such as Tata in India. But in each market they determined the matching competitor truck in terms of the Value Segment and carefully analyzed the truck and its components. Manager E explains: *"We have technical solutions inside Volvo. On the other hand, we do competitor analysis, we tear trucks apart on a continuous basis, and we see how we can benefit from the local players and suppliers."* The decision whether to use similar parts or technologies such as the competitor is based on an analysis, in which the technological risk involved is determined and whether Volvo's values, such environmental care, safety of quality is met.

However, in most cases the technological solutions of the competitors are not unknown to the Volvo engineers, as Manager E explains: *"[...] But usually they copy pretty much the Scania's, the Mercedes, and Volvo."* This statement fits to the earlier arguments about lacking R&D capabilities within Indian companies. Still, examining competitor trucks provides Volvo important information about *"[...] how it [the truck and its components] has been designed, what the ideology, what are the product trends, what are the customer expectations"*, as manager D reports. Hence, the competitor trucks analysis results in a better market understanding.

#### **4.3.2.5. Joint Ventures**

In 2008, Volvo formed a JV with the Indian automobile manufacturing company Eicher. The JV is among others, based on Eicher's entire truck and bus operations and Volvo transferred its Indian truck sales operations and service networks for trucks and buses to the newly formed organization. While Volvo gained a 45.6% ownership-share of the JV, it also acquired a 8.1% in Eicher directly, which resulted in a total direct and indirect ownership of the JV of 50%. Volvo's goal of the JV formation was to build up a significant presence in India and whole Asia (Volvo Group, 2009).

According to the brand strategy of the Volvo Group, Eicher is considered to be a basic and mass-market truck producer, that is one level below the value segment in terms of the price and technological level (Volvo Group, 2012).

Although, the interviewed managers of GTT recognize Eicher's experience and capabilities in the mass-segment, the JV was not used to obtain deep knowledge about the

technological solutions in lower than premium market segments. One reason is that the JV is not approved for this kind of collaboration, as Manager A clarifies: "*But this JV must be seen in context: it is not 100% Volvo, so Volvo sees it as a separate company and the relationship is regulated by contracts. Hence, knowledge transfers must be approved. Therefore, a JV must be handled with care and according to the rule-book, especially when the partner is considered to be a potential direct competitor.*" Although Volvo and Eicher are collaborating through the JV, the competitive situation among both companies is regarded critically by the Volvo managers. Manager F declares: "*They are concentrating on the mass-market. But we had huge discussions, and I think Eicher had also the idea to bring a new truck to the value segment.*" Moreover, the managers also assume that compared to Volvo, Eicher's technological knowledge base is significantly lower. Manager F states: "*But in terms of learning, it is more the other way around - they [Eicher] learn more from us, then we from them.*" As a result, Manager E views Volvo's knowledge strategy as follows: "*We try to learn while we also protect our key technology*".

The fear of losing knowledge to a business partner is also confirmed by the manager of the Indo-German Chamber of Commerce in a German industry context: "*[...], because often it is not a real partnership. And German companies are reluctant to share knowledge and technologies, because of the lack of trust, that the foreign firm misuses the knowledge.*" Therefore, a central problem are the lacking R&D capabilities of the Indian companies. Several managers confirmed that own R&D-activities have not been highly appreciated by the local businesses so far, as this does not create money inflows immediately. As a result, the companies' technological level has largely remained unchanged and according to the Indo-German Chamber of Commerce, the extent to which Indian companies are asking for collaborations with German MNCs is much larger than the other way around. However, the situation may alter in the future, as the Indian government is increasingly pushing local companies towards working more on own innovations.

#### **4.3.2.6. Other local sources**

Besides the sources mentioned above, from time to time, it was necessary to interact with government institutions in the respective country. This ensured the compliance with the local legal systems. Further, consultancies were hired to collect further information about the market and customers, that acted as a complement to the own knowledge sourcing activities. In regard to NGOs, manager F summarizes the situation: "*We haven't thought about that. Of course, that could be an opportunity, but there are a lot of pros and cons involved. We have to respect that we cannot do everything.*" Therefore, it is questionable, whether Volvo will

cooperate with alternative organizations in the near future for developments in the Value Truck segment.

#### ***4.3.2.7. Global external environment***

As the project was aimed at increasing the Asian share at the development, most external knowledge sourcing was conducted in the respective Asian market. No other mayor source has been utilized.

