



GÖTEBORGS UNIVERSITET
HANDELSHÖGSKOLAN

Master Degree Project in International Business and Trade

**Influencing factors on the implementation and integration
of strategic improvement systems in multinational
corporations**

- *A case study of Volvo Production System in geographically dispersed
subsidiaries within Volvo Group Trucks Powertrain*

Emil Rydin & Jessica Millegård

Supervisor: Inge Ivarsson

Master Degree Project Graduate School 2018

Abstract

In today's competitive environment companies face the challenges of continuously working towards making their operations more efficient and effective in pursuance to remain a competitive advantage. In order to cultivate a culture of continuous improvement many enterprises have chosen to develop tailored company specific production systems, known as "XPS", that aims to optimize the company's operations. At Volvo Group Powertrain, the company has initiated the Volvo Production System (VPS), which has been recently implemented in all subsidiaries within the company. In the literature, there has been discussions regarding the potential transferability of an XPS, where previous research indicates that several factors may influence the implementation and integration of an XPS, whereby others argue that an XPS can be universally transferred. The purpose of this research is therefore to investigate such influencing factors, in order to further identify key success factors and barriers that may influence the implementation and integration of an XPS in geographically dispersed subsidiaries. Performing a case study at Volvo Group Powertrain have further accomplished the purpose of this study. The theoretical framework mainly identifies five main factors influencing the XPS implementation, namely: knowledge sharing, absorptive capacity, corporate socialization, change management and leadership. This study contributes to three additional influential factors, not identified in the earlier research. These factors are the role of the global XPS coaches, the role of the local XPS manager as well as the XPS introduction to each subsidiary, and hence provides three main contributions to the theory.

Keywords: Company-specific production systems, XPS, strategic improvement programs, VPS, lean programs, program management

Acknowledgement

It would not have been possible to conduct this master thesis without the assistance and support from all the people whom have contributed with their knowledge and interest in our work during the whole semester. Therefore, we would like to express our sincerest appreciation to all whom have contributed to our study.

Firstly, we would like to thank Stefan Carlsson and Alexander Aminoff from the Volvo Group Powertrain Remanufacturing plant in Flen for discussing our ideas and coming up with an interesting research topic. We would also like to thank Susanne Hedberg and Luciana Assumpção at Volvo Group Trucks Operations for guiding us in the right direction and providing us with the contacts needed to carry out this research. Most essentially, we would like to thank Anders Lindström, Jan Berg and Patrick Galland at Volvo Group Powertrain for authorizing and supervising this project. In addition, we would like to give a very special thanks to Patrick Galland for being our mentor and providing us with the support, guidance and network during the process of the thesis.

Secondly, we would like to further state our gratitude to all the Plant Managers and VPS managers for the on-going support and for structuring our visits as well as providing us with the resources needed for our study. In addition, we would like to thank all the interviewees for their contribution in the interviews.

Thirdly, we would like to express our appreciation to our supervisor Professor Inge Ivarsson for his encouragement, guidance and valuable knowledge throughout the whole research period.

Last but not least, we would like to thank our families and friends for keeping us motivated and focused on the project and for encouraging us to always be the best that we can be.

Gothenburg, 2018-06-01



Emil Rydin



Jessica Millegård

Table of Contents

1. Introduction	1
1.1 Background	1
1.2 Problem Discussion	2
1.3 Purpose & Research Question	3
1.4 Delimitations	4
1.5 Research Outline	5
2. Frame of reference	6
2.1 Strategic Improvement Programs	6
2.1.1 Company Specific Production Systems (XPS)	6
2.1.2 Lean	7
2.1.3 WCM	8
2.1.4 Factors influencing Lean, WCM, TPS and XPS	9
2.2 Theoretical Components	11
2.2.1 Knowledge Sharing	11
2.2.2 Absorptive Capacity	12
2.2.3 Change Management	13
2.2.4 Leadership	15
2.2.5 Corporate Socialization	15
2.2.6 Summary and introduction to theoretical model	16
3. Methodology	19
3.1 Summarized research methodology	19
3.2 Research Approach	20
3.2.1 Abductive approach	21
3.3 Data Collection Method	22
3.3.1 Collection method for the frame of reference	22
3.3.2 Data collection design for the empirical research	22
3.4 Selection of participants	24
3.5 The interview guide	26
3.6 Analysis process	27
3.7 Quality assurance	27
3.7.1 Dependability	27
3.7.2 Credibility	28
3.7.3 Transferability	29

3.7.4 Confirmability	29
3.8 Ethical Statement	29
4. Empirical Findings	31
4.1 The Volvo Production System (VPS)	31
4.2 Volvo Group Remanufacturing	34
4.3 Volvo Group Powertrain	34
4.4 Volvo Headquarters internal assessment of VPS in Volvo Group Powertrain	35
4.4.1 Remanufacturing; Flen, Middletown, Charlotte & Limoges	35
4.4.2 Powertrain; Köping & Skövde	35
4.5 VPS implementation and integration in Remanufacturing	36
4.5.1 Overview and path for implementing VPS	36
4.5.1.1 Overview and path for implementing VPS in Flen	37
4.5.1.2 Overview and path for implementing VPS in Middletown	37
4.5.1.3 Overview and path for implementing VPS in Charlotte	37
4.5.1.4 Overview and path for implementing VPS in Limoges	38
4.5.2 VPS in the different levels	39
4.5.2.1 VPS with top management	39
4.5.2.2 VPS with VPS Manager	40
4.5.2.3 VPS with First Line/Area Managers	41
4.5.2.4 VPS with Operators	42
4.5.3 Organizational VPS Activities	44
4.5.3.1 Kaizens (Quick Kaizens)	44
4.5.3.2 Meetings	45
4.5.3.3 Internal Support & Training	46
4.5.4 External Support Functions	49
4.5.4.1 Network	49
4.5.4.2 External Support	51
4.6 Benchmark of VPS implementation and integration in Powertrain	52
4.6.1 Köping	52
4.6.2 Skövde	54
5.7 Summary & Discussion of main empirical findings	56
5. Analysis	59
5.1. Absorptive Capacity	59
5.1.1 Prior associated knowledge within the Volvo Plants	59
5.1.2 Effort of obtaining new knowledge	60

5.2 Change Management	63
5.2.1 Previous Change History within the Remanufacturing sites	63
5.2.2 Top management support	64
5.2.3 Management's ability to set clear targets and a common understanding of direction VPS	66
5.3 Leadership	68
5.4 Factors influencing VPS related to corporate socialization	70
5.4.1 The existence of international cross-communication	70
5.4.2 Existing corporate socialization structures within Volvo Remanufacturing	70
5.5 Factors not identified by the literature	71
5.5.1 The global VPS coaches acting as a gatekeeper	71
5.5.2 The local VPS managers	72
5.5.3 Different introduction to VPS	72
5.6 Revised proposing model	73
6. Conclusion	75
6.1 Summary of main findings	75
6.2 Theoretical implications	77
6.3 Managerial implications	78
6.4 Limitations of the study and directions for future research	79
References	81
Appendix 1	89

List of figures and tables

<i>Figure 1. Research Outline. Compiled by authors.</i>	5
<i>Figure 2. Key identified organizational factors affecting XPS implementation and integration. Compiled by authors.</i>	18
<i>Figure 3. Volvo production focus areas (Galland, 2018).</i>	32
<i>Figure 4. VPS-steps (Galland, 2018).</i>	33
<i>Figure 5. VPS support structure 1. Compiled by authors.</i>	64
<i>Figure 6. VPS support structure 2. Compiled by authors.</i>	65
<i>Figure 7. Revised theoretical model. Compiled by authors.</i>	73
<i>Table 1. Research Methodology. Compiled by authors.</i>	19
<i>Table 2. Selection of participants. Compiled by authors.</i>	24
<i>Table 3. Overview of the visits of each plant. Compiled by authors.</i>	25
<i>Table 4. Focus area description. Compiled by authors.</i>	33
<i>Table 5. VPS structure. Compiled by authors.</i>	37
<i>Table 6. Overview and summary of main findings. Compiled by authors.</i>	57

List of Abbreviations

AM	Autonomous Maintenance
CD	Cost Deployment
GTO	Group Trucks Operations
HQ	Headquarter
HR	Human Resources
JIT	Just In Time
KM	Knowledge Management
KPI	Key Performance Indicator
MNC	Multinational Corporation
MNE	Multinational Enterprise
PD	People Development
PM	Professional Maintenance
TPS	Toyota Production System
TQC	Total Quality Control
TQM	Total Quality Management
VPS	Volvo Production System
WCM	World Class Manufacturing
XPS	Company Specific Production System

Definitions of concept

- Volvo Group trucks operations remanufacturing of powertrains is referred to as “Remanufacturing” in this thesis.
- Volvo Group trucks operations powertrain production is referred to as “Powertrain” in this thesis.

1. Introduction

This chapter aims to describe the background of the researched topic followed by a problem discussion, research questions and the purpose of the study. In addition, this chapter presents the case company along with the four geographically spread subsidiaries included in this research as well as the delimitations.

1.1 Background

In today's competitive environment the challenges of working efficiently and effectively becomes more and more important for companies in order to remain a competitive advantage. Refining and sustaining their competitiveness can be accomplished by various approaches, whereby the ability to constantly improve is vital as it can be an influential factor of the companies' survival (Slack & Lewis, 2002). The current literature suggests numerous production improvement philosophies, methods and tools that a company can utilize to remain competitive. These improvement suggestions in terms lead to the development of best practises, continuous improvement systems and company-specific-tools. The best practise paradigm of manufacturing strategy includes various manufacturing concepts such as; total quality management (TQM), just-in-time production (JIT), theory of constraints, world class manufacturing (WCM), six sigma, lean production etc. (Voss, 2005; Netland & Aspelund, 2013; Netland & Sanches, 2014). There is especially one company that stands out, reaching outstanding success, when implementing these generic and best practice strategies, namely Toyota Motor Corporation. The company developed its own company-specific production system (XPS), Toyota Production System (TPS), which they deployed in their operations to create an organization of continuous improvement. Being inspired from the Toyota Production System (TPS), many other organizations have developed their variations of this concept with the aim of creating a tailored system that utilizes improvement programmes in order to improve operational performance (Netland & Aspelund, 2013). However, the importance of acknowledging the requirement to have a higher degree of codification together with being aware of the need to adapt best practices to unique business characteristics and environment has become vital for successful implementation (Netland & Aspelund, 2013). The literature describes various factors that may impact the implementation of lean and WCM, such as the organizational culture, leadership, change management, effective communication etc., hence leading to different challenges faced by dispersed

subsidiaries of a company. Therefore this study has undertaken a perspective to assume that XPS are globally transferable but affected by organizational and external factors, which impacts the implementation and integration of XPS in geographically spread subsidiaries. This will be further evaluated and tested against the case study of Volvo Group Trucks Powertrain Operations.

Volvo Group Trucks Operations (GTO) was one of the companies that followed the steps of Toyota by implementing a variation of tools and methods of the successful TPS. In 2004 some efforts of applying the Lean-concept all over the Volvo Group had been made, but the results turned out to be non-beneficial. A pre-study was required to further modify and establish a custom-made lean production system for the Volvo Group, hence in 2007 the first version of the Volvo Production System (VPS) was launched. The VPS aimed to create common values and goals as well as aligning all subsidiaries to a common vision and organizational culture (Hill & Svenningstorp, 2006). Although it was rolled out in most units of the Volvo Group in 2007, the remanufacturing of Volvo Group Trucks Powertrain Operations did not start with the implementation of VPS until recently, hence being the focus of this study.

1.2 Problem Discussion

The current literature within management and strategy mainly focus on the effect of the TPS, TQM, lean production, knowledge management on performance and the building of a learning organization (Adam, Flores & Macías, 2001; Swamidass, 2007; Thun, Drüke & Grübner, 2010). However, the application of company-specific production systems has received significantly less attention. As the requirements for learning, continuous improvement, knowledge sharing, united organizational strategy and culture have become vital factors for being successful, it is becoming increasingly important for MNCs to implement company-specific-production system (XPS) with the purpose of comprising both organizational and technical elements (Netland, 2012). Although the XPS aims to be a tailored production system with the main objective that a corporation operates in alignment in all its units with the same set of principles and methods, it is still true that every subsidiary operates in its own unique context. Managing and operating a XPS system over geographically spread subsidiaries can therefore be challenging as every unit operates in different environments. The current literature has attempted to focus on factors influencing a Lean, WCM, TPS and to some extent XPS implementation, such as organizational culture

and leadership, management commitment and capability, external support, teamwork etc. However, the current literature mainly focuses on factors influencing lean, WCM and TPS and leaving the implementation of tailored company production systems in the shadow, hence presenting a under researched area. In addition, the literature present a gap of identifying how and why the implementation may differ between subsidiaries in relation to their specific context as mentioned earlier. In order for MNCs to successfully implement an XPS system over geographically spread subsidiaries it is important to understand how these factors may affect the implementation process. Hence, making the topic of identifying success factors and barriers in regards to XPS and the implementation in geographically spread subsidiaries an interesting contribution to the current literature, which ultimately adds to an increased understanding of how to successfully implement an XPS.

1.3 Purpose & Research Question

The purpose of this research is therefore to investigate influencing factors on a company-specific production system (XPS) in order to further identify key success factors and barriers that may influence the implementation and integration of an XPS in geographically dispersed subsidiaries. The aim is therefore to investigate and assess key factors which may affect XPS-integration by performing a case study on internationally dispersed subsidiaries in the automotive manufacturing industry. Continuously, the empirical fact will be interpreted through a theoretical framework, in order to create an understanding of XPS and its implementations factors from a research point of view. To summarize the purpose of the study, two research questions was formulated, with the first one being the main research question:

- *What are the influential factors on the implementation and integration of a company-specific production system (XPS) in geographically spread subsidiaries?*
- *What are the key success factors and barriers for implementing and integrating a company-specific production system (XPS) across geographical spread subsidiaries?*

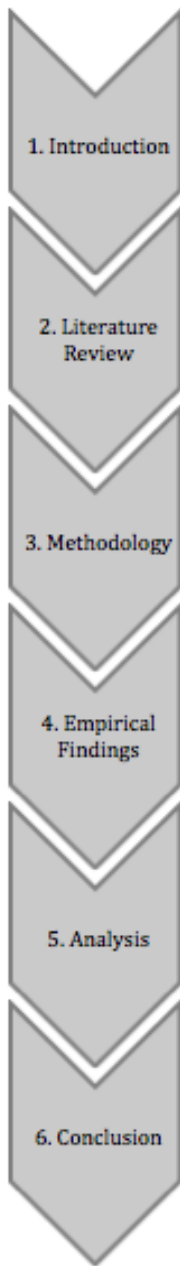
Subsequently, this study aims to contribute and shed light to the research of implementation and integration of XPS systems, which is limited in the current literature. Furthermore, we will focus on influential factors affecting an XPS and further identify barriers and key success

factors for implementing and integrating an XPS system in geographically spread subsidiaries within an MNC. In order to comprehend the influencing factors on an XPS system a deeper study is needed, which is why this study will incorporate a case study of Volvo Group Powertrain Remanufacturing, which consists of six remanufacturing centers worldwide. This study will investigate 4 out of those subsidiaries, namely; one subsidiary in Sweden, two in the US and one in France and their respective influential factors on the XPS -implementation and integration. In addition, this study also includes two powertrain sites with the purpose of benchmarking as they have come a long way in their VPS journey. The benchmark therefore aims to identify the factors influencing the XPS implementation.

1.4 Delimitations

In order to achieve the objective of this study both an empirical and a theoretical base was constructed in order to further draw conclusions and connection to the previous literature in the field. The research was constructed within the field of influencing factors on continuous improvement program, knowledge management, absorptive capacity, corporate socialization, leadership and change managements and how it differs between geographical distant subsidiaries. The study has mainly been conducted around the case company Volvo Group Trucks and their Remanufacturing of Powertrains, hence not all research within the framework of knowledge management, absorptive capacity, corporate socialization, leadership and change managements has been incorporated. Volvo Group is a multinational company and the Powertrain unit has subsidiaries worldwide, however the main focus of this study has been on the remanufacturing area of the Powertrain production, although being benchmarked against the manufacturing site as they have come further ahead in their VPS journey. Due to limited time and access to interviews and data collection, this study includes four out of six subsidiaries within the remanufacturing of powertrains; Flen (Sweden) Middletown (USA), Charlotte (USA) and Limoges (France). In addition this study included two out of five powertrain manufacturing plants; Köping & Skövde for the purpose of benchmarking. A potential longer observation could lead to even more detailed results. Also, the research is limited to the unique context of Volvo Group Powertrain and Remanufacturing, which may limit the generalization to other context. However, it can be reasonable to provide a general recommendation to companies operating in a similar industry whom have or will adapt an XPS.

1.5 Research Outline



This thesis covers six chapters in total, including the introduction presented above. The following chapter will present the literature review, including strategic improvement programs with the objective of describing the Toyota production system, Lean, company specific production systems and world-class-manufacturing. Secondly, factors influencing the implementation of Lean and company-specific-production systems will be described. Following, these factors will serve as the foundation for our theoretical model, including knowledge sharing, absorptive capacity, change management, leadership and corporate socialization, The third chapter consist of the methodology for carrying out this thesis, specifying information on the theoretical review, data collection and the analytical method. Chapter four will present the empirical findings by firstly introducing the company followed by the introduction to their specific company production system. Thereafter, the most influential factors will be presented for each subsidiary with the aim to provide the reader with a comprehensible overview of each plant. This chapter also includes a benchmark of two sites that has come further in their XPS journey. Chapter five consist of the analysis, i.e. the theoretical framework is applied to the empirical findings. The results of the analysis is then demonstrated in a revisited version of the theoretical model presented in the literature review. In chapter 6 a conclusion is presented that summarizes the findings and answering the research questions. This chapter also includes theoretical and managerial implication and suggestions for future research within this field.

Figure 1. Research Outline. Compiled by authors.

2. Frame of reference

The theoretical framework aims to describe and gather the most relevant data for this study, in order to answer the proposed research question. Additionally, the chapter intends to provide the reader with insights into each area studied. This section consists of four main chapters with the purpose of providing the reader with a holistic view of our theoretical findings. The chapter will first present an overview of strategic improvement programs that will serve as a platform to provide a common understanding of their significance. Secondly, potential influential factors will be presented based on the literature within this field. Following, the prior literature will be clustered into five main topics that will be the theoretical focus of this research, namely; Knowledge Sharing, Absorptive Capacity, Change Management, Leadership and Corporate Socialization. A summary of these topics and their importance will then be presented. Finally a theoretical model has been assembled with the aim of illustrating their influential impact on an XPS.

2.1 Strategic Improvement Programs

2.1.1 Company Specific Production Systems (XPS)

Company-specific production systems (XPS) has become a well-known tool within manufacturing and operations, especially within the automotive industry. The “X” in the “XPS” stands for the company’s name and the “PS” stands for the “production system” or business system, operations system etc. The concept originates from the Toyota Production System (TPS) when they during the years of 1945-1975 developed its superefficient production concepts (TPS). The TPS further built on the mass production paradigm of Fredrick Taylor, Edwards Deming and Henry Ford by incorporating a consistent customer perspective to all operations by utilizing the principles of just-in-time (JIT), jidoka, lean and waste elimination (Netland & Aspelund, 2013; Ohno, 1988; Sugimori, Kusunoki, Cho & Uchikawa, 1997). The Implementation of the TPS allowed Toyota to develop more automobile models faster, with less defects and at a lower cost in comparison with its Western competitors (Womack, Jones & Roos, 1990). The aim has been to identify the causes and eliminate all the waste as early as possible without any delays. Furthermore the TPS-lean emphasizes principles as visual management and daily control by Operators, which originates from managing quality in the Japanese industries (Strang & Kim, 2005). The viewpoints of both Ford and Deming put further emphasis on the meaning of empowering workers to work with continuous improvements in regards to the processes within the

organization. This further spurred the development of company specific production system within the automotive industry (Modig & Åhlström, 2012; Harrison & Van Hoek, 2008). Companies therefore choose to implement an XPS with the aim to adopt, synthesize and adapt distinguished production philosophies such as Lean production, Six Sigma, total quality management (TQM), just-in-time etc., in regards to its specific environment, characteristics and needs (Netland & Sanchez, 2014). The XPS comprises both organizational and technical elements, whereby the technical elements typically involve intranet pages with best practice databases and teaching material. The XPS process aims to outline the actions that lead to implemented change including a mixture of organizational mechanisms such as leadership, managerial commitment, follow-up, resource management, employee training, sending expats to plants, policy deployment, union aspects, establishing awards etc. These processes usually takes various forms across corporations and subsidiaries, hence being locally adopted to some extent (Netland, 2012). Furthermore, Netland (2012) argue that the XPS can also develop in a negative direction as change usually face some kind of resistance. Therefore, implementing XPS is strongly connected to changing the underlying culture. The objective of an XPS is that a corporation operates in alignment in all its units with the same set of principles and approves according to the same system (Netland & Sanchez, 2014). In comparison to general production philosophies such as lean, TQM etc. XPS is a strategic production program with the objective of being tailored to the specific firm. The principles derive from the same templates but in the development phase of the XPS they are tailored to the unique needs of that specific organization (Netland, 2013a). The value of an XPS is dependent on the strategic fit with the firm's business strategy as well as the speed of implementation (Bateman, 2005; Schonberger, 2007; Pay, 2008).

2.1.2 Lean

The term lean originates from the Toyota Production System (TPS), aiming to describe an organization that does "more with less" (Liker, 2004a). Petersson, Johansson, Broman, Blücher & Alsterman (2009) argues that the lean production can be seen as an approach or a strategy for managing the operations. Hence it can be perceived as an umbrella that includes the company culture, values, basic principles, methods, leadership as well as employees with the aim of increasing production efficiency by working towards continuous improvement. Continuous improvements (CI) concerns constant efforts to improve corporate processes, products and services. The general concept of CI involves both gradual and direct improvements, the only condition is never-ending improvements targeted to meet corporate

policies and objectives (ASQ, 2018). Even though CI is often shed in the light of a management perspective, it's important to highlight that the concept is about a company-wide change which includes all employees and stakeholders of a firm (Martichenko, 2004). According to Bergman & Klefsjö (2010) a well-established improvement work process involving the employees is a crucial part when applying lean production on a long term basis. If not involving the employees there is a risk that short term results will not be sustained in the long term. Common tools for involving the employees and coming up with improvements and sustaining them are various forms of "Kaizen". The word "Kaizen" derives from Japan and means continuous improvement. Kaizen aims to focus on different ways to conduct and organize the improvement work, including small incremental improvements of the daily operations as well as more comprehensive improvements (Petersson et al., 2009; Bergman & Klefsjö, 2010; Sörqvist, 2013). Regardless of what tools and methods a company choose to implement in their lean production approach it is essential that they have a clear understanding of lean and to what extent they aim to be lean (Marodin & Saurin, 2013) According to Netland (2013b) a trend across many manufacturing industries is to develop company-specific-production-systems (XPS) which is a corporate improvement program inspired from the Toyota Production System.

2.1.3 WCM

Systems such as the TPS and the lean production have received all the attention and left models of world-class manufacturing (WCM) in the shadow. However, some groups, such as Fiat for instance have reinvented WCM and hence produced an alternative to TPS-lean production (Chiarini & Vagnoni, 2015). According to Mylnek, Vonderembse, Rao & Bhatt (2005) WCM differs from traditional manufacturing in terms of that WCM focus on external customers whereby the traditional manufacturing emphasizes the internal cost and efficiencies. This approach can be enabled by the implementation of manufacturing practices that reorganize the manufacturing work practices and develop the employees, which in terms drives continuous improvement (Mylnek et al., 2005). Furthermore, Mylnek et al. (2005) states that WCM has 6 core manufacturing competencies that are supporting the focus of the employee development and work practice efforts, that are further defined by Kinni (1996), namely: engagement of employees, supply chain management expertise, information systems used, development of products and services, environmental stewardship, and corporate citizenship. However, the approach towards the work practices within WCM may differ from company and industry.

2.1.4 Factors influencing Lean, WCM, TPS and XPS

According to Silva, Kovaleski, Gaia, Garcia & de Andrade Júnior (2013) there has been extensive studies on understanding the factors that strengthen and enforcing the implementation of WCM. Authors such as Belén Escrig-Tena (2004), Flynn, Schroeder & Flynn (1999), McAdam & Henderson (2004) and Sharma & Kodali (2008) argue that it is essential for companies to understand how to identify critical factors that affect the implementation process, i.e. the activities and practices that should be tackled to be successful. This is also been of great importance in the theory of lean implementation Liker (2004b). describes the success of lean is dependent on the systematic implementation of core principles such as JIT, built-in-quality, continuous improvement, lean concepts and philosophy, organizational structure, people and standardized processes. In order to improve and effectively share lean knowledge in MNCs it is important to use social mechanisms, i.e. interactions among lean experts, rotation of personnel and knowledge brokers (Ferdows 2006; Henriksen & Rolstadas, 2010). The importance of a relevant competency base is also evident in the WCM-theory where Avlonitis and Karayanni (2000) highlights the significant support of a senior management team which effects the implementation plan for the WCM. Furthermore, Inkpen (2008) argue that mechanism is influenced by contextual conditions, whereby the contextual conditions can change throughout the transfer process of lean knowledge.

MNCs are heterogeneous as they are operating in different nations and environments. This means that practices established in one plant may not fit other plants, considering the difference in contextual conditions (Kostova, 1999). Rich and Bateman (2003) and Kull, Yan, Liu & Wacker (2014) there are several contextual conditions that may affect the success of lean, whereby cultural values play a particularly important role. Several authors emphasize the relevance of having specific organizational culture values and behaviors such as face-to-face meetings, open communication, cooperation between employees and a long-term approach to management, which they referred to as lean cultural values. They found that such characteristics differentiate plants that successfully implement lean. Although lean cultural values may differ from those cultural values characterizing a specific nation, meaning that the resulting incongruence is an explanation for lean implementation being unsuccessful (Rother, 2009; Bortolotti, Boscari & Danese, 2015; Kull et al., 2014). Therefor the contextual conditions should be considered when transferring lean knowledge in MNCs (Boscari et al.,

2016). In addition, Ferdows (2006) emphasize the existence of lean cultural values in the production network, but also the importance of strong relations between plants. Furthermore, the national location of the company may affect the performance in terms of availability and cost of factors in relation to production, such as labor, capital and technology. In addition, the socio-political and regulatory environment may also influence the lean implementation (Cagliano, Blackmon & Voss, 2001). Mostafa, Dumrak & Soltan (2013) explain poor lean implementation to be a result of a restricted mind-set and inadequate understanding of the lean concept as a whole. Furthermore, Dubrovski (2001) and Kasul and Motwani (1995) suggested that for a successful implementation of WCM, an integration of the entire company is needed. Benton and Shin (1998) instead believe that the main implementation problems revolve around cultural, human and geographical aspects, such as cultural differences, geographical dispersion of suppliers and different management styles etc. as supported by Cagliano et al. (2001) mentioned earlier.

In the current literature it is rather difficult to find studies on lean implementation failures as most companies want to protect and not disclose their investments that have failed. It is more common to find studies on successful change program. However, AlManei, Salonitis & Xu (2017) further identifies common root causes for failing implementations related to; lean suppliers, leadership, employee involvement, tools and techniques and business systems. Both WCM, lean and XPS literature points to a connection between human dimension and the implementation of strategic improvement systems (Silva et al., 2013; AlManei et al., 2017; Rother, 2009). Kumar & Kumar (2014) elaborate on this topic by stating that barriers of lean manufacturing implementation can further be grouped into 7 categories, namely; management, resource, knowledge, conflicts, employee, financial and past experience. Management can serve as both a driver and a barrier in the implementation process as it is related to specific attitudes, behaviors, level of focus for supporting lean manufacturing initiatives, long-term vs. short-term vision among others (AlManei et al., 2017). Lack of necessary resources such as labor, capital, communication etc. can also be a barrier of the lean implementation. Furthermore, a solid platform of lean knowledge is needed, as they will serve as a supporting function to further implement the philosophies and the various tools of lean, hence consultants or appropriate managers are key functions. In addition, resistance to change by employees is a common factor that may prohibit the lean implementation, which can further be tracked back to the fear of the unknown, fear of failure etc. (Kumar & Kumar, 2014). Furthermore, Boscari et al. (2016) found that foreign managers that manage their

plants autonomously (i.e. independent from headquarters) may lead to subsidiaries resisting the lean introduction and hence hinder knowledge transfer. In addition, Doolen & Hacker (2005) found that larger plants have are likely to implement lean practices to a greater extent than smaller plants. Other scholars believed that hard and technical lean (i.e. tools and techniques) at the bottom of the organizational hierarchy demonstrates sub-optimization and lack of customer value (Radnor & Johnston, 2013; Radnor & Osborne, 2013; Holmemo, Rolfsen & Ingvaldsen, 2018). AlManei et al. (2017), Sharma & Kodali (2008) and Eid (2009) further emphasize the following success factors for implementing strategic improvement systems; organizational culture, ownership and leadership, change, human resource management as well as management commitment. They further argue that effective communication and engagement as well as teamwork and the obtainment of a holistic view serves as additional influencing factors in the integration of strategic improvement programs.

2.2 Theoretical Components

Through our literature review we came to the conclusion that many of the factors, affecting the implementation of strategic improvement systems, stated in the previous chapter are based on the following five components: knowledge sharing, absorptive capacity, change management, leadership and corporate socialization.

2.2.1 Knowledge Sharing

According to knowledge management theory, the capability to create and transmit internal knowledge is one of the most competitive advantages for a MNC (Minbaeva, Pedersen & Björkman, 2014). Minbaeva et al. (2014) views MNCs as a "differentiated network", which creates knowledge internally and transfer it between the interrelated units. The concept of the MNC as a "differentiated network" has motivated researchers globally to study formations, integrations and transmissions of internal knowledge flows and the role subsidiary plays in this process. Historically, research related to the international knowledge transfer within multinational corporations (MNCs) has been concentrated on how depending the types, source, senders, receivers of the relationship of knowledge is on the transferring process in MNCS. On the contrary, research has paid minor attention to knowledge transfer facilitating policies and practice in MNCs, just the endogenous process (Minbaeva, 2005). The more a MNC grows organically, the greater the challenge become of facilitating the process of spreading information internally within the corporation, which is a requirement for building

dynamic capabilities, creating effective learning processes and best practices (Szulanski, 1996). Effective knowledge sharing also influences the outcome of team work, production costs, innovation facilitation, corporate performance, etc. (Hansen, 2002). But the concept of organizational absorptive capacity is considered as the most vital factor of internal knowledge transfer within MNCs (Gupta & Govindarajan, 2000), a topic which is going to be further discussed in the next paragraph.

2.2.2 Absorptive Capacity

Cohen & Levinthal (1990) define absorptive capacity as the organizational ability for a corporation to identify and distinguish the value of new information, embrace it, and thereafter integrate it within the corporate structure (Cohen & Levinthal, 1990). The definition is similar to Zahra and Georges interpretation (2002), who describes absorptive capacity as the organizational routines and processes through which corporations assimilate, gather and transform knowledge in order to produce an organizational capability. This accumulation of knowledge is characterized as potential absorptive capacity. Further the capacity to leverage this knowledge is concerned as realized absorptive capacity (Zahra & George, 2002).

Absorptive capacity is further described as the function of an organization's previous level of related knowledge, for example employee's basic abilities, educational background and certain occupational experiences. The accumulated skills generates a knowledge base which organizations must be able to recognize and use. For an organization to develop an absorptive capacity, intensity of effort is essential, since it effects the retrieval of the new knowledge. Intensity of effort is the level of energy spent by employees to gather new knowledge and perform problem solving. The organizational challenge is from this stage to internalize the new knowledge, which is another aspect of intensity of effort (Cohen & Levinthal, 1990). The organizational absorptive capacity is dependent on continuous effort and investment from the organization, since both individual and organizational absorptive capacity develops cumulative. A corporation's absorptive capacity is not limited towards connections points to the external environment, since the term is equally related to knowledge transfer internally within the organization.

How the actual absorptive capacity is constructed and developed within organizations is still a pretty unexplored area in the current research (Alv er & Westgaard, 2011). Nonetheless

Daghfous (2004) has listed potential factors affecting absorptive capacity, this can be divided into internal and external factors. Internal factors involves characteristics such as corporate size, structure, strategy, responsiveness etc, while the external refers to the external environment and the organizational position in the MNE concerning knowledge transfer (Alv er & Westgaard, 2011). The individual knowledge absorbed by learning by doing and experimentation is considered as the most important factor for the organizational ability to exploit new knowledge (Ahanotu, 1998). The individual ability to learn new skills is dependent on organizational procedures and processes. It is also affected by cross-functional communication which facilitates internal knowledge transfer.

Improved internal communication will build organizational social integration mechanisms, which eliminates barriers to knowledge sharing. It is therefore important that organizations enable and supports the use of internal communication channels (Daghfous, 2004). In a study by Minbaeva, Pedersen, Bj rkman, Fey & Park (2003) the relationship between absorptive capacity and human resource management (HRM) were investigated. The research showed that HRM-related factors such as education, training, compensations and appraisal was positive correlated with absorptive capacity (Minbaeva et al., 2014).

2.2.3 Change Management

Moran & Brightman (2001, p.111) defines change management as *“the process of continually renewing an organization's direction, structure, and capabilities to serve the ever-changing need of external and internal customers”*. Burnes (2004) further describes change as an constant feature of the organization in terms of an strategic and operational level. Although change in terms of corporate transformation can be described as either “revolutionary, dramatic change” or “evolutionary incremental change” the most common definition in association with company specific production systems (XPS) is change as “continuous improvement”, which corresponds to the “evolutionary” change (De Wit & Meyer, 2005). This change entails organizations and their employees to frequently observe, sense and respond to both the external and internal environment in incremental steps as part of an continuing procedure (Luecke, 2003). According to Ag ocs (1997) the literature has shown a common trend of change programs being met with resistance. These resistances to change can further be described in four sequential stages; the denial of the need for change, refusal to accept responsibility for dealing with the change issue, refusal to implement change

that has been agreed to and repression by taking action to dismantle change that has been initiated (Agócs, 1997).

One factor may have significant impact on the resistance of change, namely an organization's prior change history. If the plant has previously experienced unsuccessful attempts to change or have lost faith in change agents there may be a negative attitude towards change, hence negatively influencing future efforts to change (Walker, Armenakis & Bernerth, 2007).

Furthermore, a well-discussed factor in the literature of successful change implementation has been the support from top and middle management (Kaye & Anderson, 1999; Bateman, 2005; Kotter, 2007; Walker et al., 2007). It is significant to show that the management is serious about the change and that it is not just another “attempt of the month” for establishing change (Walker et al., 2007). Kotter (2007) further advocates the need for establishing a group with a shared commitment and authority to lead the change attempt, operating as a team outside the ordinary hierarchy.

According to Upton (1996) the successful implementation and sustainment of change initiatives can be connected to the management's ability to set clear targets and a common understating of direction. Even more imperative is the ability to communicate the targets and directions to all levels in the organization. Walker et al., (2007) further argues that the employees affected by the changes should clearly be able to see the personal benefits of the change, such as the ability to perform their job better, increase in pay, the increase of long-term job security etc. It is also important to plan and create short-term wins. As a real transformation takes time it is important for the employees to meet short-term goals and celebrate in order to no lose faith of a renewal effort (Kotter, 2007). Schaffer and Thomson (1992) claims that successful change programs begin with results. The authors further criticize the activity-center change programs, i.e. those where employees are sent off for training with the assumptions that it is “the right thing to do” even though managers do not explain how those activities will lead to any specific results. Therefor Schaffer and Thomson (1992) reason that companies should only initiate those innovations in management methods and processes that can assist in achieving a specific goal, hence showing a result. These should then be connected to short terms goals in order for results to show quickly, which will enhance the motivation.

Womack et al., (1990) and Brown and Cregan (2008) further argue that employee involvement has a positive and substantial effect on resistance to change. By sharing responsibility for the decision making and not viewing managers as the only decision maker the employees are able to utilize their workplace experience to influence the decision making (Brown & Cregan, 2008). As the XPS can comprise a great change to the organization, small incremental changes should be a part of the employee's daily activities in order to foster continuous improvement. As presented above, factors in relation to change management are understood to serve as a great influencer to the implementation of XPS in a subsidiary (Schaffer & Thomson, 1992; Luecke, 2003).

2.2.4 Leadership

Leadership on all levels is a critical factor for successful implementation of lean or XPS (Kotter & Cohen, 2002; Sörqvist, 2004; Liker, 2009; Sörqvist, 2013). According to Koenigsaecker (2007) and Dombrowski & Mielke (2013) there is nothing that can replace the direct involvement of leaders as they serve as role models for a culture of continuous improvement where they aspire to motivate the employees. In order to be a role model it is important that the leader shows engaged leadership, spend time on the floor so as to enhance the understanding of problems (commonly known as Gemba Management), find root causes and standardize. Additional factors are; driving the initiatives, building a platform for a learning organization by learning as well as sharing knowledge, forming a collective understanding of improvement work as well as being able to explaining why it is important, motivating people and providing incentives, requesting ideas and increasing engagement (McKinsey, 2007; Ramström & Stridh, 2008; Dombrowski & Mielke, 2013). Sörqvist (2013) further points out the significance of top management commitment and involvement as a critical success factors as the top management behavior impact leaders on all levels. This means that managers ought to stay focused on process improvement activities, have visible management, have open communication channels and continue strategic planning, providing training and education as well as empowering employees (Bateman, 2001; Alukal, 2006; Fryer, Antony & Douglas, 2007).

2.2.5 Corporate Socialization

The bigger share of employees sharing a long-term vision, the greater are the odds for a successful knowledge sharing process (Björkman, 2004). This logic is coherent with the aim of corporate socialization, which is describe as the creation a united organizational culture

and a shared vision by shared values, beliefs and objectives across all units of a MNC (Nohria & Ghoshal, 1994; Hedlund & Kogut, 1993).

As earlier mentioned, relationship between headquarter and subsidiary plays as a significant role in the process of change management and knowledge sharing. The level of knowledge may differ between the sites in the subsidiary network, but through inter-unit subsidiary communication the knowledge gap may decrease through collaboration and combining of different resources (Ghoshal and Bartlett, 1990; Birkinshaw and Hood, 1998). But transferring knowledge across MNCs is challenging and aspects such as lack of involvement, misalignment in subsidiary goals/aims, engagement, time, internal competitiveness and resources is considered as barriers for successful corporate socialization (Szulanski, 1996).

It is there essential for an MNCs to ensure long term sustainable business by identifying corporate socialization mechanism to increase internal knowledge flows (Foss and Pedersen, 2002). Corporate socialization mechanism is described as organizational mechanisms that facilitates creation and development of personal ties in a MNC, which drives internal communication and increase knowledge sharing. This statement is further strengthened by Szulanski (1996), who relates weak knowledge sharing with lack of existing internal relationships between individuals in and amongst the subsidiaries. The efficiency of corporate socialisation mechanisms is dependent on the factors “ease of communication” and the strength of the subsidiary relationship. This means that in order to facilitate internal knowledge sharing within MNCs mechanisms such as inter-unit relationships, networks and close interactions is necessary Szulanski (1996).

2.2.6 Summary and introduction to theoretical model

The theoretical framework has been based on the topics knowledge sharing, absorptive capacity, change management, leadership and corporate socialization. The subjects are by our assessment, based on the literature review of international business, the most important factors influencing dispersed subsidiaries VPS-implementation.

The literature review was initially focused on the theory of knowledge sharing. The area focuses on theories regarding the role of knowledge in MNEs and touch upon the subject of knowledge management. The process and ability of spreading information internally within the corporation is a great challenge and requirement for building dynamic capabilities,

creating effective learning processes and best practices (Szulanski, 1996). Knowledge sharing were therefore chosen as one of the chapter's topics. Through the literature review, it was evident that an organization's absorptive capacity is one of the most important factors of knowledge transfer (Gupta & Govindarajan, 2000). Absorptive capacity is the organizational ability for a corporation to identify and distinguish the value of new information, embrace it, and thereafter integrate it within the corporate structure (Cohen & Levinthal, 1990). An ability which, by our assumption, is crucial for dispersed subsidiaries VPS-implementation.

The literature of absorptive capacity stress the importance of interpersonal linkages and networks in MNCs for successful knowledge sharing. This is the reason for the inclusion of the topic corporate socialization, which is described as the creation of a united organizational culture and a shared vision by sharing values, beliefs and objectives across all units of a MNC (Nohria & Ghoshal, 1994; Hedlund & Kogut, 1993).

Furthermore, for MNCs to implement strategic improvement systems is a drastic organizational change. The systems demand structural changes, dedicated leadership, motivated personnel, and modifications of corporate policies (The Economist, 2012). The changes are not implemented over a night, instead it has to be incrementally implemented by continuous improvements (De Wit & Meyer, 2005). With this being said, the whole plant has to be open for change in order to successfully implement a strategic improvement system. This is where change management becomes highly relevant and is therefore a focus in the theoretical framework of this study. As stated leadership is considered is a critical factor for successful implementation of lean or XPS (Kotter, 2002; Sörqvist, 2004; Liker, 2009; Sörqvist, 2013). The topic is further a requirement for successfully accomplish organizational changes within an MNEs (Sörqvist, 2004), which motivated the subject to be included in the theoretical framework.

Based on this reasoning the following model (see figure 2) has been assembled by the authors to summarize the theory and provide a holistic view of potential factors influencing the XPS implementation and integration. As stated in the introduction to this chapter the model is based on the five main topics presented above. The model will serve as a foundation to be used and revisited further in the analysis to test the empirical findings against the proposed model.

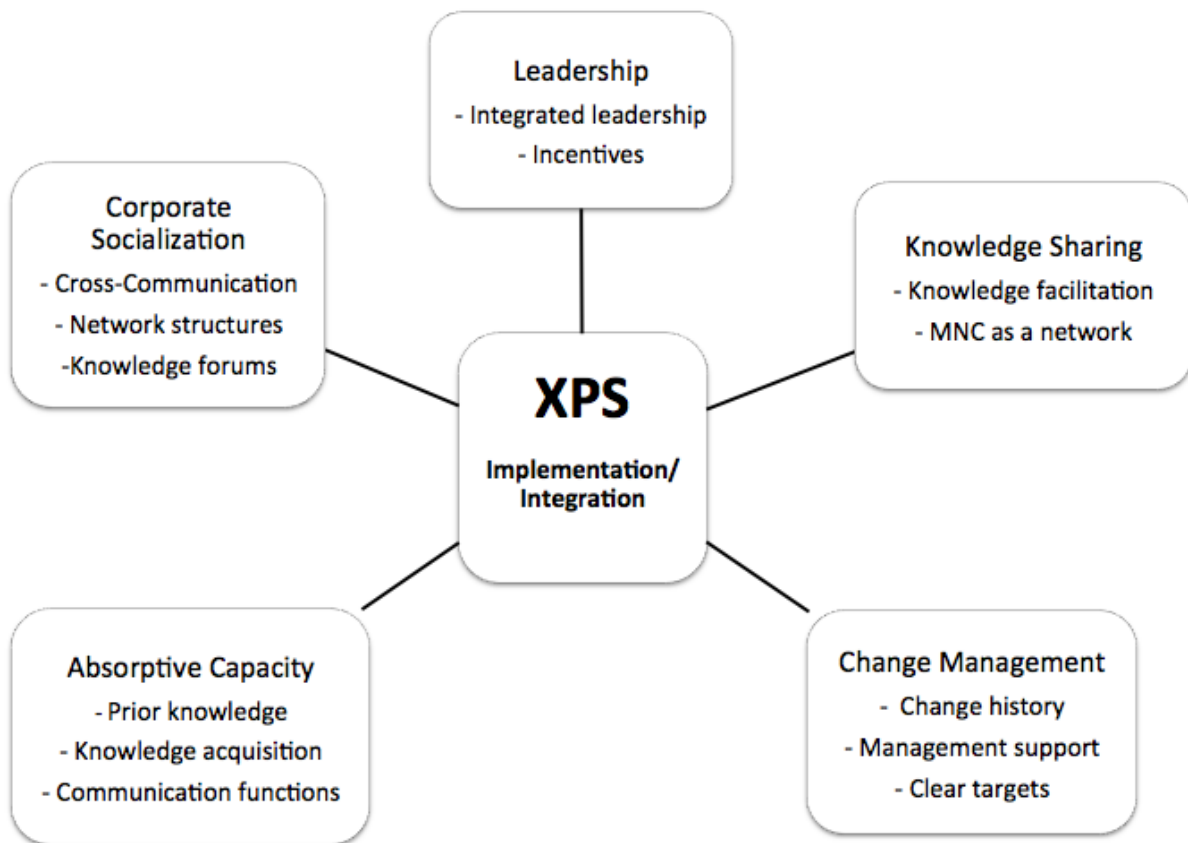


Figure 2. Key identified organizational factors affecting XPS implementation and integration. Compiled by authors.