## 5. Analysis

*This section returns to the literature review and conceptual framework presented earlier, which will be matched with the findings of the empirical section. Thereby, this chapter follows a bottom-up structure, in which the findings are first analyzed on a detailed level, before it moves up to a more general discussion. In other words, all knowledge sources are first discussed individually, and then matched together to build up the revisited framework. Afterwards, this section concludes with a more holistic discussion about the implications of the findings.*

### 5.1. Required knowledge of the Value Segment

The case study confirms the broad market characteristics outlined by Gadiesh et al. (2007), who describe the Good-Enough-Market / Value Segment, as being value-oriented, implying that customers only accept products that endow them with a real value-added at a low and affordable price. The GTT managers agreed on these characteristics and noted that the challenge during the product development was to determine the value-adding product functions and to combine them into an affordable product. Hence, the knowledge requirements for such a product are to have deep insights about the market and customers, as well as to apply technological knowledge to create product functions that exactly meet customer and market requirements and that still can be considered to be affordable. This suggests the significance of gathering and managing a large tacit knowledge base and thus complies with the argumentation from the presented conceptual framework in section 2.4.

### 5.2. Internal knowledge sources

GTT's R&D-unit in Bangalore was able to rely on existing technical knowledge that was available within the global organization and fitted the market requirements. This permitted Volvo to limit costs and risks in the development process, compared to create completely new product features and solutions. This underlines the significance of scanning the internal organization for existing knowledge, and not solely being reliant on the exploration of new knowledge. This is in accordance with the argumentation by Katila and Ahuja (2002) that internal search depth can provide an integral contribution during new product developments. Accordingly, the managers pointed out, that the challenges that occurred during the development project were not of technological nature.

Further, local employees played a key role in the Value Product development, hence supporting the argumentation of Immelt et al. (2009). These employees possess the local experience on the needs of the customers and their context, as they were raised in the country and in most cases worked for local OEMs and suppliers before. Therefore, they accumulated a

rich tacit knowledge base that is valuable during the product development for two reasons: firstly, they provide input that is derived from their experience and they were able to critically reflect on the development process and utilized technologies. Thereby, they facilitated the process of meeting the customer requirements and to lower the product costs. Secondly, their experience was also used when sourcing knowledge of the market. As those employees had prior knowledge of the market, they were able to process the gained information in a much quicker way which resulted in shorter reaction times during the development which posed an important advantage. This finding complies with the a key argument of absorptive capacity, that is a closer gap between the knowledge bases between two persons or organizations leads to faster knowledge transfers (Cohen & Levinthal, 1990). The case results provide evidence that this holds even true, when Indian engineers conduct market research in other EM countries. Although the markets that were targeted during the development differed considerable from each other, as several manager pointed out, possessing EM experience helped the employees to understand and capture relevant information faster.

Lastly, the local organization faced two challenges in the beginning of the project. Firstly, as the unit had been responsible for work packages before, it possessed little experience in complete product development projects. Therefore, the global organization provided support and sent experienced expatriates to Bangalore to train and educate the local workforce in the management of whole product development projects and Volvo processes. This is congruent with the social aspect of organizational learning, as outlined by Grant (1996) and Simon (1991). Thereby, one member of the organization transfers the possessed knowledge to another member of the same organization, while the organization itself is responsible to build structures and processes that allow for the diffusion of the knowledge. In this case, expatriates and regular visits by global managers can be considered to constitute those organizational procedures.

Secondly, large parts of the employees responsible for the Value Truck development had been recruited from local OEMs and suppliers during the inception phase of the project. Several managers confirmed the existence of different mentalities between experienced Volvo engineers and newly recruited employees especially in terms of the company's core values and processes. As a result, the before-mentioned expatriates and visiting global managers also transferred the required values to the new employees and trained them in the Volvo processes. This finding confirms the rising significance of informal coordination mechanisms to reduce the risk of deviant behavior, as brought forward by Martinez and Jarillo (1989) as well as Nohria and Goshal (1994), for instance. In this case, the application of informal coordination



instruments can be also considered to be essential, due to the large share of tacit knowledge that has been transferred from the Global organization. Formal mechanisms, such as manuals, likely would not have resulted in an altering mentality of the new employees. Therefore, without applying informal mechanisms which injected the Volvo Core Values into the local organization and managers that showed how to implement those values into the product development, the final Value Truck would be of lower quality, hence minimizing the competitive advantage of the product.

### **5.3.External knowledge sources**

Literature on new product developments in general (e.g. Laursen & Salter, 2006), and also specifically for the BOP-segment (e.g. Schuster & Holtbrügge, 2014; Radjou & Prabhu, 2012) has emphasized that collaborating with external partners leads to new ideas and a better development performance. From a BOP-perspective, it is argued, that a vast network of different local traditional (e.g. suppliers) and non-traditional partners (e.g. NGOs) facilitates the development of products for this segment and helps to overcome challenges in the respective market (Schuster & Holtbrügge, 2014). Therefore, it is derived that companies increasingly rely on partners when developing products for the BoP-segment. This argumentation cannot be confirmed by this case study about a product development for the Value Segment.