3. Methodology

The following chapter presents the overall process and methods that were used to gather the necessary information in order to fulfill the purpose of the study. Additionally, this section gives an explanation for how different methods and approaches were chosen, providing a deeper understanding for the reader.

3.1 Summarized research methodology

The following table is a summary of the research approach and how this study has been conducted.

Research Methodology	
Study Objectives:	The identification of influential factors of an XPS implementation and integration as well as the identification of key success factors and barriers of implementing and integrating an XPS.
Unit of Analysis:	Volvo Group Powertrain Production.
Study Design:	Case study analysis of a single organization of XPS implementation: including 4 remanufacturing sites within Volvo Group Powertrain Remanufacturing for case study comparison, as well as a Benchmark of 2 Powertrain sites within Volvo Group Powertrain Production.
Cases Studied:	Flen Remanufacturing, Limoges Remanufacturing, Charlotte Remanufacturing, Middletown Remanufacturing, Köping Manufacturing, Skövde Manufacturing.
Data Sources:	Direct observations, interviews with key employees. Review of reports, audits, documentation, participant observation.
Interview Sources:	Corporate management, VPS experts, Plant Manager, Focus Area Owners, Area and Line Managers and Operators.

Table 1. Research Methodology. Compiled by authors.

3.2 Research Approach

It is of great importance that the research approach is suitable with the purpose and characteristics of the study (Bryman & Bell, 2015), therefore the following text will account for the systematic investigation and collection of information concerning the research topic. In order to answer the main research question of this research a study towards four Volvo Remanufacturing sites, including interviews from all organisational levels, were conducted. Therefore, a qualitative research approach seemed best suited, as it emphasizes the interpretation of individual's social worlds (ibid), and from that perspective gives a rich description of relationships, operative definitions, abstract conceptions and embedded assumptions (London & Hart, 2004). A qualitative study also gives the opportunity to create a holistic view of the subjects, which valuable when mapping the VPS-work at the different sites.

The research is further based on a single case study methodology. The methodology is suitable due to the study's aim to cover the topic of how an existing phenomenon relates to the business setting of a MNE, which are affected by its members, corporate culture and structures (Ghauri, 2004; Yin, 2014). This means that the case study will offer deeper understanding of the business context in the subsidiaries (Yin, 2014), where the implementation of VPS actually takes place. The research method to perform a qualitative case study based on interviews with representatives experienced in VPS, must therefore be considered suitable for answering the research questions.

There are several ways of performing a single case study, but the analysis of this study will be focused on a single organization. To include only one organization involves potential biases, since the case might represent unusual or extreme scenarios (Bryman & Bell, 2015). The use of a single case study is though motivated by Yin (2013), which states that a single case structure is of relevance when the case is termed as characteristic or being seen as representative for similar organisations within the subjects (ibid). Volvo Group Powertrain is included in a larger context of a MNE (Volvo Group) and can therefore be seen as a supplementary part of the larger context within the MNE. Volvo Group has implemented VPS across all subsidiaries worldwide, the investigated subsidiaries in this study can therefore be characterized as typical organizations facing the challenge of VPS-implementation. Case studies are also stated to be favourable when doing cross-cultural and

international studies, which is a necessity due to the research area of the study (Fletcher & Plakoyiannaki, 2011).

3.2.1 Abductive approach

This study originates from an idea to investigate the implementation of strategic improvement systems and the challenges to integrate them at internationally dispersed subsidiaries. In order to identify a narrower research question, a literature review was conducted, which is found in the frame of reference of the thesis. Firstly, the review resulted in an overview of the development of strategic improvement programs commonly adopted within the automotive industry. From this review the main research question “*What are the influential factors on the implementation and integration of a company-specific production system (XPS) in geographically spread subsidiaries?*” was formulated. Secondly, the characteristics of the research question urged for the including of organisational factors, from an international business approach, to be taken into consideration. This review forms the second chapter of the frame of reference. Based on the theoretical data gathered, questions about the relations to the empirics started to derive. Just as Yin (2014) described, the chapter functioned as a theoretical blueprint, which guided the empirical data-gathering and later directed the analysis. This type of research approach is inspired from a deductive process, where the research has the starting point in existing theories, which are consequently applied and tried out in the reality (Bryman & Bell 2015).

The theoretical framework did not only direct the gathering of empirical findings, the framework was also used for critical reflection during the semi-structured interviews and observations. This kind of process suggests that the research approach, rather than being limited deductive, also is inspired by an iterative process. This means that during and after the research data collections, the researchers went back and forth to revise the theory, reviewing sections of the theoretical framework to ensure that all important parts of the framework were covered by the semi-structured interview guide, and at the same time, confirm that the most relevant topics were covered by the theoretical framework. Hence, the approach of continuously reconstruct and adjust the theory is inspired from an inductive reasoning, since the theory is re-constructed based on the findings. Subsequently, the overall research approach of this study, is tangent with the fact that qualitative cases tends to vary concerning their approach to theory generation and testing, therefore this study has to a large extent the character of a abductive approach. The abductive inspiration means that the

research combines induction and deduction. (Bryman & Bell, 2015) To summarize, this study has continuously revisited the theory, reformulated the questions based on new findings, which furthermore result in a revisited theoretical framework.

3.3 Data Collection Method

The findings in this report derives from a qualitative research including two main methods for obtaining information and data. For the empirical findings both interviews and observations have been conducted in terms of interviewing employees as well as observing and participating in different workshops, meetings etc. Eriksson & Kovalainen (2008) further argues that that combining interviews and observations captures both doings and sayings. According to Björklund and Paulsson (2003) primary sources such as interviews and questionnaires should be understood and categorized as a source of knowledge and information that is connected to the main purpose of the research, hence providing a platform to be further built upon. However, Fisher (2010) argue that the use of various types of data will provide more accurate information. As a result, this study presents a combination of both primary and secondary sources, where the primary sources represents the interviews and observations and the secondary sources involves articles, reports and internal documents from Volvo Group.

3.3.1 Collection method for the frame of reference

The literature review of this study the aims to create an understanding the implementation of strategic improvements systems within dispersed subsidiaries. Therefore, current research has had a vital role in the process of understand and map different factors affecting the implementation. The theory and empirical findings were further related to each other in order to address relationships and eventually identifying missing factors important for future MNC VPS-implementations.

3.3.2 Data collection design for the empirical research

Qualitative research and its data collection method can take many forms such as, documents, interviews, focus groups, surveys, observations etc. (Remenyi et al., 1998). In this thesis the main platform of information derives from observations and qualitative in-depth interviews of employees at the four different subsidiaries within remanufacturing of powertrains, namely; Flen, Middletown, Charlotte & Limoges. At each subsidiary a top-to-bottom approach of the interviews have been utilized in terms of interviewing the employees in the

following order; Plant Manager, VPS/WCM manager, Focus Area Owner , Area Manager and Operators. The interviews have been conducted face-to-face during a 4-5 day period at each plant and further complemented over Skype, email and telephone throughout the whole thesis project. The observations were conducted during the 4-5 day visits at each plant. To support the interviews, notes were taken continuously during the visits and occasionally even recorded in order to avoid loss of information. In addition to the data collection at the subsidiaries several visits at the Volvo Group Headquarters in Gothenburg were conducted throughout the thesis project. These visits consisted of meetings with VPS managers for both Powertrain and Remanufacturing as well as meeting with different managers in regards to the topics of VPS, WCM, powertrain and remanufacturing. The meeting included interviews as well as providing insights into Volvo Groups intranet and insights into VPS and WCM and the way of working with the different tools. Furthermore, one day each has been spent on the powertrain manufacturing sites in Sweden; Köping & Skövde, for benchmarking purposes. These days were arranged to discuss the VPS topic with the VPS manager and the Focus Area Owners, hence excluding the Plant Manager and the Operators.

When conducting qualitative research interviews there are three different approaches, namely; semi structured, unstructured as well as structured interviews (Eriksson & Kovalainen, 2008; Gill, Stewart, Treasure & Chadwick, 2008). The interview method utilized in this thesis is based on the semi-structured interviews, which allowed us to add and change the questions depending on the interviewee's response. In comparison to structured interviews, the interviewees have the possibility to provide more open answers, hence not following a strict interview pattern (Saunders, 2011). Furthermore, this informal method allows the interviewee to feel more comfortable, which enhance the accuracy of the information provided, which also responds better to the reality (Bryman & Bell, 2015) The personalized interviews allowed, just as Recker (2013) argued, a creation of trust and empathy with the interviewees resulting in a more disposed conversation about complex and delicate issues. The free discussion regarding the topic also provided an in-depth understanding of how each subsidiary is working with the VPS/WCM concept, which further assisted in clearly identifying differences between the subsidiaries and their different views of the concepts.

With the attempt of preparing each subsidiary and the involved interviewees of each plant an email was sent out two weeks beforehand to inform each Plant Manager and VPS manager

about the agenda and the purpose of the study. The transmitter of the information about our arrival was adjusted dependent on the receiver. Since it was important that the information always was communicated from the superordinate to subordinate. An initiative to increase the priority of our study and enhance the response rate. The interview guide was not sent out beforehand as this study aims to evaluate the daily work and integration of VPS, hence no preparations or changes due to the visit should be made.

3.4 Selection of participants

A strategic selection was made when determining the suitable participants of the interviews. In order to be able to investigate the integration of VPS a top-to-bottom approach was utilized. This gave us the possibility to go from a holistic view to a more detail perspective. Furthermore, the table presented below illustrated the selection of interviewees and their position in Volvo Group Powertrain.

Position (top-to-down)	Role description (VPS-focused)
VPS manager for powertrain	Globally responsible at concern level.
VPS manager for remanufacturing	Globally Responsible for supporting the VPS manager and Focus Area Owners at each site.
Plant Manager of each site	Main responsible for the implementation and integration of the VPS in specific plant.
VPS manager at the site	Coordinating and support function for the Focus Area Owners at specific plant.
Focus Area Owners	Responsible of one/several of the focus areas presented in figure 3. Assuring that the principles are applied appropriately at the departments.
Department Managers	Responsible for specified unit-department and the incorporation VPS in their tasks.
Area Managers	Responsible for specific function/station of the factory. Also responsible for carrying out VPS to his/her subordinates.
Operators	The people who perform VPS at a practical level.

Table 2. Selection of participants. Compiled by authors.

The agenda and outline stated above was sent out beforehand to each VPS manager of the plant, whom then set up a schedule for the visit involving the employees set forth above. In addition, two Powertrain Manufacturing sites was included in this study with the purpose of benchmarking. The visits in Köping & Skövde included a round tour of the premises and interviews with VPS manager and various Focus Area Owners. The following table below aims to present an overview of the visits of each plant. The “x” represents the number of interviews/presence in activities.

	Flen	Middletown	Charlotte	Limoges	Köping	Skövde	HQ	Total
Plant Manager	1x	1x	1x	1x				4
VPS Managers, coach or experts	1x	2x	1x	1x	1x	2x	1x	9
Focus Area Owner	6x	6x	6x	5x	4x			27
Area Managers	2x	2x	2x	1x				7
Operators	2x	2x	2x					6
Round Tour	1x	1x	1x	1x	1x			
Workshop		1x	1x					
Participation in Meetings		4x						
Total nr of Interviews	12	13	12	8	5	2	1	53

Table 3. Overview of the visits of each plant. Compiled by authors.

The total number of interviews included in this study amounted to 53. The number of interviews was significantly larger than initially planned. But according to Kvale & Brinkmann (2014) the number of interviews conducted in a research should not be limited, but rather be dependent on as many as is needed in order to answer the research question at hands. After the data collection, a quality assessment was made, in which a total of five interviews were excluded from the empirical data. The assessment and exclusion was based on the informations relevance for the study. Furthermore, each of the interviews took between 30-60 minutes depending on the topic and the relevance of the information provided. The interview process followed Trost (1997) logic that the interviews quality is the important factor, rather than the time spent. However, in this particular study we argue that the large number of interviews were valuable in order to investigate the topic of this study as well as making an appropriate comparison between the geographically spread remanufacturing sites. After the interviews, some additional questionnaires were sent out that complemented the research to provide us with the missing information.

3.5 The interview guide

Interview guides were constructed before the start of the data gathering process (Appendix 1). The questions were developed in coherence with the theoretical framework, as an insurance to align and cover each chosen theoretical topic. The interview guide was not accessible to the interviewees beforehand, even though Bryman & Bell (2015) claims that previous access increases the interviewee's awareness and comfortability of the topic. This measure was taken in order to avoid the interviewees to prepare for the interview. The sites are entitled to their VPS implementation and could potentially benefit from retrieving certain information. Every interview started with a short explanation of the study and questions about the interviewees role, responsibilities and experience within VPS. The following questions were divided into segments and covered the topics knowledge sharing, change management, corporate socialization and absorptive capacity. The majority of the questions were formulated by words such as "what" and "how" which is a formulation method to ensure open questions in order to seek more in-depth answers (Bryman & Bell, 2015). Previous to the data gathering the interview guide was tested by conducting a pilot interview. A pilot study is a valuable tool to test the interview guides quality and relevance (Larsson, 2010). The test pilot was performed with one of the VPS managers which generously gave us the possibility to test the interview guide beforehand. The test session was very useful since we

could test the questions on a person considered as an expert within our research area. During the interview we had a chance to estimate a reasonable timeframe and to see if our questions were understandable. Our aim was to book one hour's interview sessions in order to make sure to have enough time to finish our interview guide, the interviews took approximately 35 minutes to complete. As seen in Appendix 1, two interview guides were formulated dependent on the position/role of the interview. The questions needed to be tweaked for each positions dependent on the responsibility areas and daily work.

3.6 Analysis process

When conducting the interviews, notes were taken which was further sorted into categories, providing an overview of the accumulated data. In addition the empirical findings were designed after the theoretical framework structure in order to give a clear overview of the information presented. Thereby following a deductive thematic approach (Bryman & Bell, 2015; Fereday & Muir Cochrane 2006). This approach facilitated the evaluation to identify if the theoretical framework left out important topics or included parts not relevant. By this assessment, the theoretical framework was slightly re-designed to better suit the empirics of the study.

After the first categorization of the accumulated data, the information was sorted into sections found in the empirical data and analysis chapters of the study. The two sections were chosen and designed based on interesting identified topics relevant to the research question. This facilitated the process of including and summarizing the most relevant data into the conclusions. Most of the empirical data and analysis was used for the conclusion of the study, while other parts are found in the introductory chapters.

3.7 Quality assurance

To guarantee that the study has been executed with accuracy and thereby confirm the quality of the empirical findings, Guba and Lincoln (1994) four different quality criteria's have been taken into consideration. By following these criteria's, which has been considered throughout the process of the study, the hope is to increase the trustworthiness of the research. These criteria's are dependability, credibility, transferability, confirmability which are according to Bryman & Bell (2015) relevant when doing a qualitative study.

3.7.1 Dependability

Dependability represents the replicability of a study, hence, to what extent the result of the study is likely to be replicated again at a later stage with the same findings. In this research, is ensured through two measures. First, the research process was explained in detail throughout the project, both concerning the theory construction as well as for the interview process, which works as a guide for the reader. Second, the method of comparing theoretical framework and empirical information is described thoroughly. This gives detailed information about how the analysis was carried out, which increase the possibility that a replicated study would have the same result once again. The large information-documentation from the data gathering such as transcription of interviews, notes, written observation, documents etc. is kept. An action in order to increase the study's authenticity (Yin, 2014). All together, these measures aims to increase the traceability of the study and the possibility that the research can be replicated by other researchers (Guba & Lincoln, 1994).

3.7.2 Credibility

Credibility is linked to internal validity and reflects to what extent the result of a research equivalent to the reality of what is being research, If the findings is considered believable (Guba & Lincoln, 1994). To ensure a high level of credibility it was important for us as researchers, to receive a deep understanding of the research area in general. This was achieved by heavy studying of research material such as books, articles and relevant information material. In addition, one of the researches had conducted an internship for three months at one of the remanufacturing plants, prior to this study. This provided valuable insights into the remanufacturing process in general and enhanced the understanding of how VPS affects the operations. Another strategy used was triangulation. Triangulation was used due to the multiple methods used to authenticate the results of the same objects. By combining multiple observers, methods and empirical materials. The aim is to overcome weaknesses and biases in our study which would occur otherwise. The research findings were compared, confirmed by multiple interviews, secondary sources and internal information. A measure to ensure comparability and identification of potential biases. After each interview a summarization of the interviews was sent to each interviewee in order to ensure validation of the material, identification of misunderstandings etc. (Guba & Lincoln, 1994). Bryman & Bell, 2015). The research was also sent to all involved participators for quality assurance after the study was compiled.

Language barriers may have influenced the study to some extent, which can be seen as a weakness of the study. About 90% of the interviews were held in the interviewees' mother tongue. However, it has to be mentioned that six of the interviews were conducted with people who had English as a second language, whereby some had difficulties with expressing themselves adequately. This bias was hopefully reduced/eliminated due to the qualitative interview approach and the interviewees' chance to take part of the empirical data before publication of the thesis.

3.7.3 Transferability

Another measure concerning research quality is transferability, described as the generalizability of the result. Transferability gives an indication of the findings relevance in other social contexts (Yin, 2017). This study aims to increase its transferability through its detailed explanation of its research method. Generalizability can arise from the fact that the research analysis is supported by a deep knowledge of the field of research, as well as a previous broad understanding of the context (Collis and Hussey, 2013). Through comprehensive knowledge of the different case study units through provided lectures, material etc. provided by the supporting organization, a contextualization was created which can be argued increased the transferability essentially.

3.7.4 Confirmability

Confirmability works as a measure of a study's level of subjectivity. Researcher objectivity is stated as impossible to reach, but there are several methods to strive towards it. In order to decrease potential biases related to confirmability by the use of triangulation and validation of the data gathering process. The triangulation is aimed to decrease the risk associated with results based on low number of interviewees, as well as. Secondly the validation of the research process gives an holistic view of the project which decrease the objectivity.

It is though relevant to mention that one of the researcher's relationship and knowledge with one of the case study unit might worked as a bias for the research (Yin, 2014; Bryman & Bell, 2015).

3.8 Ethical Statement

During the interviews of the thesis, careful consideration was taken towards ethical aspects. The interviewees were not provided with the interview guide before the interviews, as earlier described, which is normally a good method to make sure that the interviewee feel informed

and comfortable according to Bryman & Bell (2015). The information was instead provided during the interviews, when all participants got a detailed explanation about the study. The majority of the interviews were recorded, but only with the permission of the interviewees, they were further informed about the transcription process and our intention with the provided information. Before the process of publishing, all interviewee has been anonymized, in order to respect business confidentiality and personal integrity.

4. Empirical Findings

The following chapter aims to present an overview of the Volvo Production System (VPS) and how it has been inspired from the Toyota Production System (TPS) and World-Class-Manufacturing (WCM). Furthermore, an overview of each Remanufacturing site will be presented. In addition, the data gathered from the interviews have resulted in three main topics that have been identified to have a major impact on the implementation and integration of VPS in the investigated subsidiaries. These factors have been divided into the following topics: VPS in different levels, organizational VPS activities, and external support functions. This chapter also includes an overview of Köping and Skövde. Köping and Skövde were chosen for benchmarking purposes as they are considered prominent within VPS and are seen as guiding stars for the implementation.

4.1 The Volvo Production System (VPS)

Volvo group operates under the Volvo Production System "VPS", which covers the core principles of their way of working (Volvo Group, 2012). The VPS was launched in the Powertrain sites in 2007 but wasn't introduced to the remanufacturing sites until the recent years. The VPS aims to produce principles, tools and guidelines for how all subsidiaries within the multinational production network should work in order to achieve operational excellence on a global scale (Netland & Sanchez, 2014; Volvo Group, 2010). The purpose is to add value for the customer, increase quality, continuous improvement and eliminating inefficiencies. The VPS consists of three different dimensions, namely; Vision, Principles, Tools & Techniques, whom aims to demonstrate the beliefs and the representation of the epitome state and the main objective of the organization.

Furthermore, continuous improvement is the key force that pushes VPS forward whereby standardization also serves as a force for additional development as well as assists in protecting and maintaining such improvements, hence also being a vital cornerstone of the VPS. Furthermore, VPS is inspired from the lean principles, WCM and the TPS. The aim of the VPS implementation is to guide the company to operational excellence, which will be achieved through incorporating WCM into VPS. The pillars in figure 3 has been incorporated into VPS.

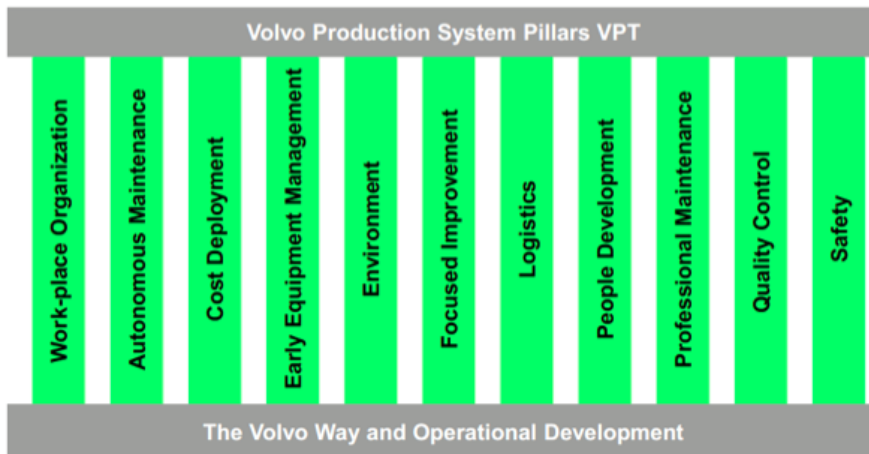


Figure 3. Volvo production focus areas (Galland, 2018).