#### *Suppliers*

In the western world, suppliers are considered to play an important and active role in product development and innovation (e.g. Bonaccorsi & Lipparini, 1994). However, the findings in this study do not fully reflect this importance in terms of active participation in the development process of suppliers. In fact, the extent to which suppliers were utilized in this project was lower compared to a premium truck development. Primarily, GTT collaborated with global suppliers with a local footprint or with completely local suppliers to exploit their low-cost manufacturing capabilities, which poses a significant aspect in developing the Value Truck. However, in most instances, this was not linked to an active development participation of the supplier. This suggests the existence of factors which minimize benefits for a higher utilization of suppliers in the actual development.

First of all, in terms of technology, in most cases internal sources were deemed to be more effective and less risky than involving suppliers for the conceptualization and development of product components. This implies, that the innovative and R&D capacity of

those suppliers was considered to be lower than internal capabilities, which was also confirmed by the Indo-German Chamber of Commerce. Besides, this also shows that in many cases the technological knowledge base of a western MNC can be considered to be sufficient for the Value Segment-Product and that no further partner with a more specialized technological knowledge base is required. Therefore, this finding downplays one central argument for the NPD involvement of suppliers, that is the access to more specialized and sophisticated knowledge (e.g. Harhoff, et al., 2014). This even holds true for some local suppliers with a global mother organization, as knowledge support is not always ensured and provided by the mother company.

Overall, the reason for this situation can be assumed to arise from lacking mentality towards R&D activities in Indian companies, as showed by the respondents' answers. Therefore, this situation underlines the argumentation of Wynstra et al. (2001), that lacking technical capabilities pose an essential barrier for knowledge flows from suppliers to the focal company. In some cases, where supplier involvement was considered essential, GTT supported the respective supplier in organizing the production of parts, for instance, thus suggesting that instead of knowledge inflows, there were rather knowledge outflows from Volvo GTT to the respective supplier.

#### *Universities and Research institutes*

Literature and most of the respondents in this study generally acknowledge the importance of involving research institutes or universities, especially for the long-term technology development (Trott, 2012). However, the study results display that building up ties and benefit from university collaboration is a challenging process in an Indian context. On the one hand, the reasons for this situation originate in the underfunded Indian Public Education System and the theoretically oriented curriculum, that results in little practical experience of the students. Still, most managers confirmed the potential of the vast numbers of students available in India. This suggests, that benefiting from Indian universities requires the investment of monetary and non-monetary resources, such as providing students with insights into real-life problems of companies. Besides investing these resources, this approach is time consuming. Therefore, as GTT's subsidiary in Bangalore was focusing on the first value truck development, while also building a new and accurate organization that caters this process, resources were scarce to invest in building up university ties. Besides, several managers pointed out that IPR issues pose further obstacles that have to be solved when collaborating with universities, indicating remaining insecurities of risk-adverse western companies in

terms of external knowledge sharing. As a result, long-term technology development of companies is impeded in India, as university contribution is limited.

### *Customers*

In most instances, GTT relied on external knowledge to obtain insights into the market and customers. Hence, customers constituted an important source and were regularly visited by the GTT engineers. The importance to understand the truck owners and drivers in the respective country, not just in the conceptualization phase but also in the actual development phase, can be seen in the implementation of this aspect into the KPI-system of the engineering teams. This complies with the demand by Thomke and von Hippel (2002) to extensively include customer in the NPD process, although in this case they were not directly responsible for the actual development.

### *Competitors and JV*

Santamaria & Surroca (2011) outline that companies are not actively seeking collaborations with organizations which may act as potential competitors. The findings of this study support this argument, as GTT has not established links with direct competitors. This can be assumed to apply also to the JV with Eicher, who supposedly has own plans to develop a truck for the Value Segment. As with universities mentioned above, this underlines the risk-averse attitude of not risking critical knowledge leakage to other external organization. Therefore, gaining knowledge about competitor products and technological strategies was mainly limited to the testing and analysis of trucks from those companies. Therefore, it can be expected that competitor collaboration is the least used knowledge source also in Emerging Markets.

### *Other organizations*

Other organization have been utilized to a limited extent during the NPD for the Value Truck. For example, some consultancies and business intelligence companies provided GTT with data material and experience about the customers and market und thus contributed to the building of the necessary knowledge base. Besides, the government constituted another source, as the future legal development is an important aspect during the truck development, for instance, in regard to emission norms. Further, the argumentation of the conceptual framework about the utilization of NGOs in this particular segment in a B2B-context was confirmed. Thereby, it can be derived that non-traditional partners play a much lower role than in a classical BoP-market context.

### *Global External Environment*

In addition to the local external environment, no source from the global external environment was accessed during the Value Truck development. Hence, this confirms the argumentation that firms prefer to conduct local knowledge search (e.g. Knudsen & Levinthal, 2007; Laursen, 2012). In this case, it is believed the scarcity of resources at the local R&D unit mainly influenced this behavior, as all available internal resources were directed towards building an organization for the new NPD and the actual local Value Truck development. Therefore, it was easier to source knowledge locally, although even this was sometimes not considered, because of the resource constraints (e.g. in case of universities).

### *Reverse knowledge spillovers and flows in EM*

By examining the external knowledge sources this study also sheds light to reverse knowledge spillovers and flows, as demanded by Li et al. (2013). In a Chinese context, researchers and economic press have argued that the western MNCs advantage of possessing superior knowledge compared to their local counterparts is not necessarily applicable anymore (e.g. Li et al., 2013; Economist Intelligence Unit, 2011). Some articles point towards a similar trend in India (e.g. Radjou & Prabhu, 2012). However, the findings in this paper display that this argumentation is not always appropriate. There are several obstacles that complicate the occurrence of reverse knowledge spillovers and flows in India. Thereby, the previously mentioned lacking R&D capabilities of local firms and a not fully effective university system primarily poses the largest challenges to learn from those local organizations, thus limiting the opportunity to acquire relevant technical knowledge. Although global companies are potentially able to invest in local institutions, such as universities or suppliers, to overcome the before-mentioned barriers, this is a time consuming process. In case a company is not willing or able to devote resources and time, knowledge flows from the local environment mainly comprise knowledge about the market and customers. As this knowledge is to a large extent bound to the local market context, transferring it within the organization would be of few use globally. Therefore, in order to create meaningful knowledge for the whole organization, insights into markets and customers must be combined with suitable technological solutions, for instance through internal knowledge sourcing. If conducted successfully, such a product can potentially be utilized in other markets world-wide, which is described as reverse innovation by Immelt et al. (2008) or Govindarajan & Timble (2012), for

instance. Although not directly part of the original research question, this case thus also provides insights of how reverse innovations can be enabled.

### 5.4. The conceptual framework revisited

After the basic results have been presented in the previous three sections, those can now be used to be matched against the assumed conceptual framework outlined in section 2.4. The original framework was based on the assumption that the local R&D subsidiary is the central unit for the value product development. Further, it was argued, that knowledge flows from the external environment posed the most significant input, both in terms of market/customer and technological knowledge. It was believed that the global organization of the local subsidiary knowledge contribution is limited to the extent, that it solely embraces processes and control mechanisms to avoid completely stand-alone activities of the R&D subsidiary. However, given the case study results, the conceptual framework must be altered and can be described with more detailed information. Figure 9 presents an revisited framework which will be further discussed below.

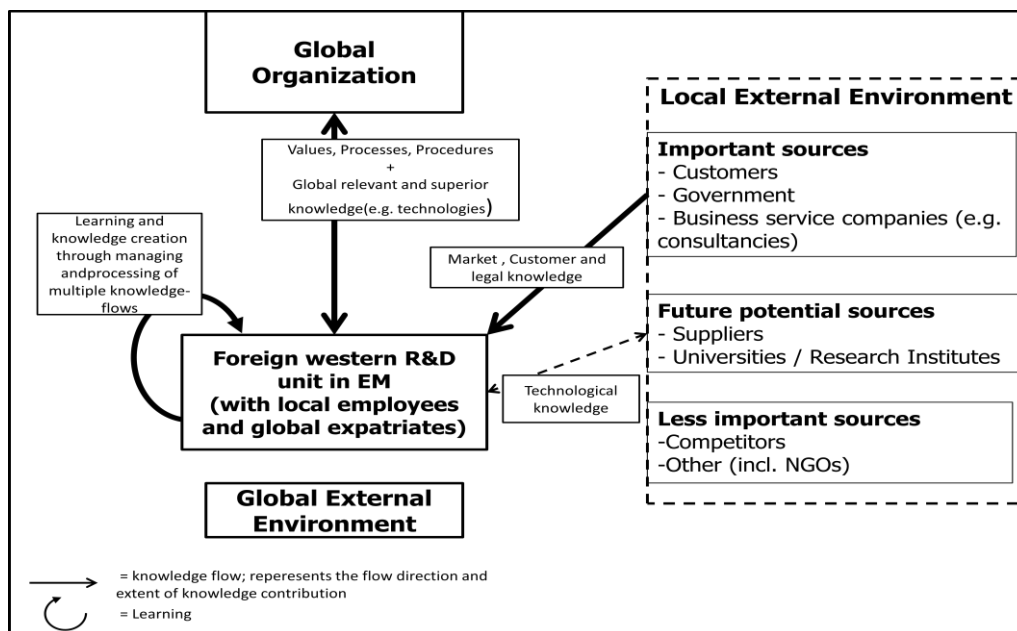


Figure 9: Revisited framework (source: own conceptualization)