Each focus area in the Volvo Production system is presented below with its associated description:

Focus Area	Description
Workplace organization	This is a method used to secure enhanced quality and productivity in labour intensive areas, by eliminating non-ergonomic working conditions, as well as NVA (Non-Value-Added) activities.
Autonomous maintenance	A method whereby the expertise of shop floor staff is effectively utilized to achieve zero equipment failure, caused by a lack of basic conditions in a machine-intensive area.
Cost deployment	This practice is used to identify problems and losses from a cost perspective and to support the prioritization of improvements.
Early equipment management	This method for launching new equipment and products into production, smoothly and effectively, is intended to prevent the occurrence of deviations in new machines.
Environment	Make a respectable existence for the community from the viewpoint of environment.
Focused improvements	A method for eliminating losses and waste of all kinds, in a prioritized manner, starting with the highest planned benefit and cost ratio.
Logistics	This focus area is dedicated to improving customer satisfaction, from the perspective of quality and delivery.
People Development	Educate, train and nurture people to materialize WCM since the success of achieving WCM depends on the people

Professional maintenance	This means achieving zero breakdowns, using the expertise provided by maintenance professionals.
Quality control	The aim of this focus area is to achieve zero defects from a TQC (Total Quality Control) perspective.
Safety	The clear objective of this process is to reach zero accidents and potential risks.

Table 4. Focus area description. Compiled by authors.

Furthermore, it is essential that the VPS starts with the people. The VPS managers need to make sure that the employees; Perform his/her job, improve his/her job, develop him/herself as well as develop the team. In order to carry out the VPS principles it is mainly three factors for successful implementation and integration; (Galland, 2018).

- **Prioritize** - *Improve our performance through the reduction of losses and wastes.*
- **Involve all for excellence** - *The power of VPS come from the involvement of all employees in solving problems.*
- **Develop the competence** - *To produce good products we need to have skilled people focused on continuous improvements (Galland, 2018).*

Volvo Group utilizes a step by step approach when it comes to the implementation of the principles, which is further illustrated in figure 4.

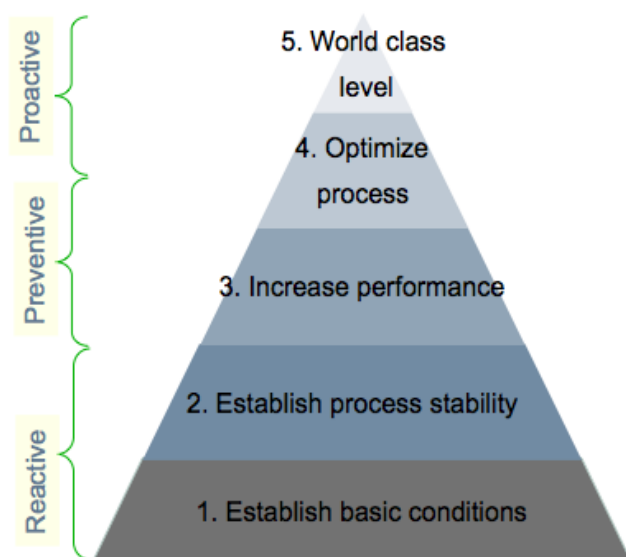


Figure 4. VPS-steps (Galland, 2018).

The first step revolves around making sure existing operations are in good shape. The second step is to make sure that existing operations deliver in a stable manner. When good basic conditions and stable processes are achieved one can move on to step 3, which is to increase performance. The first three steps are necessary to fulfill before any true optimization can take place, i.e. step 4. At step 5 the 0 defects and 100 % performance can be achieved, which is the ultimate goal (Galland, 2018).

4.2 Volvo Group Remanufacturing

The Volvo Group Truck Operations (GTO) has 6 remanufacturing centers worldwide managing used components from their whole range of brands. The first Volvo Group remanufacturing center opened in Flen, Sweden in 1960. Since then other remanufacturing sites has been established in France, Japan, Brazil, China and India (Volvo Group, 2016).

The remanufacturing system is based on an exchange system where the customers receive and install a factory-remanufactured component and return the replaced component to the dealer. Remanufactured components such as engines, gearboxes, exhaust filters and rear axle transmissions can be repaired to the same condition as new parts. The exchange allows customers to benefit from the same quality and a full warranty at a lower price (ibis).

This study has focused on four of the six Powertrain remanufacturing sites, namely: Flen (Sweden), Limoges (France), Charlotte (US) and Middletown (US). Common for all sites is the continuous work with lean methodologies to use less material and fewer processes to integrate more recycled materials, reduce waste and energy, recover heat and assess their water footprint (ibis).

4.3 Volvo Group Powertrain

Volvo Group Truck Operation Powertrain Production is one of the world's leading manufacturer of engines and components for Volvo customers worldwide (Volvo Group, 2018). The operations include the development, manufacture, assembly and testing of heavy engines, gearboxes and drive axles (Näringsliv, 2011).

GTO has 5 powertrain production sites worldwide, located in Sweden, Brazil, France, Japan and the US, where they produce heavy truck engines used in Volvo Penta, Volvo Buses,

Volvo Construction Equipment etc. Common for all sites is that they have come a lot further in their VPS journey, which can be explained by their early initiatives of the application of lean principles, as well as the VPS concept being introduced to them significantly earlier than remanufacturing. Throughout their journey it becomes evident that they have utilized the network and created synergies between the units to further apply the concept of VPS (Volvo Group, 2015).

This study has included a benchmark on two out of five Powertrain production sites, namely: Köping (Sweden) and Skövde (Sweden) that were chosen due to their extensive work with VPS, where they aim to continuously improve.

4.4 Volvo Headquarters internal assessment of VPS in Volvo Group Powertrain

4.4.1 Remanufacturing; Flen, Middletown, Charlotte & Limoges

In the fall of 2017 an internal audit was carried out in all of the remanufacturing sites, where they were assessed on their performance in VPS. Each of the remanufacturing subsidiaries scored differently in these audits which indicates different levels of success on their work with lean principles and management. Limoges scored the highest, followed by Middletown and then Charlotte. Flen represented the lowest score amongst all remanufacturing sites. However, in comparison with the powertrain sites all remanufacturing sites scored relatively low in the audits, hence indicating the importance of identifying key success factors and barriers for their implementation and integration of VPS.

Moreover, when considering figure 4 (Galland, 2018) all investigated remanufacturing sites have struggled somewhat with step 3; increasing performance, which are said to be achieved before any true optimization of the processes can take place. The VPS aims to guide the way to reach the top level of the triangle, the world class performance, whereby this study aims to provide the key success factors for achieving this.

4.4.2 Powertrain; Köping & Skövde

An overall assessment of both Köping & Skövde is that both of them scores quite high in the VPS audits, which has further allowed them to be perceived as guiding stars for the remanufacturing sites. Although they are pure manufacturing sites and thereby faced by

different challenges, it is still believed that they can assist in the VPS journey for the remanufacturing sites, which is why they will be used as benchmark in this study that will be presented further down.

The concept of VPS was implemented as a global effort in the powertrain sites in 2007, which means that they have been working with the principle for a longer period of time. This explains why they have come further in their VPS implementation and integration and why they are seen as lead stars. Revisiting the triangle “Figure 4: VPS-steps”, both Köping and Skövde can be places in step 4 and 5, where they are continuously working with optimizing their processes and striving towards achieving world-class-level in all units, departments and processes.

4.5 VPS implementation and integration in Remanufacturing

This chapter has been divided into four different topics. Firstly, an overview of each site will be provided, followed by the three main topics stated in the introduction of the empirical findings. These topics originate from the data gathered from the interviews, but also due to the literature evidence of potential factors influencing such implementation. Consequently, these topics are described as: VPS in different levels, organizational VPS activities, as well as external support functions.

4.5.1 Overview and path for implementing VPS

The structure presented in table 5 aims to give an overview of how the different focus areas are distributed among employees. As seen in the table, some plants have additional supporting functions in terms of coaches and in one case the Plant Manager is acting as the VPS manager. In addition, the plants also differ in size and have initiated their VPS journey at different times, which is presented below.

Roles	Flen	Middletown	Charlotte	Limoges
Nr of Focus Area Owners	6	6	6	6
VPS Responsible	1 VPS Manager	1 VPS Manager	Plant Manager	1 VPS Manager

Coaching Functions	-	1 VPS Coach	-	4 VPS Coaches
--------------------	---	-------------	---	---------------

Table 5. VPS structure. Compiled by authors.

4.5.1.1 Overview and path for implementing VPS in Flen

The Volvo plant located in Flen is one of the remanufacturers in the remanufacturing group. Today there are approximately 220 people employed at the plant in Flen, working in one shift. According to the VPS manager the VPS journey started in 2013 although not being implemented to bigger extent until 2016. The Plant Manager further describes the VPS journey to have picked up increasingly the last couple of months as the overall organization in Flen has started to embrace the concept more and realized that “VPS is here to stay”. Furthermore, the VPS structure is presented in table 5.

4.5.1.2 Overview and path for implementing VPS in Middletown

The Volvo plant in Middletown is one of the remanufacturers of powertrains and Mac Engines. There are approximately 180 people employed at the plant in Middletown today. The production is working in 2 shifts. According to the VPS manager and VPS coach they started the real journey towards VPS 1.5 – 2 years ago. Before that they had made some efforts in working with common tools and methods within the system. However, when VPS was introduced to the management team there was a sense of nervousness and anxiety according to several interviewees. There was a lot of confusion around VPS, and still are to some extent, but most of the management team has been open-minded, which has facilitated the introduction. According to the VPS coach the VPS journey also depends on the individuals own skills for pushing it forward and seeking out knowledge of the unknown. As an initiative to create an organization open for change and modernization, the management team has been rearranged to further support changes such as VPS.

4.5.1.3 Overview and path for implementing VPS in Charlotte

The Volvo plant in Charlotte is one of the remanufacturers of powertrains and transmission. Today there are approximately 80 people employed at the plant in Charlotte, working in one shift. The charlotte plant started with their own lean implementation in 2012, although the VPS was not introduced on a bigger scale until the middle of 2017. Due to this recent VPS implementation, Charlotte is still quite new to many of the focus areas as they are used to doing it the “Charlotte way”. Furthermore, several Focus Area Owner interviewees 1,2 and 3 expressed their concerns of the VPS attempts, and one interviewee further stated that:

“I don’t know if VPS is here to stay, it used to be something else a couple of years ago, WCM or something” - Focus Area Owner 1, Charlotte

However, due to the historical path of Charlotte they have embraced VPS as a lean programme and is in the current state trying to transform the structure and know-hows to suit the VPS framework/structure. Furthermore, the Plant Manager stated that;

“It should be clear we have accepted the challenge and will develop ourselves as necessary to become familiar with the requirements”

In comparison to other sites Charlotte is a lot smaller, which plays a significant role in the structure of the VPS set up (see “Table 5. VPS structure”), i.e. the Plant Manager is the VPS manager.

4.5.1.4 Overview and path for implementing VPS in Limoges

The Volvo plant in Limoges is one of the remanufacturers of powertrains, Volvo and Nissan engines. There are approximately 230 people employed at the plant in Limoges today. The production is working in two shifts. According to the VPS manager, Limoges started their VPS-journey in 2017. They describe the initial implementation as easy, since they had much of the systems and philosophy already in place. Since the introduction of VPS in 2014 the development and integration was very limited. But approximately two years ago the VPS-prioritization increased in the organization.

“This was the first time VPS really became a prioritization. I think that the Plant Manager really understood the value of VPS during the workshop 2 years ago and he was much more keen after that to communicate it to the rest of us.” -Focus Area Owner 1, Limoges

Volvo Limoges has a newly created structure of their VPS-organization since a year ago. This is one of the initiatives derived from the newly assigned strategy to increase the VPS integration pace, compared to ever before. Today, Limoges has six employed Focus Area Owners, several of these managers have long experience from VPS and earlier employment from the VPS-prominent site Venissieux. There is additional one Area Manager assigned to the VPS-organisation. Accordingly, four VPS-coaches have been employed to support the Focus Area Owners.

4.5.2 VPS in the different levels

Each plant is carrying out VPS in the organization differently. The long-term plan is to integrate VPS at all organizational levels. Even though the plants are striving towards the same goal, it was evident that they have conducted their VPS-journey with different strategies and approaches.

4.5.2.1 VPS with top management

During the recent years VPS has seemed to grow incrementally as a prioritization for top management at all plants. Subordinates from both Limoges, Flen and Middletown describes an increased managerial expression of ownership and dedication towards the implementation and integration of VPS. Additionally, all Plant Managers agree about the necessity of VPS and the need of a united top management, striving towards the integration of the system. However, it seems commonplace that representatives from the top management levels to hold different levels of knowledge within the subject. Generally, at the plants, managerial-interviewees express an insecurity regarding the role distribution and responsibilities of VPS. At all sites a certain amount of resistance of change were expressed and a general frustration that VPS is seen as a side track and not as integrated in daily activities. The resistance of change and of VPS were especially evident in Flen and Charlotte, declared from all interviewee levels.

At present Limoges and to some extent Charlotte works with a push approach to VPS. Flen and Middletown has implemented a major focus of creating a “pull” culture instead of a “push”. The aim is to create a “pull” from the production units to the management team regarding VPS-activities. Limoges and Middletown are the plants where the top management has historically made biggest effort in initially implement a push approach towards VPS. The Focus Area Owners at these sites points to the plant management’s “push focus” as a great strength. They further believe that the push approach has led to an implemented “pull approach” based on the foundation of a well-informed plant, which independently takes ownership to drive the VPS integration further.

The Plant Manager 1, Middletown, described the VPS approach as:

“At first it took an open-mind push approach but now the team is adapting more of a pull approach.”

Seemingly on all sites, great support from the Plant Manager in terms of financial resources and training were seen as a key factor for VPS-implementation. In Middletown the management team's investments in a proper introduction to VPS had a significant positive effect on the individual's perception and feeling towards VPS.

4.5.2.2 VPS with VPS Manager

Flen and Middletown have had an assigned VPS Manager for some years whereas Limoges recently assigned the position. The situation is different in Charlotte, since the site has not appointed a similar role. In Middletown the VPS Manager are 100% dedicated towards VPS, whereby in Flen and Limoges the role accounts for 50%. The VPS Manager in Flen has an extensive background in Volvo through positions such as Operator, production manager, improvement and quality coordinator as well as safety technician within VPS. The VPS Manager in Middletown has vast experience of TPS and lean manufacturing including FPS (Fiat Production System). Middletown has employed a VPS coach who has previously worked for the Curitiba plant and have therefore followed the VPS journey from the beginning, since implemented in the Brazilian plant. In Limoges the VPS Manager have managerial experience within the focus area Quality from the VPS-prominent site Venissieux.

The VPS Manager, Flen describes his role as *"in charge of implementing VPS by providing support and guidance to the Focus Area Owners, participates in projects related to VPS as well as communicate the overall progress of VPS to the Plant Manager."*

This definition seems to be the general introspection of the role, which is affirmed by the other managers. The VPS Manager's statements is line with role-description expressed by representative Focus Area Owners on all sites. They describe the role of the VPS Manager as responsible for bringing the management team together and act as a strong motivational person for VPS towards Operators (Focus Area Owner 1 & 2, Limoges; Focus Area Owner 1 & 2, Flen; Focus Area Owner 2 & 6, Middletown).

Area Manager 1, Middletown further expressed that:

"The VPS manager and coach has really helped to drive the projects and made it clear to the Operators that VPS is critical to their jobs, without that I wouldn't have been able to drive the projects myself"

which further shows the importance of the VPS Manager.

The VPS Managers are also encouraged to transfer knowledge from the Remanufacturing network to the subsidiary. In this context, the VPS Manager in Flen utilizes his network to a larger extent compared to other subsidiaries. The VPS Manager, Flen, states that the purpose of visiting each respective site is to gather information and then transfer know-hows back to Flen. In order for VPS to be integrated throughout the organization, several interviewees states that there is a must of a VPS manager.

4.5.2.3 VPS with First Line/Area Managers

According to the Plant Managers, Flen & Limoges and Focus Area Owners, Flen, Limoges & Middletown, one of biggest challenges is to involve and engage the First Line Managers in the VPS-journey. The VPS Manager, Flen tells that the First Line Managers have historically had an undivided focus on the production and their daily routines.

The problem of involving the First Line Managers in the VPS-journey is twofold. The first part of the challenge is to create an understanding and incorporated focus regarding VPS within these manager's mind-sets. According to other interviewees, Area Manager 2, Middletown and Focus Area Owner 3, Flen, VPS is currently seen as an extra activity, rather than part of the daily work. It is further problematic to implement VPS as these managers are continuously challenged towards time constraints and production goals. The Area Manager 2, Charlotte further describes:

“It can be compared to firefighting where you have to respond to the current issue. That's always the priority. We have to address the issue that is stopping the production and solve it as quickly as possible in order to run production again. Thereafter we can start working towards VPS.”

The trade-off between meeting productions targets and implementing VPS is common for all subsidiaries, hence both time constraints and people allocation is seen as a major issues. The challenge is, secondly, explained by the manager's previous level of experience within VPS related work as well as the individual willingness to change (Focus Area Owner 4, Middletown). Some of the managers with limited VPS-experience/education expressed an insecurity on how to carry out certain VPS-project, while others relied on their previous knowledge and performed projects independently. Another uncertainty factor mentioned was

“what to demand” regarding VPS from the position as an Area/First Line Manager. The managers which possess higher experience and knowledge within VPS found it easier to put requirements and demands on both superiors and subordinates. An ability that, according Focus Area Owner 1 & 2, Flen increases the perceived commitment and credibility as a manager. Area Manager 1, Flen also highlighted commitment as a significant factor:

“It is important to follow up on projects to show the Operators that you are committed”

This statement is in line with Focus Area Owner 4, Middletown which mention the engagement of an Area Managers and described it as:

“I am extra proud over Area Manager 1, Middletown who really managed to engage all the blue collar workers, and who made a good contribution in motivating the whole team and taking the lead”

Focus Area Owner 4, Middletown further explains that this was an initiative which further spurred interest and energy for further projects. Other sites such as Charlotte and Flen express the limited support from the first Line Manager’s/Area Managers in regards to VPS, hence lacks the commitment described above.

In addition, Area Manager 1, Charlotte stated that:

“We are making a lot of continuous improvement work and working with focused improvement but we should have better disciplines, how to complete them as well as documenting them in a VPS way”

From the interviews, it emerged that Limoges is the site who have integrated VPS the most towards First Line/Area Managers. According to the VPS Manager, Limoges, The First Line Managers are seen as ambassadors of VPS. However, it must be mentioned that the other subsidiaries seemingly try to engage these managers further into the process of VPS. The general aim for the sites is to educate the Area/First Line Managers to an extent where they can individually integrate VPS further to their subordinates.

4.5.2.4 VPS with Operators

Commonly for all sites, the VPS awareness varies between Operators depending on level of engagement in VPS-activities. The general level of knowledge within VPS must though be

considered as limited. For this reason, VPS remains a mystery among many Operators, whereby Operator 1, Middletown whom had not participated in any VPS-activities stated:

“I don’t even know what VPS stands for and I don’t understand the long term effects nor the end results...it seems to be a lot of ideas for improvement started but never finished”

Evident from the empirics on all sites, participation in VPS-activities drastically change the Operator’s mind-set and understanding of VPS. Operator 2, Middletown who had recently participated in a project stated:

“This project was my first real introduction to VPS which gave me a deeper understanding about the topic in general”

The positive impact of involvement in VPS-activities are confirmed from the top management of Limoges, Flen and Middletown.

In comparison to other sites Flen is the most outstanding one when it comes to Operators knowledge in regards to VPS. This is mainly a consequence of the weekly Kaizen, but also the wider spread of knowledge and the Operator’s prior history. Many of the Operators has worked for different plants within Volvo Group before and has therefore been introduced to the concept earlier. However, they also realize the need for further VPS work:

“VPS is a long-term commitment where we have to be better in incorporating it in the organization and engaging more employees, we were doing much more VPS work in the other plant I worked for” - Operator 1, Flen

Limoges have implemented similar engaging-initiatives by educating 70-80 percent concerning the basics of VPS. There have also been initiatives when the plant sent a group of 15 Operators to Venissieux. An initiative relative unique in its context. The main goal is to build involvement. The management team is also very keen that Operators are introduced to VPS step-by step.

“In the beginning you must start with easy VPS projects. If Operators start with complex ones, then it will be tricky. It’s important to create a habit, and then do more things so they are not afraid of the tools. So the methodology is to encourage people towards VPS.”- VPS Manager, Flen

“VPS is a long-term commitment where we have to be better in incorporating it in the organization and engaging more employees, we were doing much more VPS work in the other plant I worked for” - Operator 1, Flen

5.5.3 Organizational VPS Activities

The organizational VPS activities, in terms of the internal communication on how to share the knowledge and understanding of VPS in the organization, mainly revolves around kaizens, meetings and internal support and training. The sites has different perceptions and practices toward these inter-unit activities, which is described further below.

4.5.3.1 Kaizens (Quick Kaizens)

As described in the theoretical framework the Kaizens aim to foster the work of continuous improvement where the aim is for the Operators to identify improvement areas and present this by filling in a form. This form ought to include the current state, the improvement suggestions and the benefits of making the improvement. All the investigated subsidiaries have adapted the Kaizen work where the top management sets different goals depending on the site. For instance, Flen has a goal of seven Kaizens per employee/ year, whereby Middletown represents six per employee/year and Limoges has set their target to five. Charlotte is the plant that stands out, with no set goals of Kaizens. However, they are continuously working with filling in these forms, but not to the extent as the other investigated subsidiaries. In addition, another factor that differentiate the plants is that Flen has a “Kaizen stop” on a weekly occurrence, whereby 30 minutes are dedicated exclusively to involve everyone in the plant to work with improvements. This has allowed for all Operators being aware of the concept of Kaizen and hence has contributed to a greater understanding of VPS in general according to the VPS manager in Flen.