The local external environment poses an significant source of knowledge relevant for the value product development. However, this does not comprise both technical and market knowledge, as anticipated, but to a great extent solely the latter one. Consequently, actors, such as the customers itself, consultancies, and the government that provide in-depth insights about the market and are considered to play the most significant external source of knowledge for the local R&D unit. Although, suppliers or universities can potentially contribute with

technical knowledge, MNCs have to invest tremendous resources to counterbalance the lacking R&D mentality of local companies, or to benefit from an underfunded and for companies unfavorable university system. Therefore, these sources are not relevant for companies in the short-term. In sum, this shows that GTT's external search breadth, that is the number of different external actors from which knowledge was sought, was limited, as primarily customers were utilized during the development. Given the high degree of tacit knowledge required for understanding the customer context, sourcing knowledge from customers can be characterized by a large search depth, as shown by the regular contacts between GTT's engineers and the customers.

At the same time, the results show that it is not solely crucial to be open towards external knowledge sources, but that internal global knowledge transfers are equally important. In this case, GTT employed internal existing technological knowledge to develop a truck that fits the market requirements in the Value Segment. Further, the global organization and HQ of Volvo transferred knowledge about company's values, processes, and procedures to the development team of the Value Truck. This allowed the local organization to learn to be able to conduct a complete product development and to create a truck that complies with Volvo's requirements. In other words, this implies, that values and processes transferred to the local R&D unit constitute a key enabler for NPDs in EM, especially in case of an inexperienced local subsidiary.

### *General discussion*

The results of the case study suggest, that the local R&D unit plays a central role in developing Value Products. Although not all activities necessarily have to be conducted in this subsidiary, the local R&D unit should be in the lead of the product development in order to benefit from the closeness to the relevant markets. Through the local presence, the process of obtaining market and customer knowledge as well as reacting and anticipating changes on the market is enhanced. All managers in the interviews confirmed the significance of a local R&D unit that is able to recruit local employees with market experience or that is located close to the relevant market actors, such as customers. This is in line with arguments from several authors in literature, who argue that it is necessary to localize vast resources and to establish a complete value chain in those markets (e.g. Immelt, et al., 2009; Prahalad & Hart, 2002). Given this fact and the attractiveness of those markets, it can be expected that the ongoing internationalization of the R&D function (UNCTAD, 2005) will continue in the future and that the gravity of the innovational capacity of western firms will shift towards

EM, as predicted by the Economist (2010).

This case offers further evidence to support the results of Almeida & Phene (2004), who showed the significance for a R&D subsidiary to utilize the internal MNC network as well as in the local host environment at the same time. Therefore, although various articles (e.g. London & Hart, 2004) stress the importance of external knowledge sources for enabling the creation of adequate products for below premium segments, those articles fall short of considering the internal knowledge base and capabilities of the global organization. In fact, this case demonstrates a viable strategic opportunity for global MNCs to develop competitive products for the Value Segment by combining local attained market knowledge with existing global expertise (e.g. about technologies and processes). Two prerequisites exist for this approach:

Firstly, the global and local organization have to be organized to enable internal and external knowledge transfers. It is believed, promoting and ensuring knowledge transfers internally can be achieved through the establishment of transnational structures, where knowledge is jointly developed and shared (Bartlett & Goshal, 1998). London and Hart (2004) argue that world-wide learning, which constitutes one of the key characteristics of the transnational organization, prevents the MNCs from successfully developing a product for the BoP-segment through a bottom-up development process, in which the MNCs subsidiary sources knowledge from its external environment. However, as discussed above, although a bottom-up product is needed in the Value Segment, this may comprise knowledge inputs from both internal and external networks, thus leading to a mixed strategy of local learning and world-wide knowledge sharing. Still, as can be seen in the case, this can cause friction between the global and local organization. Hence, managerial flexibility is needed to adapt ideas to the requirements and to build the best out of both "worlds".