In general, the subsidiaries view the Kaizens as a method to increase the motivation and involvement among the employees and hence increase the understanding of VPS and how it can contribute to value-adding activities. In order to further motivate the employees each site has a “kaizen competition” where they monthly select “the best Kaizen of the month”. The process usually takes place as a ceremony where the winning Kaizen gets to present his or her Kaizen and then get rewarded by receiving a prize in the form of either movie tickets, money, certificates etc. depending on the plant. Middletown is the only plant where the award is not handed out to a single individual but instead to the department of the winning kaizen that

aims to represent pride and being the price itself. Furthermore, in Charlotte they used to have a price of 100\$ for the best kaizen of the month, but somehow the initiative had no effect on the number of Kaizens handed in.

“We almost had money left over in the end of the year” – Interviewee Focus Area Owner 3, Charlotte

A common factor that became evident throughout the interviews at all the plants were that Operators whom had participated in project and workshops had a more positive attitude towards Kaizen and VPS in general. For instance, Operator 1 in Middletown, who had not participated in a project states that:

“A lot of people waste a lot of time doing Kaizens... It seems to be a lot of ideas started but never finished”

In addition the same Operator expressed concerns of the Kaizens in general, in terms of being time-consuming and her not being aware of how it affect the end result.

However, Operator 2, also in Middletown, who had participated in a workshop showed a positive attitude towards the kaizen, stating that:

“By participating in the workshop I understood VPS and the need for Kaizens more”

4.5.3.2 Meetings

The meetings can further be divided into two main categories; the communication of VPS in general and how VPS is communicated between top management. Meetings regarding VPS and how they communicate VPS in general are quite similar on each site, where the common denominator is the monthly “town hall” meetings, aiming to communicate the business factors regarding the plant in general. The town hall meetings have also been used as a communication channel in order to present the basics about VPS, especially targeted towards Operators.

The differentiating aspect between the plants is how VPS is communicated between the top management. For instance, in Flen the VPS manager describes that the whole management group has a weekly meeting dedicated to follow-up on the Kaizens on every department. The meeting aims to discuss the number of Kaizens each department have received, how many

have been improved and implemented. In addition, they have weekly meetings where they include the debriefing of every focus area. By participating in the several meetings in Middletown, it became evident that the Middletown plant instead try to incorporate VPS in the daily meetings, with the aim to incorporate it into the daily activities, i.e. not being a side task. In Limoges they are in the process of implementing a new schedule of set meetings, including a daily meeting amongst the management team and a monthly VPS-review between the VPS Manager and the Focus Area Managers. The agenda will be focused on follow up, current situations and targets concerning VPS. Unique to Flen is that the VPS manager also has set meetings with each focus area every other week, with the purpose of coaching, motivating and requesting more VPS activities from the different organisational levels and units.

In contrast to Flen, Middletown has adapted a different approach where the full time VPS manager have meetings continuously with the Plant Manager, whom then is responsible for the communication of VPS to the Focus Area Owners. Charlotte is still in a transition stage and has therefore no set meetings dedicated to VPS. Commonly for all subsidiaries, is however that VPS is as a growing topic.

4.5.3.3 Internal Support & Training

The management team on each site indicated that the hierarchical structure of support should be a top-down approach where the Plant Manager and VPS manager supports the Focus Area Owners with sufficient support and training. They, in turn, become responsible for educating and supporting his or her team whom then should be able to provide their subordinates with sufficient support to further integrate VPS within the organization. Furthermore, the VPS manager in Flen stated that:

“We have a training approach on the logic of "train the trainer", where the aim is to ensure the managers ability to train his subordinates”

There are also plants where the VPS manager is directly involved in project, such as in Middletown especially, but also in Flen and Limoges. Since the Charlotte plant is missing the VPS manager it is, according to Focus Area Owners 1,2, 4 and 5 in Charlotte, mainly up to themselves to seek out the information they need about VPS. Common for Volvo Group Powertrain is that everyone have access to a “learning material” that is provided upon introduction to all Focus Area Owners and VPS managers. This material aims to guide the

organization in the VPS journey, consisting of information regarding each focus area and the associated tools, methods and techniques for that specific area. Common for all sites is that several interviewees have expressed their concern regarding the learning material in terms of being overwhelming and difficult to comprehend. Important to mention is that the learning material is in English, which makes it further challenging for both the Swedish plant in Flen and the French plant in Limoges. Therefore, the VPS manager in Limoges have initiated a project where he has handpicked the information that he believes is relevant for Limoges and further translated it to French.

Furthermore, the plants represent various approaches towards internal support and training, whereby a common denominator is the projects and workshops serving as a tool to involve and motivate employees at an operational level. Some plants have had more projects than others but there is an increasing awareness among all sites about the benefits of utilizing such an approach to adapt a learning-by-doing mind-set, which is the “VPS-way”. Area Manager 1 in Flen, further elaborated on this:

“First you should participate and observe someone who knows the process. Second step you should do it together with someone who knows. And third you should do it yourself while having the person who knows observing you. The way of truly learning is by doing it yourself – Learning by doing”

Therefore, the four plants are increasingly investing in these projects and workshops to be carried out. Recently there has been an Autonomous Maintenance (AM) project carried out in Middletown where participants from both Charlotte and Skövde were present. The personnel from Skövde aimed to educate, train and supervise the workshop for learning purposes and knowledge sharing of the Charlotte and Middletown personnel. This project involved stakeholders from different levels in the organization and served to provide know-how - experience when further expanding AM to the rest of the plant. The workshop took place over one week time in Middletown and was then continued in Charlotte, where all participants partook again, hence undertaking a learning-by-doing approach. In order to share the knowledge and results with the rest of the plant, presentations are being held by both the Line Manager, Focus Area Owner and the Operators in order to spread awareness and VPS knowledge. In addition, Flen has also undertaken two projects where the focus have been around the focus areas Autonomous maintenance focus area (AM) and professional maintenance focus area (PM), where they, according to the VPS manager in Flen, witnessed

an increased learning and understanding among the employees who participated in the projects. Furthermore, when carrying out projects all sites try to involve Operators that complement each other. They keep track of the training by utilizing a competence mapping, which is a tool included in the People Development (PD) focus area, which usually falls under the HR department. Unique to Charlotte is that they are instead utilizing its own excel document to keep track of the training and unlike the other sites, Charlotte does not have any existing HR department, which was noticeable factor when investigating the lack of internal support. In addition, Limoges has a certain training system in order to educate the Operators of the plant. When planning and prioritizing new VPS-activity the focus is not first and foremost to create an efficiency improvement. Instead the most important factor is to choose a VPS-activity with potential to create involvement from the Operators. A philosophy that, according to the VPS manager in Limoges, is based on the belief that if the Operators understands the actual benefits, first thereafter Volvo can create value for the organization as a whole. This is further a method to deal with organizational resistance of change.

Furthermore, the importance of visual management as a tool to spread awareness and communicate VPS is apparent in several interviews at all plants, but especially valued in Middletown and Limoges. For instance, the Plant Manager in Middletown expressed the importance of their work with visual management.

“For us, visual recognition is of great importance, for example, we hand out a goldpin to employees after completing VPS training. This works as a reminder of our VPS-journey and targets long-term goals”.

The visualization usually take form in signs, information and posters, demonstration of workshops and projects etc.

During the interviews in Limoges it was evident that the VPS Manager valued their work with visual management:

“We have paid great attention to visually illustrating our work with VPS in the factory. This is one of the initiatives to create a solid awareness and commitment amongst the people on the “floor” in order to proceed with the implementation of VPS.”

Through the guided tour banners, posters, handbooks and visually marked VPS activities were demonstrated.

In addition to the training provided on site, there are plants that arrange visits to other sites, such as; the employees in Flen visits Skövde or Köping Powertrain, staff from Limoges visit Venissieux and Middletown and Charlotte visit Hagerstown. However, due to the geographical distance Charlotte does not have as many visits to powertrain sites as the other plants. Middletown is also slightly behind the two other remanufacturing sites when it comes to arranging visits. Unique to Flen is also that the VPS manager continuously visits the other sites within remanufacturing to take on a benchmark approach to further identify success factors for implementing VPS in Flen.

Furthermore, there seems to be a general consensus, according to several interviewees, that all plants need to be better in providing the sufficient training required to carrying out the VPS work. It is evident that the VPS knowledge differs between both individuals as well as the different levels in the organizations, whereby a lot of the VPS knowledge is dependent on the individual's prior exposure to XPS and Lean. Throughout the interviews it became clear that interviewees who had either participated in more projects, or who had worked in companies that had applied similar programs, or have had a more extensive introduction to VPS, had a more positive attitude towards VPS and a solid knowledge base for further rolling out VPS in the organization.

4.5.4 External Support Functions

The external communication builds on various approaches to share the knowledge and understanding of VPS in the organization, i.e. through the utilization of the sites network and the external support from the headquarter. During the interviews it became evident that the network in this context mainly refers to the plants access to bigger plants within powertrain and other production units, which contributes to knowledge sharing and absorption.

4.5.4.1 Network

The interviews in all four subsidiaries suggest that the external communication is considerably dependent on the individuals own network and connection with other sites within both the remanufacturing network and the powertrain network. For instance, in Flen several managers, such as the VPS manager, Area Manager 1 etc., have worked in either Skövde or Köping Powertrain production before and hence already have an extensive network regarding these sites. Similarly, some of the current managers has been employed from Vénissieux by the plant in Limoges. The relationship is described by the Focus Area

Owner 5, Limoges as *"a group feeling of two French sites together in a global organization"*, which gives an indication of the cultural connectiveness. Limoges therefor has extensive communication with Venissieux, where they aim to share knowledge through both; different communication channels as well as site visits. These types of visits differ depending on the purpose and projects itself, varying from including Operators to only a managerial level. Regardless, both Flen and Limoges explain their visits to those specific sites to the close geographical and cultural distance, as well as their VPS expertise as the main drivers for their interest in the plant. Although Hagerstown powertrain being located in the US and hence relatively close to both Middletown and Charlotte they do not receive enough support from the plant. The interviewees in both Middletown and Charlotte explains that this partly has to do with that they Hagerstown is much further ahead than Middletown and Charlotte in their VPS journey as well as, according to Focus Area Owners 3, Middletown, there is a sense of competitiveness from the powertrain site, where this person believes that the Swedish culture is more supportive of knowledge sharing. This can further be exemplified by the fact that Skövde was the Powertrain plant coming to the US for educating and training in the AM workshop in both Middletown and Charlotte. However, Charlotte and Middletown try to utilize their relationship and engage both parties whenever projects are carried out. However, several informants in Charlotte; Focus Area Owner 2 and 4 and Area Manager 1 and 2 points at Charlotte's geographical location being the furthest away from a powertrain sites to be problematic in terms of hindering such visits to occur on a more frequent basis. In addition, Charlotte sometimes do not know what kind of support they need as stated by interviewee Area Manager 1, Charlotte.

"there is a willingness to help but it's an area for improvement. Middletown has offered. All or everyone offer, but the best way to put it is that sometimes you don't realize what you need... Everyone has a willingness to help each other out but the execution is difficult sometimes."

Furthermore, as stated earlier they do not have a remanufacturing network in regards to VPS, which puts a constraint on knowledge sharing between the remanufacturing sites. All investigated plants emphasize the need for such network in order to identify challenges together and common up with solutions together, as a team within the remanufacturing group. Flen is unique in this matter, where the VPS manager travels to various sites within the remanufacturing group to get inspiration, obtain knowledge and identify key success factors

that could potentially be brought back to Flen. There are also visits that he has conducted that has aimed to share expertise with the other plants.

As stated in the beginning of this section the external communication is highly dependent on the individuals own network within Volvo Group and hence being tied to the individual's previous experience to some extent. However, the individuals own network can also depend on their VPS introduction, for an example one interviewee got the opportunity to visit other sites within reman and powertrain as part of his introduction, which further allowed him to build on his knowledge and network with the other sites.

4.5.4.2 External Support

The external support function mainly revolves around the support from the global VPS coaches in Gothenburg as well as the individuals and plants own network connection as stated above. When Focus Area Owners are firstly introduced to VPS they get support from the global VPS coach within the remanufacturing group as well as the local VPS manager/coach. The first introduction consists of a detailed overview of the learning material as well various theories of each focus area ranging from 500 – 1000 pages as stated previously. In addition, multiple PowerPoint presentations can be accessed on teampace.volvo.com. Furthermore, the material is then accessible on the Volvo Intranet where the individual is supposed to gather information when needed. Several interviewees at all plants have however expressed concerns in regards to the overwhelming material. The challenges regard the extensive material of being too much and too difficult to comprehend. Although advocating a learning-by-doing approach it can be difficult to know where to start. In Middletown several interviewees also emphasize the use of difficult terminology and acronyms that creates a confusion and mystery around VPS in general. Both Flen and Middletown also express the difficulty to comprehend and obtaining a holistic view of VPS and how the focus areas together contribute to a world-class-level (the ultimate goal of VPS). In contrast to the other sites, the interviewees in the plant in Limoges doesn't express the learning material to be problematic due to the fact that the local VPS manager has translated it into French as well as hand-picked what he believes is applicable to their specific context. Another factor that became evident in the interviews were the different introduction to different Focus Area Owners, whereby some had only been introduced to the learning material whereby others had the opportunity to partake in projects and visits to other sites. For instance, in Middletown Area Manager 1 stated that his real learning took place when he

was introduced further to VPS in a workshop where the global VPS coach assisted in showing him various tools and methods, which further facilitated the knowledge application. This was further supported by Focus Area Owner 5 in Middletown, who stated that:

“skype calls are not as effective. You need hands on information face-to-face”

To conclude, different focus areas have different approaches and support. However the external support mainly occurs on a demand basis where the global VPS manager support and guide the VPS manager and the local Focus Area Owners. The external support from the Headquarter in Gothenburg involves coaching in terms of both web-based, through Skype email etc. as well as on site face-to-face meetings. However, Due to Flen’s geographical location and the easy access from Gothenburg it allows the global VPS coaches to visits more frequently in comparison to the sites in Middletown, Charlotte and Limoges. In contrast to the other sites, interviewees in Charlotte stress their own lack of knowledge in regards to VPS due to the absence of a local VPS manager, which makes it difficult for them to know what to ask the global VPS manager for. In addition, several interviewees in both Middletown and Charlotte emphasize the need for real training and face-to-face meetings, which they believe would facilitate their knowledge absorption. Another important factor to mention is that the global VPS coach is French, which several interviewees in Limoges emphasize to be of great importance as they have limited knowledge in the English language, which otherwise would have created a barrier for knowledge sharing and absorption.

Several interviewees at each respective site point out the need of a global network for the remanufacturing sites, with the aim to share VPS knowledge between sites. The purpose would be to reach a unified approach in the VPS journey of the respective sites by identifying key success factors as well as barriers for the implementations.

4.6 Benchmark of VPS implementation and integration in Powertrain

4.6.1 Köping

The VPS journey in Köping has been an ongoing process with a strong focus on small incremental steps. One of the main focuses has been to strongly follow the set VPS-methodic. The VPS implementation started with a push approach where the information flows organizationally from top-to-down. This approach has been radically changed in recent time, when Köping has implemented a pull approach where the emphasis is to utilize the Operator’s knowledge to drive VPS further.

“ We believe that the real essence of VPS lies in the knowledge of production technicians and Operators. These people know their own workstations the best and have deepest knowledge of improvement needs. Therefore, the focus should be on providing them with the tools and knowledge to drive our VPS-journey forward”.- Focus Area Owner 1

As a consequence, the Focus Area Owner 2 & 3, the VPS Manager and the VPS-coach, states that the biggest prioritization is to invest in training towards the Operators. From the conversation regarding Operator-education, two initiatives were noted in particular.

Firstly, similar to other powertrain and remanufacturing sites, several interviewees in Köping agreed that the study material is too heavy and overwhelming. There are a lot of theories that the employees wish a better summarized and pedagogical learning material. Therefore Köping has put effort into adjust and redesign the original learning material. It was found that, for example, the VPS-coach had made summarizing documents with large emphasis on change management. The original material was adjusted to better suit the end-user of the material.

Furthermore, one of the most important aspects of Operators-involvement is the presence of the Area Managers. In Köping each responsible Area Manager should be personally involved in the process and projects of VPS. The aim is to pay attention to the workers and raise the awareness concerning the Operators work by listening, motivating and participating in their daily routines. When interacting with the Operators the level of communication must be at a complexity level understandable for the Operator, to meet the person “where they are” (Focus Area Owner 1).

“ We need to leave our offices and go out to the factory and not rely on just communicating directives. This requires extensive communication. We need to get the workers to believe in their ideas through intense coaching and motivation. But most importantly, communicate with the Operators at an understandable complexity level. Hence, "meet the people where they are".-Focus Area Owner 2

The need for improved training and communication were further elaborated on by interviewee K. AM/PM, which states that successful integration is dependent on better communication between all organizational levels, competence development, logical discussion and being able to provide a holistic view of VPS and how its different focus areas are connected to each other and help contribute to the overall performance of the plant.

4.6.2 Skövde

The Volvo plant in Skövde manufactures trucks, buses, marines as well as industrial engines and components. The factory currently has around 3000 employees. The production is working in five shifts, including weekends. VPS was introduced in 2007 in a similar way to the VPS introduction in the remanufacturing sites. There was a so called “Tsunami” roll out, consisting of five days of training, with additional access to an extensive learning material towards VPS. The training session was aimed at all the company's department and involved all employees of all managerial positions. The VPS introduction was overall confusing and had further created a sense of anxiety and an overwhelming feeling in the plant according to VPS-coach 1 & 2. There was a strong Push approach, whereby VPS-coach 2 emphasize the importance of a balance:

“There is a balance between pull and push. For a lasting development, one must come to understand WHY you do things. It is not about doing it, but understanding the WHY we do it”

- VPS-coach 1

The interviewee's further stressed the importance of shifting the focus from the Objective perspective, i.e. technical aspects of VPS, the tools, methods etc. and instead start by understanding the Subjective perspective, i.e. the culture, engagement, communication, values etc. Until this shift you won't really fully understand VPS, hence one won't be able to roll it out in the appropriate way.

Every organization is working differently with VPS and Skövde have managed to do so by incorporating VPS to their own culture, their own values and their way of working. Although VPS being a global system, it is still about working with local adaption, where VPS aims to guide the way to allow every subsidiary to work as efficient as possible. Therefore, it is crucial to utilize an approach of meeting every individual and sub-unit where they currently are in the VPS integration, which further facilitates a pull, rather than a push approach. In order to do so the interviewees VPS-coach 1 & 2 highlighted the need to work through leadership, teamwork and carrying out the improvement work at all levels of the organization. There are no shortcuts for the VPS implementation and it should be red thread threw all levels where both the VPS manager, the supervisor, Line Managers and the Operators are in place when conducting workshops, projects etc. The need for this is that all competence should be present when carrying out the projects and it is essential that all

questions can be answered in order for the Operators and other employees to lose trust in the VPS, whether there are questions directed to the Line Managers or the VPS managers.

“Previously, when we have carried out projects where the supervisors and Line Managers were not present, it failed, as we as the VPS coaches were not able to answer some of the questions... The VPS coach + the leadership of that department is crucial for a successful implementation of VPS” - VPS-coach 1

Furthermore, the VPS needs to be communicated to the employees in terms of breaking down the goals and explain how the employees can contribute to the efficiency of the company by utilizing the VPS. VPS coach 1 further described it as:

“The aim is to build an organization, where leaders fosters leaders and where trainers train the trainer. “

Lean is foremost about the ability to change and in order to do so, leadership and continuous improvement is of essence. If there is a constant work with VPS and continues improvements, there will be no need to take on a focused improvement approach.

Skövde also take part in a Kaizen competition, where they every month appoint a winner of the best improvement suggestion. Out of the 12 yearly suggestions, one get selected to go and compete against the other powertrain sites. For instance, this year, the competition will take place in Brazil where Skövde will send their 2 Operators whom came up with the best kaizen of the year in Skövde. Last year Skövde had 37 000 improvement suggestions, where the target was set to 17/employee/year.

In comparison to the remanufacturing sites, there is an established network within the Powertrain Production, where there is an external network with the rest of the powertrain sites located worldwide (Curitiba, Skövde, Köping, Hagerstown, Venissieux). This network consists of both skype and face-to-face meetings where there is both a VPS network and a focus area network. In addition, some knowledge sharing takes place between the remanufacturing and powertrain sites in terms of workshops and projects etc., as the most recent one; the AM workshop in Middletown and Charlotte described earlier.

5.7 Summary & Discussion of main empirical findings

The table below presents an overview of each remanufacturing plant with the objective to further illustrate the main differences among the sites. In addition, the summarizing text and discussion will further emphasise the main findings and put the different variables in relation to each other.

	Swedish Subsidiary (Flen)	US Subsidiary (Middletown, PA)	US Subsidiary (Charlotte, NC)	French Subsidiary (Limoges)
Overview and path for implementing VPS				
Nr of employees	220	180	80	230
VPS implementation	2016	2016	2017	2017
VPS Manager/Coach	1 VPS Manager, dedicating 50 % to VPS	1 VPS Manager, dedicating 100 % to VPS 1 supporting VPS coach, dedicating 50% to VPS	- No VPS Manager	1 VPS Manager, dedicating 50 % to VPS 4 VPS coaches with mixed responsibilities
VPS in different levels				
Top Management	Medium level of knowledge	Medium level of knowledge	Limited knowledge	High level of knowledge
VPS Manager	High level of knowledge	High level of knowledge	- No VPS Manager	Medium level of knowledge
Line Managers/Area Managers	Medium level of knowledge	Medium level of knowledge	Limited knowledge	High level of knowledge
Operators	Limited knowledge	Limited knowledge	Limited knowledge	Limited knowledge
Organizational VPS activities				
Kaizen	7 Kaizens/employee/year -Kaizen stop	6 Kaizens/employee/year	- No set target	5 Kaizens/employee/year
Meetings	Several weekly meetings involving top management, Area Managers, VPS Manager and Operators	Occasional meetings, involving management team, VPS manager and VPS coach	- No dedicated VPS meetings	Occasional weekly meetings involving management team and VPS Manager
Internal support & Training	Workshops Kaizen Stop Field trips for Operators	Workshops	Workshops	Workshops Adapted learning material Field trips for Operators
External Support Functions				

Networking with Powertrain sites	Köping Skövde	Hagerstown	Hagerstown – rarely	Venissieux
HQ support	Frequent visits from HQ Frequent Web-based communication	Occasional visits from HQ Frequent Web-based communication	Occasional visits from HQ Limited Web-based communication	Occasional visits from HQ Frequent Web-based communication

Table 6. Overview and summary of main findings. Compiled by authors.

By the illustration provided above it is evident that each plant has adopted a different approach towards the VPS implementation and integration in the plant. What stands out the most it that Flen represent the most VPS initiatives investigated in this thesis. They also represent the greatest external support, in terms of both networking as well as support from the HQ. In contrast, Charlotte represents the fewest VPS initiatives of the investigated subsidiaries, which can be explained by their current transition stage as well as the absence of a VPS manager. Middletown and Limoges represents similarities in several aspects, such as having both a VPS manager and supporting functions such as VPS coaches. They also represent similar external support in terms of both networking and HQ support. An important factor to acknowledge is that Middletown and Limoges scored the highest in the internal audits as was presented earlier in the empirical findings.

Commonly at the plants, many of the interviewees express a resistance to change. The identified resistance to change is stated to be most evident in the beginning of the implementation of VPS and is considered as a strong barrier for further VPS-integration. According to the empirics, one of the most underlying factors for resistance to change is the support and commitment from managerial positions of the subsidiaries. Many of the interviewees stated that they were left by themselves to implement VPS, deprived of the needed support to perform the activities. They therefore experienced a pressure of working with VPS and a confusion what to demand from the system, which decreased the trust and identity of VPS.

The role of the VPS Manager has played a significant part in the implementation of VPS, confirmed by interviews from all organizational levels. Accordingly, a VPS Manager with a prior related knowledge tends to more easily be persuaded concerning the value of VPS, since these are more inclined to put effort in supporting their subordinate. A commitment which, according to Focus Area Owners, is strongly related to the integration and understanding of VPS. Several employees expressed to value personal involvement from

their superordinate, which effects the overall motivation of VPS. The Top Management of the sites seems to recognize these tendencies as well, by stating that the more commitment invested in VPS, the more advanced projects has the potential to be performed.

Another potential difference amongst the subsidiaries discussed in the empirics is the attitude towards external communication and support. The relationship towards Volvo HQ and the subsidiary-network is expressed as dependent on the overall resistance to change as well as the accumulated attitude to VPS. Some plants considered themselves able to implement VPS individually, without the support, while others stated to be dependent on external support.

The sites who expressed a stronger willingness to gather external knowledge demonstrated a greater participation in cross-functional communication. A tendency, which was stated to increase the awareness of the VPS in general. The participation in VPS-activities seems to affect the employees significantly concerning VPS and is considered as an effective way to integrate the system. In contrast, lack of cross-functional communication were described to work as a barrier for VPS-integration, since the work are not aligned nor systemized in the same way and not followed up.

The lack of a standardized VPS-team was a recurrent topic during the interviews. The interviewees expressed a problematization who to contact regarding VPS related matters. The interviewees also demanded forums where the employees can meet and talk about VPS related things and exchange knowledge. Instead the empirics reveals a reliance on the global coaching functions for VPS related matters.

5. Analysis

The following chapter will cross compare the literature review and the empirical findings gathered from the case study of Volvo Group Powertrain. The aim is to relate the new findings of the study towards the research topics presented in the frame of reference. In addition, factors not explained in the literature will be presented. Finally, the theoretical model illustrated in the literature review will be revisited and adjusted to the new findings demonstrated in the empirical findings.

5.1. Absorptive Capacity

5.1.1 Prior associated knowledge within the Volvo Plants

Since VPS is fairly new to Volvo Remanufacturing the prior related knowledge is limited, which is a barrier towards absorptive capacity and knowledge sharing (Cohen & Levinthal, 1990; Minbaeva et al., 2014). The results are confusion regarding the value and purpose to VPS, which is exacerbated by recent changes of different strategic improvement systems during the years. The lack of knowledge contributes to a limited potential absorptive capacity, which will require measures before it can be realized (Zahra & George, 2002).

When summarizing the empirical facts, evidence of the identified feeling of uncertainty is found in all subsidiaries and at all organizational levels. Since VPS were launched in 2007, Volvo has suffered from a low level of previous knowledge, which has inhibited both activities and integration of VPS. However, this trend has improved considerably in the last two years, due to higher prioritization of VPS as a system. Changes that have been noticeable concerning the level of integration and an increased knowledge level internationally.

Zahra and George (2002) states in their study that a more advanced level of knowledge enhances a subsidiaries capability to realize new practices. This was very evident in our empirical data since the production sites always express the needs of previous experiences to acquire new deeper knowledge of VPS. The sites therefore practice a step-by-step approach to VPS, where they gather knowledge incrementally.

The Plant Managers had different level of prior knowledge towards VPS. The empirical findings show a significant correlation between the Plant Managers and the VPS integration at the specific sites. A proactive approach tends to foster positive organizational attitude, commitment and increase the amount of ongoing VPS projects. A negative approach seemed

to decrease the organizational attitude to VPS at all organizational levels. The empirics is in line with Sörqvist (2013) explanation of the significances concerning top management commitment and involvement as critical success factors for further integration of VPS.

The VPS managers were well-acquainted with the theoretical knowledge of VPS but had varying educational background. Some of them have extensive experience within VPS and others are more new. The experiences of working with VPS or XPS varied significantly amongst the VPS Managers. Over the years, the HQ has tried to raise the current level of knowledge and has managed to speed up implementation during the last two years. The meetings between VPS manager and HQ representatives seems to be very crucial in this process. The increased level of knowledge is equivalent to potential absorptive capacity. Knowledge which can be realized and integrated through mechanisms such as HRM- related factors (Minbaeva et al., 2014).

Commonly, the Focus Area Owner had also varying levels of prior knowledge within VPS. A majority of the Focus Area Owners were fairly new to the subject. In this context Limoges showed to be prominent, where several Focus Area Owners had worked previously in plants with more advanced level of VPS. The previous knowledge was a clear advantage in order to make VPS work in practice, which is tangent to the theory of Zahra and George (2002).

Due to the previous knowledge of the system we consider both plant and VPS manager, at the sites, to be able to recognize and spread the value of VPS. The understanding of VPS varied amongst the other managerial positions, where several individuals lacked the prior knowledge needed to integrate VPS further into the organization.

To conclude, our findings present that the prior knowledge seems to be strongly related to realize VPS-practices within the different plants, which supports the theory of Zahra and George (2002). It must therefore exist a certain measure of prior knowledge of VPS in each subsidiary, at every key positions to successfully integrate VPS.

5.1.2 Effort of obtaining new knowledge

As stated in the theory, a corporation's effort to attain knowledge is considered as one of the most important aspects of absorptive capacity (Cohen & Levinthal, 1990) and is therefore crucial in the process of VPS-integration. The commitment of some plants has resulted in initiatives, such as, more advanced VPS projects and more frequent international visits. The

empirical findings show that some Plant Managers, to a larger extent than others, encourage their employees to conduct international visits and participate in cross-communication which gives a clear indication of an effort to obtain new knowledge.

To conclude, all sites states to value and prioritize VPS and strives towards comparable targets. But according to the empirical material, they seem to strive towards them with different approaches. Some of the plants act as the site individually, has the potential to manage the VPS implementation. These plants request less inter-unit support and encouragement of international communication. This tendency is a clear loss of knowledge sharing, since the international visits/communication is one of the main channels of internal knowledge sharing (Daghfous, 2004).

5.1.3 The utilization internal communication functions and structures

The empirical findings give a clear indication that the communication structures are very different in the different subsidiaries. All subsidiaries have, to some extent, ensured cross-functional communication for sharing information both vertically and horizontally within the plants.

So the communication systems are in place to theoretically communicate VPS, but there is room for large improvements. Since the empirical findings refer to a work environment where VPS have a low prioritization and communication activities are neglected. To ensure VPS-communication is the VPS manager's responsibility, since the role includes aligning insights and communication amongst the organizational levels. The communication strategy is built on set meetings and supportive functions in order to create an insightful and committed mind-set towards VPS, but the strategy have not managed to successfully do so. As a consequence, the plants with the least communication activities have a harder time assimilate and exploit knowledge within the plant, a tendency further explained by Daghfous (2004). The operative departments of the plants seem is the units where the communication is poorest. The lack of communication tends to slow down the process of VPS-implementation, which supports the research regarding the correlation between communication and VPS (Minbaeva et al., 2014; Szulanski, 1996; Govindarajan & Gupta, 2000).

The empirical findings reveal a difference between the subsidiaries concerning training. All plants have access to the same documented training-material from an intranet. The perception

and usage of this material is very different. The majority of the users sees the material as good content but very confusing. The plants seem to use the information in two different ways. Some of the plants uses it to a very limited extent, while others views it as a useful asset. The ones really took advantage of the material, seems to adjusted the original information in order to fit the content individually to every stakeholder. A measure which made the original material useful and applicable in the daily work of the company.

Limoges and Middletown are the plants which internally promotes VPS the most, due to its extensive effort of training and support. This statement is supported by the empirical findings were its described that the management team prioritize the development and involvement of the employees, before direct results towards their VPS-journey. This is a strategy striving for long-term success rather than short-term within the implementation of VPS. An approach which urges for learning and commitment, which further enhances the ability of absorptive capacity according to Cohen & Levinthal (1990).

In a global MNE, especially when integrating a new production system, its critical to have what Cohen and Levinthal (1990) refer to as a gatekeeper between different organizational units both domestically and internationally. The global VPS manager works as a gatekeeper towards the different production sites. At subsidiary-level the internal VPS manager applies this role. These manager's responsibilities are to transfer and implement the VPS-vision and translating information into a form understandable to the organization as a whole, which facilitates the process of exploiting knowledge (Minbaeva et al., 2014). The next gatekeeper is the Area/First Line Managers. At this level the transfer of knowledge and communication often fails. It's evident that several production unit neglects VPS due to an insecurity for VPS as well as time/resource constraints. The information flow partially stops, which harms the integration of VPS (Ghoshal, 1987). This is supported by the empirical findings, where several Operators views Area/First Line Managers ability of turning VPS-activities into everyday activities, as one of the biggest challenges for VPS-implementation.

To conclude, the above reasoning shows proof regarding the correlation between cross functional communication and increased implementation of VPS. Furthermore, the empirical findings also reveal that an inefficient communication-chain has direct negative effect on the VPS implementation.

5.2 Change Management

5.2.1 Previous Change History within the Remanufacturing sites

According to Walker et al. (2007) one factor that may influence the resistance to change is the prior change history in the plant. The authors argue that previously experienced unsuccessful attempts to change may influence future attempt to change negatively. The empirical findings further suggest that it has played a significant part on the resistance towards VPS in Charlotte. On the other hand, some previous efforts of Lean implementations have although facilitated the implementation process of VPS to some extent, in regards to being familiar with some of the tools beforehand as well as an enhanced understanding of some of the aspects of VPS. The benefits of previous implementations were evident in Limoges, which described their initial transition towards VPS as fairly easy, due to experiences in previous change to similar practices. Apart from Limoges, the empirical evidence insinuates a stormy implementation process in most of the plants, whereby each site has responded differently but the similar resistance towards the implementation has been present in the initiation of VPS of all investigated sites.

The previous changes to the plants, in terms of the implementation of the WCM concept, generated a challenging foundation for implementing VPS. The arguments of *“I don’t know if VPS is here to stay, it used to be something else a couple of years ago, WCM or something”* and the overall concern of VPS as a change attempt is repeated a numerous times when interviewing employees. However, in some plants the changes have been facilitated by adopting an incremental step-by-step approach, which is supported by Shaffer and Thomson (1992) and Luecke (2003) who argue that small incremental changes should be part of the employee’s daily activities in order to foster continuous improvement. In addition, support from other sites, such as Flen’s connections with plants such as Skövde and Köping, Middletown's connection with Hagerstown as well as Limoges connection with Venissieux. These powertrain sites have served as a positive influence on the remanufacturing network in terms of seeing the benefits hands on as well as creating a feeling of an achievable target. This is also supported by Shaffer and Thomson (1992) who state that companies should initiate processes that can assist in achieving a specific goal that can further be connected to short term goals, hence showing a result.

To conclude, the empirical findings suggest that the plants prior change history have influenced the VPS implementation, in terms of the attitude towards VPS and the level of resistance towards change.

5.2.2 Top management support

The studied literature emphasizes the support from top management as an influencing factor for the implementation of change (Bateman, 2005; Kotter, 2007, Walker et al., 2007). As shown in the empirical findings the plants have had different introduction paths to VPS, different approaches and different prior knowledge of improvement programs, which may have influenced the support from the top management. The empirical findings suggest that support from the VPS manager has served as the greatest influential factor of all plants, except Charlotte as they do not have an assigned VPS manager. The prior literature (Kotter, 2007) advocates the need for establishing a group with a shared commitment and authority to lead the change efforts, operating as a team outside the ordinary hierarchy, which may be somewhat applicable to the structure of the VPS role as stated above. This might also further explain why Charlotte is in an earlier stage in transitioning to the VPS way, in comparison to the other sites. Furthermore, two different approaches can be drawn from the empirical findings in terms of support between Plant Manager, VPS manager and Focus Area Owners.

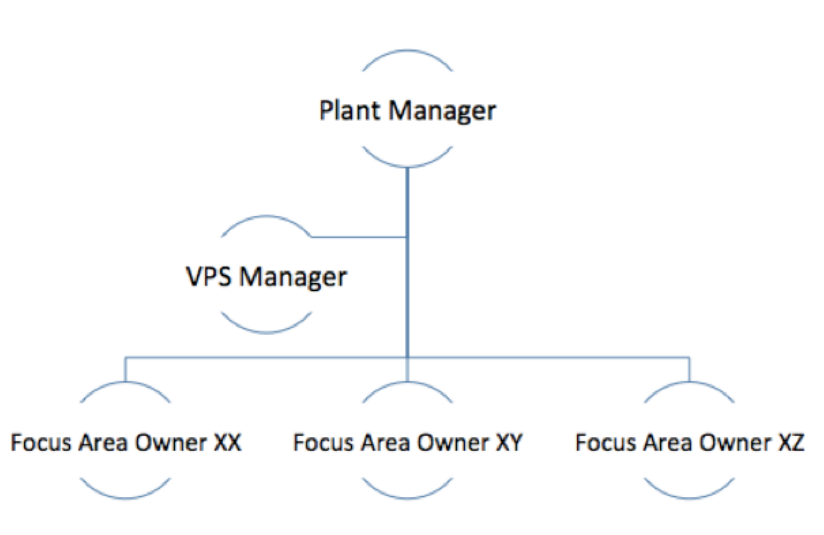


Figure 5. VPS support structure 1. Compiled by authors.

Figure 5 represent a support structure where it is the Plant Manager who supports the VPS manager by enabling an autonomous approach whereby the VPS manager is expected to push the VPS work forward among the Focus Area Owners. This structure is seen in both Flen and Limoges.

However, important to mention; in both scenarios the VPS manager is expected to serve as a support function in terms of providing knowledge and guidance in carrying out VPS in the whole organization.

Middletown has carried out a similar structure to Flen and Limoges. As stated in the empirical evidence in Middletown the Plant Manager have had a “push” approach in the beginning in order for the team to develop a more autonomous approach towards VPS, which have allowed him to develop a more supportive role in terms of implementing improvements in the plant. Furthermore, the dedicated VPS managers serves to support VPS both at the strategic, but mostly the operational level, in terms of a more direct involvement in projects carried out on the shop floor.

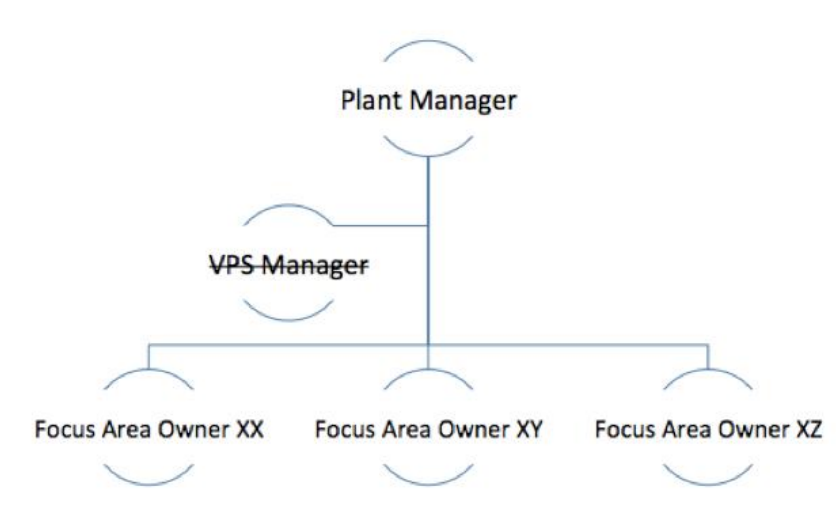


Figure 6. VPS support structure 2. Compiled by authors.

The figure above represents the structure in Charlotte. The absence of a VPS manager breaks the link of two main influential factors of a successful VPS implementation: The supportive function in terms of providing knowledge and guidance as well as the driving factor of carrying out the work. Therefore, it is impossible that the VPS can be carried out through neither push nor pull as they can’t occur without these 2 factors. Therefore, assigning a VPS manager in the early initiation of VPS will create the support needed and have a positive influence on the XPS implementation. In addition, the current structure forces the Plant Manager to undertake a more controlling role in comparison to the other sites, which can be explained that he is obliged to take on the ultimate responsibility to carrying out VPS in the whole organization, hence being involved in almost all focus areas.

Furthermore, the top management support in terms of VPS should derive from “meeting people where they are” in the development phase, as shown by the Benchmark in Skövde.

This expression requires communication amongst Operators and Managers at an understandable complexity level. The challenge of aligning the level of complexity in communication to ensure a mutual understanding is research area not described by current literature. The question concerning level of complexity is further elaborated on by Focus Area Owner 1, Middletown, who further states that each responsible Manager should be personal involved in the process and projects of VPS, instead of just communicating extensive information to the Operators.

To conclude, this indicate that the VPS top management should be involved on a strategic and operational level, which can only be accomplished by the support and a deep understanding of the Operator's skill sets and experience.

5.2.3 Management's ability to set clear targets and a common understanding of direction VPS

Like the title states, the literature suggest that it is crucial for the management to be able to set goals and being able to communicate them throughout the organization (Upton, 1996). Walker et al. (2007) further states that the employees affected by the change should be able to see the personal benefits of the change. During the interviews, all interviewees were asked the question "*What are the strategy and short/long-term-goals concerning VPS?*". Based on the empirical evidence, very few of the interviewees could account for any defined goals. The goals actually mentioned were vaguely defined and difficult to relate to. The success successfully transferred to the majority of the interviewees was the message that "*VPS is here to stay*". Management's ability to set clear goals and a common understanding of direction towards VPS differed among the plants. There was a relation between the level of understanding and visual management. According to many interviewees, involvement in VPS projects as well as visualized VPS initiative increases the understanding of a sites VPS-journey.

Employees ability to see the personal benefits of VPS differed more among individuals than between sites. The empirical findings suggest that this has to do with the employee's previous exposure to VPS and their involvement in VPS-related activities as well as how each department/Line Manager communicate the concept of VPS to his or her Operators.

However, the recent projects of the AM workshop on the all the sites have been communicated to several departments at each sites, with the aim of firstly; communicate the

realized benefits, and secondly; communicate how this will be carried out on other machines, hence creating a short and long term plan for the upcoming projects. This is further supported by Upton (1996) who argues that it is crucial to be able to communicate the targets and directions throughout the organization.

Furthermore, common for all sites was that employees that had participated in the workshops demonstrated an increased understanding of VPS and the purpose for carrying out improvement work. This further contributed to an increased motivation as well as a positive effect on resistance to change, which is supported by the literature (Womack et al., 1990; Brown & Cregan, 2008).

As the XPS can comprise a great change to the organization the literature (Shaffer & Thomson, 1992; Luecke, 2003) suggest that small incremental changes should be a part of the employees daily activities in order to foster continuous improvement. According to the empirical findings, this is foremost carried out in terms of Kaizens. Flen is the only site that dedicates a certain time for this in the form of a “Kaizen Stop”, which is carried out on a weekly basis. Other than the Kaizens, changes are carried out through projects and workshop activities. Furthermore, the literature (Womack et al., 1990; Brown & Cregan, 2008) support this approach as they argue that employee involvement has a positive and substantial effect on resistance to change. In addition, the Volvo Remanufacturing VPS culture fosters a learning-by-doing approach, which aims to promote these incremental changes mentioned by the literature. The empirical evidence suggest that all the sites understand the essence and purpose of starting small and then expanding, which is also confirmed by the findings in Köping and Skövde.

To conclude, the goals associated to VPS are mainly communicated through visual management tied to projects, workshops as well of various figures and pictures symbolizing the ultimate goal of “*going for gold*” i.e. the world class level illustrated in Figure 4 in the empirical findings. In addition, the personal benefits are also brought forward when utilizing visual management in forms such as Kaizens, workshop and various projects. However, the empirical evidence suggested that there is an overall lack of knowledge in regards to short - and - medium term goals, hence contributing to a negative effect on the implementation of VPS.

5.3 Leadership

The empirical findings suggest that leadership has played a significant part in regards to the VPS position in the plants. Ultimately it is this person that drives change in the organization, whether it is by providing the needed support to the Plant Manager, Focus Area Owners or Line Managers/Area Managers. By further elaborating on the findings in Skövde in regards to “train-the-trainer” or “lead-the-leader” the VPS manager serves as a direct implementer for VPS. By including the supervisors and Focus Area Owners in projects and workshops he/she motivates, train and lead the rest of the employees. A common opinion that was brought forward in several interviews was the importance of plant and VPS Managers, commitment, attitude and proactiveness to the implementation of VPS as they are the main drivers for implementing VPS and enhancing the knowledge in the organization as whole. In addition participation in projects further created a virtual circle of learning-by-doing and hence increasing the motivation. The presence of leadership when carrying out these projects, whether it is driven by the VPS manager, Plant Manager, Focus Area Owner or Area/Line Manager is therefore very important in order to motivate the Operators and engage all of the employees. This is further supported by the literature (Kotter & Cohen, 2002; Sörqvist, 2004; Liker, 2009; Sörqvist, 2013) that states that the leadership on all levels is crucial for successful implementation of an XPS. However, the Operators who had not participated in VPS related projects showed some resistance to change, hence they need to be further involved in order to get a buy-in from all employees.