Secondly, the local R&D unit must be capable to process those multiple knowledge flows that originate from the global organization and the local environment. Therefore, the existence of absorptive capacity towards both internal and external networks and the ability to learn must be a distinctive competence of the local unit. Accordingly, it is suggested, that a mixed team of local employees and global expatriates lead to superior results in becoming open towards both networks, as both groups possess a higher absorptive capacity towards their respective network. A second reason for the necessity of close interaction between local employees and global expatriates is the high degree of tacit knowledge resulting from both the external environment and internal network, which both groups have to combine with each other. As a result, this approach initiates a learning and knowledge creation process through

the ability to process internal and external knowledge, which is congruent with the integration of specialized knowledge bases described by Grant (1996). Besides, this is also in line with the reasoning of a current article of the Economist (2014), in which the heterogeneity of teams with local employees and global expatriates was argued to be a key prerequisite for success in EM.

At the same time, it must be denoted, that the strategy of relying to a large extent of exploitation of existing technological knowledge also bears risks. As March (1991) outlines, organizations possess an incentive on exploiting existing knowledge, as this presents less-risky and faster returns, than to pursue exploration activities. However, exploitation potentially lead to inflexibility and the non- development of the internal knowledge base in the long-run. Returning this argument back to this context, western MNCs should not consider internal technological knowledge as the ultimate wisdom, but should continuously scan the EM environment for new technical ideas and solutions. Therefore, the search for new external knowledge is believed to bear future development opportunities, although external sources, such as suppliers, currently may not seem to possess relevant knowledge.

Given the differences between the arguments of the BoP-literature of large partner involvement and the results of this case study, the following passage shortly discusses reasons for the deviant frameworks. It is believed that some of the differences occur due to the different concepts of the Value and the BoP-segment. As shown in the case, customers in the Value Segment appreciate the value-orientation of a product, that is every function adds value to the customer. Although, this is to a certain extent also true for the BoP-segment, customers pay more for a value product, hence leading to a higher expectation in terms of quality and reliability. Thereby, western MNCs are able to leverage on its existing technological solutions, that are proven, reliable, and that do not require the involvement of a large network of external partners.

Further, although these study results present some obstacles in the local environment to establish links with external organizations, it can be derived, that this argument per sé cannot explain the differences between external knowledge sourcing in an BoP-context and Value-Segment context. This is due to the fact, that the implications of the environment and its particularities are the same for both segments. Rather, it may be, that lacking R&D capabilities of local companies are not apparent in the BoP-segment, as those businesses with their technological level can exactly meet the segment-specific market requirements in this segment. Therefore, teaming up with technological business partners in the BoP-segment may be more attractive for western MNCs, than in the Value Segment.



Last but not least, another reason for the difference between the case results and BoP-results can be attributed to the development stage of the R&D unit. As the Bangalore unit was in the transition stage from a R&D unit that contributed to global projects or merely adapted products to a unit with the full responsibility for a complete NPD, this process required the deployment of all available resources. At the same time, as theory and this study results suggest, becoming embedded within an external network and overcoming the liability of foreignness also require the utilization of tremendous resources (e.g. Zaheer, 1995; Cantwell, 2009). Therefore, it can be derived, that in an early stage of local R&D-unit development, the focus lies on establishing the internal organization and building up the required capabilities, instead of teaming up with external partners. This may change over time, if the R&D operations have become mature and resources can be deployed for the partner seeking process.

## 6. Conclusion and Outlook

This study focuses on the product development of a western MNC for the Value Segment. More specifically, this study examines how the MNCs is creating and acquiring internal and external knowledge during the product development in this specific segment, which most western companies are unfamiliar with. Prior research has primarily focused on how companies can serve the BoP-segment, which is not congruent with the Value Segment. Besides, those studies often focused on the whole value chain and mainly took place in a B2C-context. Therefore, literature lacks detailed insights how a western MNCs manages the knowledge aspect during the product development in Value Segment. Although the study primarily adopts the micro-view of the MNC, the results also help to shed more light on knowledge flows in EM on a general level, which constitutes an area in which some researchers have argued that more research is needed. By applying the case study method of a truck development process for the Value Segment, this study hence fills some of the gaps in previous literature.

### *Findings and theoretical contributions*

Firstly, the findings suggest that local NPDs for the Value Segment in EM requires the effective combination of internal and external knowledge to meet the customer requirements in terms of affordability and functionality of the product. Thereby, MNCs are capable to rely on existing internal knowledge in which the company possesses a relative advantage against the EM environment, in this case process and technological knowledge. The internal knowledge base is then matched with complementary external knowledge on the market and customers in order to create a new product. These results provide a more detailed picture of the knowledge sourcing process of MNC in the Value Segment and put more emphasis on internal knowledge than previous studies, which, to a large extent, argued for acquiring knowledge from vast partner networks in EM. The results confirm studies that argued for a balance between utilizing external and internal knowledge sources, as well as relying on exploration and exploitation during the development process. Two principal reasons for a lower utilization of external partners have been discussed. Firstly, more demanding market and customer requirements in terms of quality and reliability in the Value Segment constitute an incentive to rely on internally existing and proven technologies. Secondly, the transition process of the local R&D unit towards the full responsibility for a complete NPD, in which resources are deployed for the internal organizational development, may act as a obstacle to conduct extensive external knowledge sourcing activities.