Furthermore, the literature suggest that it is important that the leaders are able to form a collective understanding of improvement work as well as being able to explain why it is important, motivate people and provide incentives (McKinsey, 2007; Ramström & Stridh, 2008; Dombrowski & Mielke, 2013). In terms of creating a collective understanding of improvement work and to be able to explain why it is important all the plants within remanufacturing are still struggling as they are experiencing challenges in time allocation as well as resource allocation. The empirical evidence suggest that there are still a lot of Operators who do not understand the need for Kaizens.

In the literature it is also stated that there is nothing that can replace the direct involvement of leaders as they serve as role models for culture and continuous improvement where they aspire to motivate employees (Koenigsaecker, 2007; Dombrowski & Mielke, 2013) This is

further supported by the findings in Skövde and Köping, in order to enhance the understanding among all employees it is important to have support from both the local VPS manager and the Line Managers. There needs to be a corporation where all leaders should be present in order to answer the Operators questions in order to not lose faith in VPS. This is also confirmed by the literature in term of leadership on all levels being a critical factor for successful implementation of lean or XPS (Kotter & Cohen, 2002; Sörqvist, 2004; Liker, 2009; Sörqvist, 2013). The current status in the remanufacturing sites is that the VPS Managers are generally involved in the majority projects but further need support and buy-in from all leadership, i.e. the area and Line Managers. This indicates that both the VPS manager as well as the area/Line Managers must act as role models in order to cultivate a culture of continuous improvement.

Furthermore the literature (McKinsey, 2007; Ramström & Stridh, 2008; Dombrowski & Mielke, 2013) also state the importance of providing incentives, which every plant has addressed in terms of the Kaizen competition with associated prizes such as movie tickets, statues, money etc. depending on the site. However, Charlotte has abounded the prizes tied to the kaizen competition, which may have negative effect on the motivation for improvement work. Another factor brought up in the literature that is common for all the sites is the work with visual management, which is done by boards on the shop floor containing improvement work and production updates, hence showing a commitment from leaders in the form of Line Managers and Area Managers.

Although VPS being relatively new to all remanufacturing sites and the knowledge being quite limited, there is great indication from all sites of a willingness to learn and change and continue to build on the platform for a learning organization, however more support and commitment is needed in order to request ideas and increase the engagement among all employees. The literature points out the critical success factor of top management behaviour and its effect on leaders on all levels (Sörqvist, 2013), which makes it important to take this top-bottom approach and pushing for VPS before a pull can be accomplished on all levels. The leaders will have to start seeing the VPS as part of the everyday work, and not as an extra activity.

To conclude, the commitment and demonstrated presence of strong leadership is highly related to the implementation of VPS. VPS builds on motivation and all collective leadership

needs to create incentives which further encourage the Operators to engage in improvement activities, and also shows that the organization is committed to an XPS. The aim of the initiatives must be to create a collective understanding of VPS and communicate why it is important.

5.4 Factors influencing VPS related to corporate socialization

5.4.1 The existence of international cross-communication

As described in the theory, organizations inter-unit links and networks are essential for obtaining new knowledge (Tsai, 2001). The empirical findings show that managers of different sites have limited knowledge regarding the other sites VPS-status. The few exceptions are the domestically close sites, which has a significant better relationship towards each other. As earlier mentioned, networks for international knowledge exchange exists, but these are not utilized to a wider extent. This statement is supported by the fact that the manager who, despite regular contact with the equivalents of other sites, could not account for any of the others sites VPS journeys. All VPS managers realize the benefits of international contacts and have a belief that that increased communication will be implemented in short term. Even though inter-unit links exists, the benefits of interpersonal links described by Nohria and Ghoshal (1994) and Hedlund and Kogut (1993) couldn't be proved based on the empirical findings. On the contrary, it was clear that there was a clear link between weak inter-unit links and lack of knowledge sharing.

To conclude, the absence of networks have a negative impact on knowledge sharing and hence complicated the implementation and integration of an XPS.

5.4.2 Existing corporate socialization structures within Volvo Remanufacturing

As earlier described in the theoretical framework, corporate socialization mechanism are factors that enables development of inter-personal links within MNEs, which further increase the knowledge transfer. There are several ways to facilitate socialization mechanisms, such as workshops, training, trips, forums etc. (Björkman, Barner-Rasmussen & Li, 2004).

Limoges and Flen were the plant which had implemented the most corporate socialization mechanism and prioritizes international/national visits in all organizational levels. Generally, for all plants the visits seem to have a direct positive effect on the knowledge sharing. Several participants also highlighted the benefit of creating relationships with relevant personnel in

other plants, an indirect effect, which according to Björkman et al. (2014) has the potential to facilitate knowledge transfer in the future.

According to the empirical findings the inter-unit trips created direct effects on the knowledge sharing process. Since many of the employees stated that visits often bring ideas and information implemented soon after the visit, in the home-site. During the meetings at a certain production site, the site's recent VPS-project is often presented. A VPS project is often very relevant to all sites as they often struggling with similar problems.

Other identified corporate socialization mechanisms were the different managerial forums. The focus on VPS has been a limited topic during the years, but seems to have grown as a prioritisations during recent years. These events facilitate knowledge sharing, but must still be seen as an unexploited knowledge-source due to the low transparency concerning the sites VPS journeys.

To conclude, the corporate socialization mechanisms has a significant impact on knowledge transfer and the interpersonal links within the sites. The level of knowledge sharing specifically concerning VPS is a measure of the topic as a prioritization. It is therefore possible to conclude that corporate socialization mechanisms increases knowledge sharing between geographically dispersed sites, it's just a matter of the prioritisation of the topic itself. It is essential that the mechanisms is targeted to the knowledge in specific which is to be transferred.

5. 5 Factors not identified by the literature

The following section accounts for three factors identified by the empirical evidence, which are not explained by current literature. These factors have proven to influence the implementation and integration of VPS in the investigated subsidiaries. This chapter therefore aims to highlight these factors that the previous research fails to mention.

5.5.1 The global VPS coaches acting as a gatekeeper

The empirical evidence indicates that it is foremost the global VPS coaches that serves as a link of transferring ideas and best practices between the subsidiaries. This is achieved by conducting workshops, through presentations and projects at different plants. The global VPS team consists of a global coach specifically dedicated to remanufacturing, one coach dedicated to Powertrain as well as several global Focus Area Owners whom are responsible

for the VPS implementation of Powertrain. Although several interviewees express their gratitude for these VPS managers in terms of support and knowledge building the empirical findings indicate that there is a great need among the subsidiaries for more VPS knowledge sharing. As a result the global VPS center/ may compose a bottleneck considering the efficiency of VPS related knowledge sharing as the plant ultimately becomes dependent on the access to these VPS managers in terms of both availability and time in order to share knowledge. In addition, the time difference due to the geographical location of the plants serves as an extra constraint in this matter. Furthermore, this may also cause a too strong dependency on these VPS managers, which will hamper the subsidiaries to seek out information from other subsidiaries.

5.5.2 The local VPS managers

The empirical findings suggest that the local VPS manager has been the main driver for further implementing VPS in the whole organization, i.e. on the operational and the strategic level. They achieve this by various approaches, such as VPS meetings with Plant Manager and Focus Area Owners, by conducting and participating in workshops and projects, by encouraging kaizen activities etc. Although the current literature address at the importance of leadership and commitment from top management it fails to mention the importance of a dedicated person responsible for driving the improvement work. The empirical evidence indicates that the absence of a local VPS manager creates a barrier for implementing VPS in regards to limited support, knowledge creation, knowledge sharing and most importantly limited commitment and motivation.

To conclude, a local XPS manager has a positive impact on the implementation and integration of an XPS.

5.5.3 Different introduction to VPS

The introduction to VPS between both; Focus Area Owners at the local site as well as the introduction between sites has varied in terms of support, access to material and participation in workshops, meetings and visits to other sites. The empirical findings suggest that the introduction to VPS has played a significant part in the individuals attitude towards the VPS and hence, served as a direct influential factors on the resistance towards change. Introductions in the form of visits other sites, participation in workshops and projects has contributed to a more positive attitude in general towards VPS.

To conclude, the more extensive introduction to an XPS in terms of direct involvement in XPS activities has a positive impact on the XPS implementation.

5.6 Revised proposing model

The previous sections were brought forward in line with the proposed model in the theoretical framework and was further tested against the empirical findings. Furthermore, the analysis presented a number of factors that explains the differences in the implementation and integration of XPS in the investigated subsidiaries, such as the difference regarding the role and responsibilities of the VPS manager, the different approaches to knowledge absorption and knowledge sharing, commitment, leaderships styles etc. These different approaches further assisted in identifying key success factors for implementing and integrating an XPS in an organization, which created the need to revisit the proposed model in the theoretical framework.

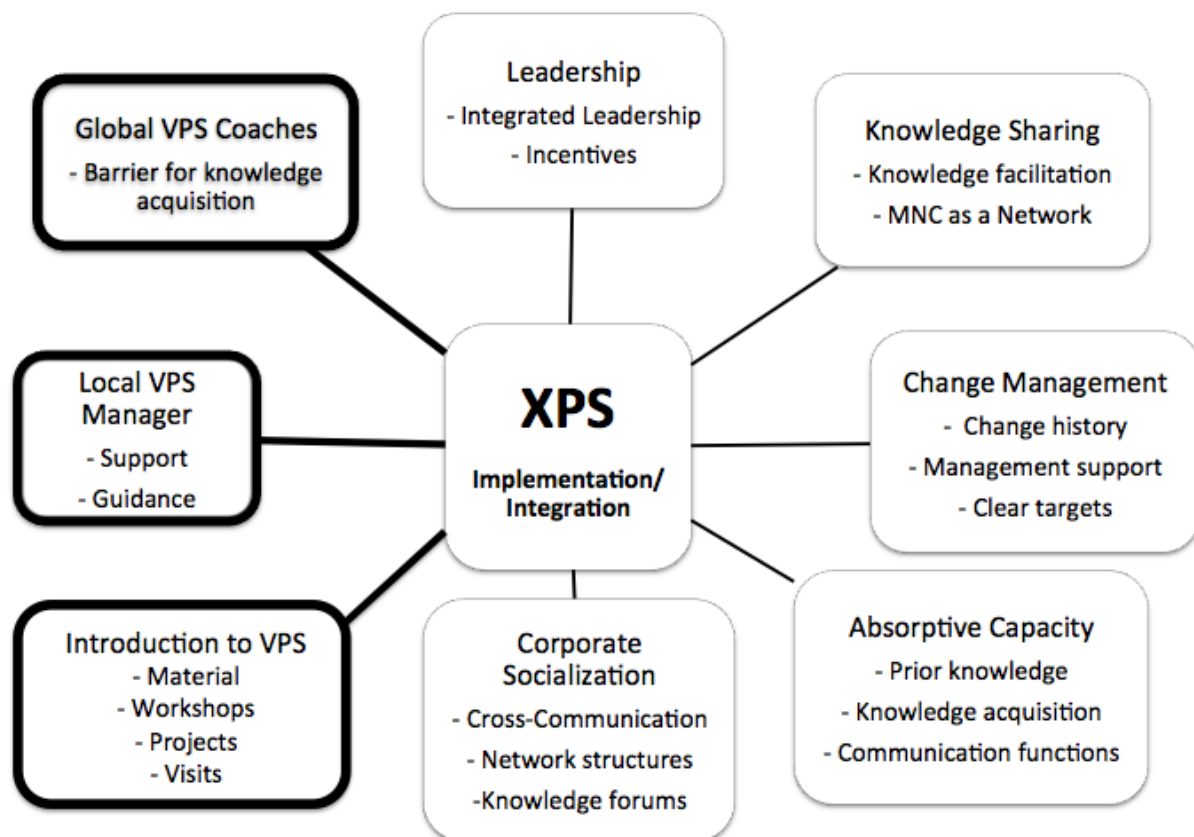


Figure 7. Revised theoretical model. Compiled by authors.

As supported by the literature, absorptive capacity and knowledge sharing in terms of prior knowledge, efforts in knowledge acquisition, use of cross-functional communication has proven to have a positive influence on the implementation and integration of XPS. Furthermore, the lack of a VPS network presented in the empirical findings has served as a negative impact on the VPS implementation, which is further supported by the literature in regards to corporate socialization. However, cross-organizational attempts to share knowledge have been present to some extent, which has demonstrated positive effects on the VPS implementation. The theoretical review of change management indicated that resistant to change would be affected by the prior change history of a plant, top management support, and the management's ability to set clear targets and creating a common understanding of direction. This was also supported by the empirical findings whereby the management support served to be a crucial aspect in the VPS implementation. Furthermore, the empirical evidence and the theoretical literature were consistent in the need for a strong leadership on all levels in the organization when implementing an XPS. Additional factors that were not included in the original proposed model, but was discovered in the empirical findings as influencing factors were: the role of the global VPS coaches, the important role of the local VPS manager as well as the introduction to VPS. Being too dependent on the global VPS coaches indicated a negative effect on the knowledge acquisition on a subsidiary level. Furthermore, the VPS manager acted as a supportive and guiding role in implementing VPS, hence demonstrating a critical role for the whole organization. Finally, the introduction to VPS impacted the attitude towards VPS, which indicated that an extensive introduction contributed to a greater willingness to change.

6. Conclusion

This chapter will present the answers to the research questions and summarize the main conclusion based on the reports empirical data and analysis. Firstly, the research question will be answered followed by the contribution of the study, the theoretical and managerial implications. Lastly, recommendation of future research will be provided.

6.1 Summary of main findings

As stated in the introduction, the purpose of this study has been to investigate and identify influencing factors on a company-specific production system (XPS) in order to further identify key success factors and barriers that may influence the implementation and integration of an XPS in geographically spread subsidiaries. In order to fulfil the purpose of this study a case study was performed at Volvo Group Powertrain, where the objective was to investigate the implementation and integration of the Volvo Production System (VPS) in their globally spread subsidiaries. Therefore, this thesis included four remanufacturing subsidiaries located in Sweden, the US and France, as well as two powertrain production subsidiaries located in Sweden. In order to answer the main research question of:

“What are the influential factors on the implementation and integration of a company-specific production system (XPS) in geographically spread subsidiaries?”

this study has examined influential factors on the VPS implementation and integration in the investigated subsidiaries within Volvo Group Powertrain. The research further identifies a link between the five identified factors further implied in the theoretical model and the dimension affecting VPS in the reality. The factors mentioned in the model are knowledge sharing, absorptive capacity, change management, leadership and corporate socialization. These factors were further broken down in the frame of reference and were later confirmed by the empirical evidence to serve as influential factors of the VPS implementation and integration. The factors identified in the literature review included the following; knowledge sharing, which incorporated knowledge facilitation and the MNC as a network. Absorptive capacity accounted for the prior associated knowledge and effort of obtaining new knowledge. Change management was affected by the previous change history of the plant, the support of the top management as well as the management's ability to set clear targets and

a common understanding of VPS. Leadership consisted of an integrated leadership as well as management's ability to provide incentives. Last but not least, corporate socialization included cross-communication, the structure and utilization of networks and knowledge forums. During the analysis, three additional factors were identified with influence on VPS implementation. These factors were not previously mentioned in existing research and were therefore added to an updated model. The empirical findings suggested that these factors, namely; the global VPS coaches, the local VPS managers as well as the introduction to VPS impacted the VPS implementation and integration considerably in the investigated subsidiaries. These eight success factors were evident to have a significant contribution concerning the variation between the implementation of the study, which further allowed the researchers to further identify negative and positive influential factors and hence, answering the sub question of:

“What are the key success factors and barriers for implementing and integrating a company-specific production system (XPS) across geographical spread subsidiaries?”

One of the main influencing factors of the VPS implementation is, as mentioned, change management, since change management as a subject can explain resistance to change. Furthermore, the combination of the two factors knowledge sharing and leadership can explain the importance of support of local VPS coaches, which is one of the main findings of this thesis. In the analysis chapter, the consequences from the absence of local VPS coach showed to have significant negative impact on VPS-implementation, since the employees had to rely on their prior knowledge to introduce and run VPS activities. Furthermore, the study points towards a major reliance on global VPS coaches and insecurity surrounding VPS resulted into the image of VPS as secondary prioritization. Leadership at all organizational levels therefore plays a vital role in implementing VPS.

Another influencing factor highlighted in the model was absorptive capacity, which is dependent on prior related knowledge. Prior knowledge is further proved to be a major facilitator for implementation of VPS. The employees with previous related knowledge tended to be more positive and easily convinced of VPS. Especially managers seemed to take more personal ownership and showed greater commitment of integrating VPS further into the organization. Another main dimension of Absorptive capacity is “intensity of knowledge acquisition effort”. As stated by the thesis, this dimension has a significant impact on organizational learning and thus for the implementation of VPS. Since plants investing in

“effort of knowledge acquisition” tends to apply higher knowledge sharing via better relationship with the global VPS coaches as well as enhanced inter-subsiary contact.

The existence of knowledge sharing channels such as international/national forums, teams and networks enhances the VPS-integration. This is a part of the concept corporate socialization which provides many suggestions how MNEs may facilitate knowledge sharing between subsidiaries such as regular meetings, both physically and virtual. Initiatives which were proved, in the study, to improve the knowledge and commitment of VPS and enhance the efficiency of HQ top-management.

This study shows that the basis for knowledge sharing is inhibited by the lack of standardization in the VPS-structure within subsidiaries. This contributes to an uncertainty amongst the plant-personnel who to conduct inter-subsiary contact with regarding the VPS-related questions. This counteracts the creation of potential networks, which precludes personal ties and thereby lost knowledge sharing. The absence of personal ties is further a barrier towards organizational socialisation, which is directly related to the implementation of VPS.

6.2 Theoretical implications

In this study the integration of VPS in geographically dispersed subsidiaries, within the business setting of a MNE, has been investigated. It has examined influential factors on the VPS implementation and integration and why this implementation has differed between geographical dispersed subsidiaries.

The current study is based on a broad review of previous research and empirical findings conducted from a case study of Volvo Group Powertrain Remanufacturing highlighting their VPS journey. This attention contributes to the research regarding implementation, managing and integration of similar strategic improvements systems. This study also further builds on the general research of knowledge sharing and change management in MNEs. Due to the consistency of the result, this study furthermore presents a strong indication for the relationship between the factors knowledge sharing, absorptive capacity, change management, leadership, corporate socialization and the implementation of VPS. The above factors are mentioned in previous literature, however, this study also identified the factors; global VPS approaches, local VPS manager and introduction to VPS, to have significantly

influence on VPS, which is not mentioned in earlier research, according to our theoretical review. Therefore, this paper contributes with new potential research areas. Such as how these specific factors in-depths effects implementation and integration of strategic improvement systems.

Due to the extent of the case study's structure and the consistency of the result, the conclusions made in this study is considerable as generalizable to other MNEs. Hopefully this study can work as a useful framework for continuous studies within related areas.

As earlier discussed, previous studies have listed multitude factors affecting the implementation of Lean, WCM and TPS. However, there has been less focus on factors influencing a tailored company-specific production system. By highlighting the major impact of organizational factors in regards to these customized systems, we hope to inspire other researchers to continue to increase the awareness of organizational factors within XPS.

This study is based on a limited amount of theoretical perspectives and it cannot therefore be precluded that all factors of influence are mapped. But the study presents a model of significant influencing factors and how they integrate with each other.

6.3 Managerial implications

This research identifies and assesses factors influencing XPS-implementation in dispersed subsidiaries of a MNE. The following text provides suggestions directed towards managers within MNEs applying strategic improvement systems.

It is of great significance to ensure managers ability to lead the change processes. This ability is identified vital for the process of creating and implementing organizational changes in the long-term. Firstly, the management support is a strong facilitator of XPS-implementation, which decrease organizational inertia and resistance to change. It was repeatedly evident throughout the study that a fully dedicated XPS manager is one of the most important factors for facilitation of XPS- implementation.

The result of the study also reveals the relevance of prior related knowledge amongst XPS-personnel. Prior related knowledge makes it easier to get an understanding of the value of strategic improvement systems, which facilitate applying it practically. Subsequently, MNEs

should therefore emphasize knowledge sharing mechanisms and structures, in order to share applied experiences to complement theoretical XPS training.

Another managerial contribution of the study is the study's findings regarding structural XPS-communication. In order to ensure inter-unit communication, MNEs should prioritize creation of inter-unit teams in order to promote international knowledge sharing.

A factor highly influential towards XPS is the level of knowledge regarding all stakeholders of XPS in the MNEs. Lack in knowledge works as a barrier towards the implementation of VPS. This is due to the fact that knowledge flows from top-to-down through the organization. In order to transfer it from one organizational level to another, a certain knowledge is required.

Based on the case study, the XPS-related positions varied significantly where some individuals had too much unrelated responsibilities, which inhibited the focus on XPS. MNEs therefore has to standardize all important XPS related-position as a strategy which further will ensure a higher quality of the XPS-work and enhanced knowledge transfer.

As stated in the analysis, the promotion of physical and virtual forums and networks should be prioritized. This is an important knowledge sharing facilitating activity where members can share theoretical and practical information. This will ease the function and increase the efficiency of the intermediate global responsiveness.

Finally, we would like to highlight the importance of managerial encouragement towards the importance of knowledge sharing.

6.4 Limitations of the study and directions for future research

One of the study's limitations is that the research is based on a single case study consisting of four subsidiaries belonging to one MNC. However, it must be said that the case structure is sufficient to propose a generalization of our result. The generalization could of course have been stronger if more cases were included in the study, such as other XPS at different organizations. Based on this reasoning we purpose future researchers to use the similar research questions applied to other XPS, as a way to strengthen the findings.

In this study it has been assumed that an enhanced inter-unit communication and knowledge sharing will increase the implementation of VPS and in long term, decrease the difference

amongst the dispersed subsidiaries. But due to lack of previous knowledge in this specific area and limitation in the empirical finding, the causal link between the two factors has not been deeper investigated. We therefore suggest further research to focus on the actual causal link between variation in VPS implementation and knowledge sharing.

In the theoretical framework we tried to cover all potential factors that may affect the implantation of VPS. But during the analysis, new factors, which were not found in previous literature were identified. These identified factors were the impact of the global VPS coaches, the local VPS manager and the introduction to VPS. According to our findings the role of the global VPS coaches could cause a negative effect on the XPS implementation, whereby the other two proposed a positive impact. As these factors have only been investigated in relation to this research case study it would be further recommended to conduct more research in this area, involving other companies.