Secondly, in terms of external knowledge sourcing, the results show, that a higher significance can be attributed to knowledge on customers and the market, than for this segment appropriate technological knowledge. Building and the creation of customer and market insights for the engineers constitute a key prerequisite for a successful product development in this segment. Thereby, building close ties with customers and important market actors leads to the necessary tacit knowledge base. The utilization of non-traditional partners in NPD, as suggested in BoP literature, cannot be confirmed in this study. Further, this case demonstrates the remaining obstacles as a MNC to benefit from technological knowledge spillovers in India. The devotion of extensive resources and time is required to counterbalance challenges with lacking skills of local companies, such as suppliers, and the unfavorable Indian university system. The detailed description in this case study, thus enhances the understanding for factors that influence knowledge flows in an Indian context.

Thirdly, when combining the before-mentioned findings, the study confirms the significance of conducting the NPD for the Value Segment with a localized R&D unit and locally recruited employees. As the new product requires a extensive tacit knowledge base about customer and market requirements, which, in addition, are fast-changing in this segment, local employees that are situated close to the market are able to utilize their increased absorptive capacity towards the local conditions. Hence, they can take decisions during the NPD in a faster and more effective way. In order to enable those local product developments, the global organization has to ensure internal knowledge sharing and the transfer of core values and process knowledge to counterbalance lacking experience of locally recruited employees. One way of achieving this state is the utilization of informal coordination mechanisms, such as sending experienced expatriates to the local subsidiary. Therefore, the R&D unit must be embedded in internal and external networks and capable to process and learn from multiple knowledge flows, which is believed to succeed through the deployment of heterogenic local teams, consisting of local employees and global expatriates.

Lastly, this local NPD approach in the Value Segment has implication for the organization of MNCs, as some characteristics of the transnational organization are emphasized (e.g. global knowledge sharing), while others are neglected (e.g. glocalization strategy).

### *Managerial implications*

Apart from the implications mentioned above, which are also managerial relevant, the results suggest, that sourcing the required internal and external knowledge was not the largest

challenge. Rather, manager considered the establishment and creation of the local organizational structures that allow this process to take place as a greater challenge for them. Therefore, the local R&D unit requires extensive support from the global organization during this initial phase, i.e. through establishing efficient processes and implementing core values into the local organization. However, this approach also potentially causes frictions between the local and global organization, as some processes may not suit the local environment, for instance. Therefore, managerial flexibility is required on both sides to adapt and to adopt global requirements to the local conditions.

Besides, managers also pointed out that it is important to source market and customer knowledge continuously, given fast-changing environment. Therefore, it is not merely sufficient to conduct market intelligence activities, such as surveys, or interviews every two years. As in this case, one approach to foster this continuous process is to implement this requirement into the internal KPI-system not just for the Marketing & Sales organization, but also for engineers that develop products for this segment. This approach will likely lead to better engineering results and products that meet the customer preferences.

#### *Limitations and future outlook*

This study also bears some limitations, especially in regard to its data gathering process. Although it was attempted to include non-company interview partners, such as the Indo-German Chamber of Commerce, to confirm statements about external knowledge flows in EM, this study lacks the insights of the "affected" local parties. As a result, this study solely provides a picture that is mainly built up from a point of view of a western MNC. Future research in this area should attempt to include interview partners of local organizations as well, as this may uncover additional obstacles and factors for knowledge flows in EM that were caused by MNCs.

Further, this case takes place in a very specified context, that was influenced by the first time NPD experience of the case company in the value segment. A company which longer experience and established full NPD operations may have overcome some of the mentioned barriers, such as an internal resource constraints, in order to source knowledge from local partners to a higher extent. As a result, a longitudinal research design is needed to overcome this limitation. Such a study can potentially also examine whether the knowledge sourcing behavior of R&D units in EM also complies with the updated Uppsala model (Johanson & Vahlne, 2009). As in this case, local knowledge sourcing is limited in the initial phase, due to lacking resources, or trust and experience about external partners. However

overtime, the R&D unit may learn how to deal with obstacles in the relationships with external partners, thus starting to increase knowledge sourcing activities, for example through a collaboration, that is congruent with a positive commitment decision in the Uppsala-model from 2009. As a result, the R&D unit improves its network position in the local environment which in turn increases its knowledge opportunities. A longitudinal study approach may be able to examine this hypothesis.

Finally, although this case sheds some more light on reverse knowledge flows in an EM-environment, further studies are still needed. In fact, a case in which external partners are utilized to a larger extent can positively contribute to this research area. At the same time, this results about reverse knowledge flows in an Indian context can potentially also be matched with the situation in other countries and industries in order to create a complementary picture.

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## Appendix

### 1. List of interviews and respondents

Manager	Area of Responsibility	Location	Interview type	Date	Length of interview
Manager A	Long-term Innovation Strategy Asia	Göteborg	Face-to-Face	26/03/2014	60min
Manager B	Global Product Planning HD	Göteborg	Face-to-Face	27/03/2014	60min
External Manager C	Representative of Indo-German Chamber of Commerce in Bangalore	Bangalore	Face-to-Face	07/04/2014	70min
Manager D	Plattform Manager Value Trucks	Bangalore	Face-to-Face	08/04/2014	60min
Manager E	Manager Range- and Project management for the Value Truck	Bangalore	Face-to-Face	08/04/2014	75min
Manager F	Advanced Technology Research; involved in the early phase of the Value Truck development	Bangalore	Face-to-Face	09/04/2014	60min
Manager G	Chief Project Officer for Value Truck	Bangalore	Face-to-Face	09/04/2014	60min
Manager H	Key Account Management for Value Truck (internal and external)	Bangalore	Face-to-Face	10/04/2014	55min
Manager I	Chief Engineer Chassis for the Value Truck	Bangalore	Face-to-Face	11/04/2014	50min
Manager J	Product Planning UD Trucks (incl. Value Truck)	Ageo	Face-to-Face	15/04/2014	50min
Manager K	Advanced Technology Research UD Trucks	Ageo	Face-to-Face	15/04/2014	45min
Manager L	Manager Asian Purchasing Projects	Bangalore	Via Phone	28/04/2014	45min
Manager M	Product Planning China	Shanghai	Via Phone	09/05/2014	30min

## **2. Interview guide for Volvo GTT**

### **1. Introduction and general overview**

- Which general responsibility do you have in the organization?
- Which responsibility did you take in developing the Value Truck?
- How different is the development of a Value Truck compared to a Premium Truck?
- What is the share of internal and external knowledge used in the development?
- What are the reasons either to rely on internal or external knowledge/technologies respectively?

### **2. Type of knowledge and availability**

- How familiar are you or your unit with the Value Segment?
- On which knowledge do you rely when developing the Value Truck?
- What knowledge is available within the organization? From which internal sources?
- How did you ensure the internal knowledge flows?
- What type of technology and knowledge has been sourced from external sources?
- For what purpose has the knowledge been sourced? (e.g. knowledge about market segment, technical knowledge, know-how, etc..)
- From which organization?
- What are challenges when gathering required technological knowledge?
- What would you do differently in the future?

### **2. Partner Characteristics**

- Which external sources of knowledge did you use for the development of the Value Truck?
- What is the share of traditional partners (e.g. western suppliers) or non-traditional ones (e.g. local suppliers)
- How have the partners being identified and selected?
- What were the challenges when selecting or sourcing knowledge from external organizations ?

### **3. Sourcing modes**

- Which sourcing methods did you apply?
  - E.g. Collaboration, Acquisition, Joint Venture, HR recruitment
- Which sourcing mode do you prefer?
- What were influencing factors for selecting a specific sourcing mode? (e.g. Project-phase, Partner, Regulations, flexibility?)
- How will the use of sourcing modes will change in the future?

### **4. Concluding questions**

- What were the success factors and obstacles in the development process?
- What have you learned from the knowledge sourcing activities from the Value Truck?
- What would you have done differently?

### **3. Interview guide for Indo-German Chamber of Commerce**

#### **1. Strategies of foreign companies in India**

- How is India perceived by foreign companies? As a production location or as an attractive market?
- How do industries differ from each other in this perspective?
- Which market segments do the foreign firms target in India?

#### **2. Market for the middle class / Value Segment**

- What are the general characteristics for this segment?
- How do local companies approach this segment?
- How do foreign companies approach this segment?
- What are the challenges when acting in this market segment?

#### **3. R&D in India**

- To what extent do foreign companies set up R&D centers in India?
- What is the purpose of those centers? (e.g. global research or local product development)
- How do western companies use the R&D centers to develop local products for the value segment?
- What are the challenges in this local product development process and how do companies are able to overcome them?
- To what extent do western companies interact with their local environment when developing products for the local market (e.g. technological partnerships) ? 7
- What are potential knowledge sources during the new product developments in India?