Since MNCs operates in a global and heterogeneous environment, we believe further research combining deeper cultural research and international business studies, will give a deeper knowledge of the contextual barriers of implementing a XPS, a topic we really want emphasise for further research. We also believe that the further research would benefit from a new study in five to seven years from now. In order to see how the implementation of VPS has affected the organizational culture and the way of doing business, which is the long-term purpose of VPS.

References

- Adam Jr, E. E., Flores, B. E., & MacIas, A. (2001). Quality improvement practices and the effect on manufacturing firm performance: evidence from Mexico and the USA. *International Journal of Production Research*, 39(1), 43-63.
- Agocs, C. (1997). Institutionalized resistance to organizational change: Denial, inaction and repression. *Journal of Business Ethics*, 16(9), 917-931.
- Ahanotu, N. D. (1998). A conceptual framework for modeling the conflict between product creation and knowledge development amongst production workers. *Journal of Systemic Knowledge Management*, 1(1).
- AlManei, M., Salonitis, K., & Xu, Y. (2017). Lean implementation frameworks: the challenges zfor SMEs.
- Alukal, G. (2006). Keeping Lean Alive. *Quality Progress*, Vol. 39, No. 10, pp. 67-69.
- Alv er, I. & Westgaard, S. (2011). "Transfer of Procedural Knowledge within MNCs: A literature Review", NTNU, I T, Trondheim
- ASQ. 2018. *CONTINUOUS IMPROVEMENT*. [ONLINE] Available at: <http://asq.org/learn-about-quality/continuous-improvement/overview/overview.html>. [Accessed 14 February 2018].
- Avlonitis, G. J., & Karayanni, D. A. (2000). The impact of internet use on business-to-business marketing: examples from American and European companies. *Industrial Marketing Management*, 29(5), 441-459.
- Bateman, N. (2001). Sustainability: A Guide to Process Improvement. *Lean EnterpriseResearch Centre*.
- Bateman, N. (2005). Sustainability: the elusive element of process improvement. *International Journal of Operations & Production Management*, 25(3), 261-276.
- Bel n Escrig-Tena, A. (2004). TQM as a competitive factor: A theoretical and empirical analysis. *International Journal of Quality & Reliability Management*, 21(6), 612-637.
- Benton, W. C., & Shin, H. (1998). Manufacturing planning and control: The evolution of MRP and JIT integration. *European Journal of Operational Research*, 110(3), 411-440.
- Bergman, B., & Klefsj , B. (2010). *Quality from customer needs to customer satisfaction*. Studentlitteratur AB.
- Birkinshaw, J., & Hood, N. (1998). Multinational subsidiary evolution: Capability and charter change in foreign-owned subsidiary companies. *Academy of management review*, 23(4), 773-795.
- Bj rklund, M., & Paulsson, U. (2003). Seminarieboken. *Studentlitteratur, Lund*.

Björkman, I., Barner-Rasmussen, W., & Li, L. (2004). Managing knowledge transfer in MNCs: The impact of headquarters control mechanisms. *Journal of international business studies*, 35(5), 443-455.

Bortolotti, T., Boscari, S., & Danese, P. (2015). Successful lean implementation: Organizational culture and soft lean practices. *International Journal of Production Economics*, 160, 182-201.

Boscari, S., Danese, P., & Romano, P. (2016). Implementation of lean production in multinational corporations: A case study of the transfer process from headquarters to subsidiaries. *International Journal of Production Economics*, 176, 53-68.

Brown, M., & Cregan, C. (2008). Organizational change cynicism: The role of employee involvement. *Human Resource Management*, 47(4), 667-686.

Bryman, A., & Bell, E. (2015). *Business research methods*. Oxford University Press, USA.

Burnes, B. (2004). Emergent change and planned change—competitors or allies? The case of XYZ construction. *International Journal of Operations & Production Management*, 24(9), 886-902.

Cagliano, R., Blackmon, K., & Voss, C. (2001). Small firms under MICROSCOPE: international differences in production/operations management practices and performance. *Integrated Manufacturing Systems*, 12(7), 469-482.

Chiarini, A., & Vagnoni, E. (2015). World-class manufacturing by Fiat. Comparison with Toyota production system from a strategic management, management accounting, operations management and performance measurement dimension. *International Journal of Production Research*, 53(2), 590-606.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. In *Strategic Learning in a Knowledge economy* (pp. 39-67).

Collis, J., & Hussey, R. (2013). *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave macmillan.

Daghfous, A. (2004). Absorptive capacity and the implementation of knowledge-intensive best practices. *SAM Advanced Management Journal*, 69(2), 21.

Dombrowski, U., & Mielke, T. (2013). *Lean Leadership - fundamental principles and their application*. Paper presented at the Forty Sixth CIRP Conference on Manufacturing Systems.

Doolen, T. L., & Hacker, M. E. (2005). A review of lean assessment in organizations: an exploratory study of lean practices by electronics manufacturers. *Journal of Manufacturing systems*, 24(1), 55.

Dubrovski, D. (2001). The role of customer satisfaction in achieving business excellence. *Total quality management*, 12(7-8), 920-925.

- De Wit, B., & Meyer, R. (2010). *Strategy: Process, Content, Context- An International Perspective*. 4th ed. Hampshire: Thomson Learning.
- Eid, R. (2009). Factors affecting the success of world class manufacturing implementation in less developed countries: The case of Egypt. *Journal of Manufacturing Technology Management*, 20(7), 989-1008.
- Eriksson, P., & Kovalainen, A. (2008). *Qualitative methods in business research: A practical guide to social research*. Sage.
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International journal of qualitative methods*, 5(1), 80-92.
- Ferdows, K. (2006). POM forum: Transfer of changing production Know-How. *Production and Operations Management*, 15(1), 1-9.
- Fisher, C. (2010). *Researching and writing a dissertation: An essential guide for business students*. Nottingham: Pearson education limited.
- Fletcher, M., & Plakoyiannaki, E. (2011). 10. Case selection in international business: key issues and common misconceptions. *Rethinking the case study in international business and management research*, 171.
- Flynn, B. B., Schroeder, R. G., & Flynn, E. J. (1999). World class manufacturing: an investigation of Hayes and Wheelwright's foundation. *Journal of operations management*, 17(3), 249-269.
- Foss, N. J., & Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management*, 8(1), 49-67.
- Fryer, K. J., Antony, J., & Douglas, A. (2007). Critical success factors of continuous improvement in the public sector: a literature review and some key findings. *The TQM Magazine*, 19(5), 497-517.
- Galland, P., 2018. *Why Do We Need Improvement*. [ppt] (Email communication, 23 February 2018).
- Ghoshal, S. (1987). Global strategy: An organizing framework. *Strategic management journal*, 8(5), 425-440.
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British dental journal*, 204(6), 291.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, 2(163-194), 105.
- Gupta, A. K., & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic management journal*, 473-496.

- Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization science*, 13(3), 232-248.
- Harrison, A., & Van Hoek, R. I. (2008). *Logistics management and strategy: competing through the supply chain*. Pearson Education.
- Hedlund, G., & Kogut, B. (1993). Managing the MNC: the end of the missionary era. *Organization of transnational corporations*, 6, 98-113.
- Henriksen, B., & Rolstadås, A. (2010). Knowledge and manufacturing strategy—how different manufacturing paradigms have different requirements to knowledge. Examples from the automotive industry. *International Journal of Production Research*, 48(8), 2413-2430.
- Hill, B. & Svenningstorp, J. (2006). *The Volvo production systems pre-study results*. Volvo Technology, Gothenburg, [ONLINE]. Available at: [http://goo. gl/1mmZc](http://goo.gl/1mmZc) [Accessed 21 February 2018].
- Holmemo, M. D. Q., Rolfsen, M., & Ingvaldsen, J. A. (2018). Lean thinking: Outside-in, bottom-up? The paradox of contemporary soft lean and consultant-driven lean implementation. *Total Quality Management & Business Excellence*, 29(1-2), 148-160.
- Inkpen, A. C. (2008). Knowledge transfer and international joint ventures: the case of NUMMI and General Motors. *Strategic Management Journal*, 29(4), 447-453.
- Kasul, R. A., & Motwani, J. G. (1995). Performance measurements in worldclass operations: A strategic model. *Benchmarking for Quality Management & Technology*, 2(2), 20-36.
- Kaye, M., & Anderson, R. (1999). Continuous improvement: the ten essential criteria. *International Journal of Quality & Reliability Management*, 16(5), 485-509.
- Kinni, T. B. (1996). *America's best: Industry Week's guide to world-class manufacturing plants*. New York: Wiley.
- Koenigsaecker, G. (2007). Sustaining lean-Nothing can replace the direct involvement of leaders. *Manufacturing Engineering*, 138, 117-130.
- Kostova, T. (1999). Transnational transfer of strategic organizational practices: A contextual perspective. *Academy of management review*, 24(2), 308-324.
- Kotter, J. P., & Cohen, D. S. (2002). *The heart of change: Real-life stories of how people change their organizations*. Harvard Business Press.
- Kotter, J. P. (2007). Leading Change: Why Transformation Efforts Fail. *Harvard Business Review*. Boston, United States, Boston. 85: 96-103.
- Kull, T. J., Yan, T., Liu, Z., & Wacker, J. G. (2014). The moderation of lean manufacturing effectiveness by dimensions of national culture: testing practice-culture congruence hypotheses. *International Journal of Production Economics*, 153, 1-12.

- Kumar, R., & Kumar, V. (2014). Barriers in implementation of lean manufacturing system in Indian industry: A survey. *International Journal of Latest Trends in Engineering and Technology*, 4(2), 243-251.
- Kvale, S., & Brinkmann, S. (2014). *Den kvalitativa forskningsintervjun*. Studentlitteratur.
- Larsson, L-Å. (2010). Intervjuer. In: *Ekström, M. & Larsson, L-Å. 2nd Ed. Metoder i kommunikationsvetenskap*. Lund: Studentlitteratur, pp. 61, 63, 65, 68-70, 74-77.
- Liker, J.K. (2004a). *The Toyota way: Fourteen management principles from the world's greatest manufacturer*. McGraw-Hill, New York, NY.)
- Liker, J.K. (2004b). *The Toyota Way*. McGraw-Hill, New York, NY.
- Liker, J.K. (2009). *The Toyota Way: Lean för världsklass*. Malmö, Sweden: Liber.
- Luecke, R. (2003). *Managing change and transition* (Vol. 3). Harvard Business Press.
- Marodin, G. A., & Saurin, T. A. (2013). Implementing lean production systems: research areas and opportunities for future studies. *International Journal of Production Research*, 51(22), 6663-6680.
- Martichenko, R. (2004). Continuous improvement: What's the problem. *Logistics Quarterly*, 10(4), 1-7.
- McAdam, R., & Henderson, J. (2004). Influencing the future of TQM: internal and external driving factors. *International Journal of Quality & Reliability Management*, 21(1), 51-71.
- McKinsey. (2007). *Bibehåll uppnådda resultat*. Utbildningsmaterial. Eskilstuna, Sweden.
- Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of management studies*, 48(2), 235-252.
- Minbaeva, D. B. (2005). HRM practices and MNC knowledge transfer. *Personnel review*, 34(1), 125-144.
- Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. F., & Park, H. J. (2003). MNC knowledge transfer, subsidiary absorptive capacity, and HRM. *Journal of international business studies*, 34(6), 586-599.
- Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. F., & Park, H. J. (2014). MNC knowledge transfer, subsidiary absorptive capacity and HRM. *Journal of International Business Studies*, 45(1), 38-51.
- Modig, N., & Åhlström, P. (2012). *This is lean: Resolving the efficiency paradox*. Rheologica.
- Mostafa, S., Dumrak, J., & Soltan, H. (2013). A framework for lean manufacturing implementation. *Production & Manufacturing Research*, 1(1), 44-64.

- Moran, J. W. and B. K. Brightman (2001). Leading organizational change. *Journal of Workplace Learning*, 12(2), 66-74.
- Mylnek, P., Vonderembse, M. A., Rao, S. S., & Bhatt, B. J. (2005). World Class Manufacturing: Blueprint for Success. *Journal of Business and Management*, 11(1), 7.
- Netland, T.H., & Aspelund, A. (2013). Company-specific production systems and competitive advantage: a resource-based view on the Volvo Production System. *International Journal of Operations & Production Management*, 33(11/12), 1511-1531.
- Netland, H., T (2013a). *Company-specific production systems: Managing production improvement in global firms*. Phd. Norwegian University of Science and Technology: Norway.
- Netland, T. (2013b). Exploring the phenomenon of company-specific production systems: one-best-way or own-best-way?. *International Journal of Production Research*, 51(4), 1084-1097.
- Netland, T., & Sanchez, E. (2014). Effects of a production improvement programme on global quality performance: The case of the Volvo Production System. *The TQM journal*, 26(2), 188-201.
- Netland, T. H. (2012). Managing strategic improvement programs: the XPS program management framework. *Journal of Project, Program & Portfolio Management*, 3(1), 31-44.
- Nohria, N., & Ghoshal, S. (1994). Differentiated fit and shared values: Alternatives for managing headquarters-subsidiary relations. *Strategic Management Journal*, 15(6), 491-502.
- Näringsliv, 2011. *Världsledande Tillverkare Av Dieselmotorer Starkt Förankrad I Skövde*. [online] Available at: <<http://www.naringsliv.se/tidningar/2011-3/livsmedel/rikt-runt/varldsledande-tillverkare-av-dieselmotorer-starkt-forankrad-i-skovde/>> [Accessed 14 May 2018].
- Ohno, T. (1988). *Toyota production system: beyond large-scale production*. crc Press.
- Pay, R. (2008). Everybody's jumping on the lean bandwagon, but many are being taken for a ride. *Industry Week*, 5.
- Petersson, P., Johansson, O., Broman, M., Blücher, D., & Alsterman, H. (2009). *Lean: gör avvikelser till framgång*. Bromma, Sweden: Part Media.
- Radnor, Z., & Johnston, R. (2013). Lean in UK government: internal efficiency or customer service?. *Production Planning & Control*, 24(10-11), 903-915.
- Radnor, Z., & Osborne, S. P. (2013). Lean: a failed theory for public services?. *Public Management Review*, 15(2), 265-287.

- Ramström, T., & Stridh, T. (2008). *To Succeed with Continuous Improvements—A Checklist for Team Leaders* (Doctoral dissertation, Master thesis, Luleå Technical University, Luleå, Sweden).
- Recker, J. (2012). *Scientific research in information systems: a beginner's guide*. Springer Science & Business Media.
- Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management: an introduction to process and method*. Sage.
- Rich, N., & Bateman, N. (2003). Companies' perceptions of inhibitors and enablers for process improvement activities. *International Journal of Operations & Production Management*, 23(2), 185-199.
- Rother, M. (2009). *Toyota Kata: Managing People for Improvement, aptiveness, and Superior Results*. McGraw-Hill, New York, NY.
- Saunders, M. N. (2011). *Research methods for business students, 5/e*. Pearson Education India.
- Schaffer, R. H., & Thomson, H. A. (1992). Successful change programs begin with results. *Harvard business review*, 70(1), 80-89.
- Schonberger, R. J. (2007). Japanese production management: An evolution—With mixed success. *Journal of Operations Management*, 25(2), 403-419.
- Sharma, M., & Kodali, R. (2008). Development of a framework for manufacturing excellence. *Measuring Business Excellence*, 12(4), 50-66.
- Silva, L. C. S., Kovaleski, J. L., Gaia, S., Garcia, M., & de Andrade Júnior, P. P. (2013). Cost Deployment Tool for Technological Innovation of World Class Manufacturing. *Journal of Transportation Technologies*, 3(01), 17.
- Slack, N., & Lewis, M. (2002). *Operations strategy*. Pearson Education, Edinburgh, UK.
- Strang, D., & Kim, Y. M. (2004). The Diffusion and Domestication of Managerial Innovations: The spread of scientific management, quality circles, and TQM between the United States and Japan. In *The Oxford handbook of work and organization*.
- Sugimori, Y., Kusunoki, K., Cho, F., & Uchikawa, S. (1977). Toyota production system and kanban system materialization of just-in-time and respect-for-human system. *The International Journal of Production Research*, 15(6), 553-564.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic management journal*, 17(S2), 27-43.
- Swamidass, P. M. (2007). The effect of TPS on US manufacturing during 1981–1998: inventory increased or decreased as a function of plant performance. *International Journal of Production Research*, 45(16), 3763-3778.

- Sörqvist, L. (2004). *Ständiga förbättringar*. Lund: Studentlitteratur.
- Sörqvist, L. (2013). *LEAN: Processutveckling med fokus på kundvärde och effektiva flöden*. Studentlitteratur.
- The Economist. 2012. *From bitter to sweet*. [ONLINE] Available at:<<https://www.economist.com/node/21552631?fsrc=rss>> [Accessed 12 March 2018].
- Thun, J. H., Drüke, M., & Grübner, A. (2010). Empowering Kanban through TPS-principles— an empirical analysis of the Toyota Production System. *International journal of production research*, 48(23), 7089-7106.
- Trost, J. (1997). *Kvalitativa intervjuer*.(2. painos) Lund: Studentlitteratur.
- Upton, D. (1996). Mechanisms for building and sustaining operations improvement. *European Management Journal*, 14(3), 215-228.
- Volvo Group. 2010. *Annual Report 2009*. [ONLINE] Available at:<www3.volvogroup.com/investors/finrep/ar09/ar_2009_eng.pdf> [Accessed 23 January 2018].
- Volvo Group. 2012. *www.volvogroup.com*. [ONLINE] Available at: <<http://www.volvogroup.com/group/global/engb/volvo%20group/history/Pages/history.aspx>> [Accessed 23 January 2018].
- Voss, C. A. (2005). Alternative paradigms for manufacturing strategy. *International Journal of Operations & Production Management*, 25(12), 1211-1222.
- Walker, H., Armenakis, A. A., & Bernerth, J. B. (2007). Factors influencing organizational change efforts: An integrative investigation of change content, context, process and individual differences. *Journal of Organizational Change Management*, 20(6), 761-773.
- Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world*, Rawson Associates, New York, 1990. *Google Scholar*, 93.
- Yin, R. K. (2009). *Case Study Research, Design & Methods 4th ed.*
- Yin, R.K. (2013). *Case study research: Design and methods*. 4th edn. Thousand Oaks, CA: Sage Publications.
- Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of management review*, 27(2), 185-203.

Appendix 1

Interview guide for Plant Manager/VPS Manager/Focus Area Owners/Area Managers/Line Managers:

(Subject to some differences depending on the position of the interviewee)

Introduction:

1. What is your position, and what are the work tasks included in your work?
2. Age / Nationality
3. How long have you worked at Volvo Group Remanufacturing?
4. What is VPS to you?
5. What is your experience within VPS/WCM/Lean?

Background/site:

6. When was XX Remanufacturing established?
7. How many people are working here today?
8. When did the site start with the implementation of VPS?
 - a. How did it start?
 - b. Was the plant familiar with lean before?
 - c. What was the preparations?
 - d. Who was responsible?
9. How do you work with VPS today?
 - a. What are the strategy/goals (longterm vs. shortterm) concerning VPS?
 - b. How are the goals communicated?
 - c. How are the VPS goals/strategies shared/encouraged?

10. How integrated is VPS in the organization? (deployment)
11. What results does the deployment of the approach lead to? (results)
12. How many Kaizens are you doing? How are you working towards improvements?
13. Does it exist supporting function concerning VPS?
 - a. Is there any support from the HQ in Gothenburg?
 - b. Are there any support from other subsidiaries?
 - c. How much support from global VPS coaches, Patrick Galland and Jan Berg?
 - d. How do you support Focus Area Owners and the whole organization?
 - e. Do you have any VPS Meetings, VPS workshops etc. ?
 - f. Do you visit other sites
 - i. What do you do there?
 - ii. What d you learn from it?
 - iii. Is it your own initiative or a requirement from the Plant Manager?

Learning Material

14. What learning material do you have access to?
 - a. What information is accessible for different stakeholders e.g. Operators, Area Managers, employees etc.?
 - b. Are there any documents, Online databases etc.?
 - c. Any incentives for employees to carry out VPS? Such as Rewards?
15. Who supplies the rest of the organization with study material?

16. How is VPS educated throughout the organization?

Knowledge sharing

17. How is VPS communicated throughout the organization?

18. How do you communicate VPS to Focus Area Owners/Area Managers/Operators??

19. How often do you get support from Plant Manager?

20. How is the organizational network structured?

Is the organization hierarchical or flat?

21. Are there any incentives for you to share information?

22. Are there any barriers for knowledge sharing today?

23. What will facilitate knowledge sharing?

Additional Questions:

24. What are the main challenges for implementing VPS?

25. What are the biggest opportunities when implementing VPS?

29. How are you motivated?

30. What are you extra proud over?

Additional Questions for Area/Line Managers:

31. Is VPS integrated at your department?

32. How is VPS integrated there?

33. How has VPS been introduced to the Operators?

34. How do you encourage the Operators work with vps?

a. Do you arrange any workshops? in regards to what? and how often?

35. Is there any communication between different departments to identify improvement areas/failures?
36. How do you follow up on processes to make sure that improvements are sustained?
37. Are impacts communicated to the Operators?
38. Do you encourage improvement efforts at the workplace?
39. Is improvement work part of the Operators daily work?

Interview guide for Operators:

Introduction:

5. What is your position, and what are the work tasks included in your work?
6. Age / Nationality
7. How long have you worked at Volvo Group Remanufacturing?
8. What do you know about VPS?
9. What is your experience within VPS/WCM/Lean?
10. What do you think of VPS?
 - a. Why do/don't you like it?

VPS Implementation and Integration:

11. Is VPS integrated at your specific working area?
12. How is VPS integrated there?
13. How has VPS been introduced?
14. How are you encouraged to work with vps?
 - a. Are there any workshops? in regards to what? and how often?

15. Is there any communication between different departments to identify improvement areas/failures?
16. Are there any follow-up processes to make sure that improvements are sustained?
17. Are impacts communicated to you?
18. Does management encourage improvement efforts at the workplace?
19. Is improvement work part of the daily work?