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Analyzing ERP-System implementation in an automotive company

Master's thesis in the Master's Programme Supply Chain Management

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SUMMARY

This master's thesis investigates the implementation of a new Enterprise Resource Planning (ERP) system, SAP S/4HANA, within the automotive company Polestar. As the company transitions from its previous system, Workday, to SAP, the focus lies on improving process standardization and cross-functional collaboration. The study adopts a qualitative case study methodology, combining semi-structured interviews with employees, analysis of internal documentation, and a theoretical framework rooted in ERP implementation literature and organizational theories. Key internal factors such as coordination mechanisms, change management, knowledge sharing, and corporate culture are analyzed alongside external factors derived from the ARA-model, which emphasizes activity links, resource ties, and actor bonds. The findings reveal that insufficient early communication, lack of cross-functional alignment, and overreliance on external consultants hampered initial progress. However, over time improvements in collaboration and organizational learning emerged. The thesis proposes a conceptual ERP Implementation Model to evaluate how internal and external factors influence each phase which are: pre-implementation, implementation, and post-implementation of ERP implementation. The insights are intended to support both Polestar and other organizations navigating complex ERP implementations and to provide actionable recommendations for the future. It can also give insights and understanding to other companies when implementing new ERP systems in the future.

Keywords: ERP Implementation, Automotive industry, Standardization, Cross-functional collaboration, Coordination mechanisms, change management, Knowledge sharing, Corporate culture

List of abbreviations

SI-partner = Solution integration partner

ERP = Enterprise resource planner

SAP = The world's largest supplier of enterprise resource planning software

SAP ECC = Older enterprise resource planner module in SAP

SAP S/4HANA = Newest enterprise resource planner module in SAP

OEM = Original equipment manufacturer

VCC = Volvo Car Corporation

Table of Contents

1. Introduction	1
1.1 Aim	2
1.2 Delimitations	2
1.3 Research questions	2
1.4 Structure of the thesis	3
2. Methodology	5
2.1 Case study approach	5
2.2 Data Collection	5
2.3 Data analysis	7
2.4 Reliability and Validity	9
2.5 Ethical considerations	10
3. Theoretical framework	11
3.1 Enterprise resource planning system	11
3.1.1 <i>Definition of ERP</i>	11
3.1.2 <i>ERP Benefits</i>	12
3.1.3 <i>ERP implementation and critical success factors</i>	13
3.2 Internal organizing	16
3.3.1 <i>Cross-functional collaboration</i>	16
3.3.2 <i>Coordination mechanisms</i>	17
3.3.3 <i>Change Management</i>	17
3.3.4 <i>Cultural context</i>	18
3.3.5 <i>Knowledge sharing</i>	19
3.3 External organizing (ARA-model)	20
3.2.1 <i>Activity links</i>	20
3.2.2 <i>Resource ties</i>	22
3.2.3 <i>Actors bonds</i>	22
3.4 Enterprise Resource Planning Implementation Model (ERPIM)	23
4. Empirical results	24
4.1 Polestar background	24
4.2 ERP Implementation at Polestar	24
4.2.1 Pre-Implementation Phase	25
4.2.2 Implementation Phase	26
4.2.3 Post-Implementation Phase	28
5. Analysis	31
5.1 Internal Factors	31

5.1.1 <i>Cross-Functional Collaboration</i>	31
5.1.2 <i>Coordination Mechanisms</i>	32
5.1.3 <i>Change Management</i>	33
5.1.4 <i>Cultural Context</i>	34
5.1.5 <i>Knowledge Sharing</i>	35
5.2 External Factors	37
5.2.1 <i>Activity Links</i>	37
5.2.2 <i>Resource Ties</i>	38
5.2.3 <i>Actor Bonds</i>	39
6. Discussion	41
6.1 Significant resources during phases of implementation.....	41
6.1.1 <i>Significant internal factors</i>	42
6.1.2 <i>Significant external factors</i>	43
6.2 Alignments Between Theory and Practice.....	44
6.3 Divergences Between Theory and Practice	45
7. Conclusion.....	47
References	49
Appendix 1: Interview guide used in data collection.....	55

1. Introduction

The automotive sector is a sector undergoing rapid changes. Electrification, sustainable development, new ways of working with supply chains and customers are main challenges that this sector is characterized by (Jasiński et al., 2021; Colovato & Baldo, 2023). The share of electric vehicles is expected to rise to an estimated 50% in 2030. This will greatly impact the competition by the introduction of more actors and therefore the need to streamline operations for existing OEM:s (Papadimitriou et al., 2022).

One of the actors in this industry is Polestar, which is a rapidly growing automotive company specializing in production and sales of electric cars, with a strong focus on innovation and sustainability Polestar (2024). While it is still heavily influenced by the former parent company Volvo Car Corporations (VCC), sharing engineers, routines, IT-platforms, and leadership, Polestar became a stand-alone company in 2017. This makes Polestar unique in the sense that they are one of the few new entrants in the automotive sector, a sector that is characterized by large investments and economies of scale in order to be successful (Fedotov, 2022). Polestar is set to grow to seven new markets in 2025 and is moving away from a “genuine agency sales model” where Polestar had complete control over pricing, which proved costly and inefficient (Polestar, 2024). Currently, the strategy is moving towards a more traditional view of OEM:s by using retailers for sales but still continues to sell using their own channels called “Polestar Online” and “Polestar Spaces”. As the company now expands, it faces new challenges in aligning its internal processes and ensuring efficient collaboration across various departments, particularly between finance, digital finance and sales departments. One key challenge mentioned by Polestar is the lack of a standardized way of working, in wider terms called coordination mechanisms, which has led to inefficiencies and inconsistencies in their business operations.

In an attempt to increase collaboration and coordination, Polestar is currently making a strategic shift from Workday to SAP as its enterprise resource planning (ERP) system. This transition presents an opportunity to streamline workflows and establish a more structured and standardized approach to operations (Davenport & Short, 1990). However, such a transformation requires careful planning and coordination to ensure an effective ERP implementation and maximize the benefits of the new system. A key benefit of implementing coordinated mechanisms in workflows is cost-effectiveness (Muenstermann et al., 2010), and avoiding redundancies (Tregear, 2015). By reducing inefficiencies, eliminating redundant tasks, and optimizing resource allocation, Polestar can minimize operational waste and

improve productivity. Given these circumstances, Polestar seeks to improve its way of working by implementing an ERP system that fosters efficiency, consistency, and collaboration across departments.

Furthermore, with multiple departments involved in the company's core business functions, cross-functional collaboration is essential for maintaining operational efficiency. The shift to SAP not only impacts individual teams, but also influences how different functions interact and share information. Ensuring alignment and coherence in this transformation is critical to achieving the company's broader objectives.

1.1 Aim

The aim of this thesis is to investigate how Polestar is planning for pre-implementation and implementation of the ERP system called SAP S/4HANA, with a particular focus on enhancing process standardization and cross-functional collaboration. The study aims to investigate the pre-implementation implementation and post-implementation phase, assessing how closely it aligns with existing research and best practices in ERP implementation. In doing so, the thesis explores the key factors influencing each phase of the implementation. By analyzing strategies for standardization and cross-functional collaboration, this research seeks to develop a structured framework to support an ERP implementation over several phases and improve organizational workflows. The intended outcome is to deliver actionable recommendations for Polestar and gain deeper insights into internal and external factors that have an impact on ERP implementation within this organizational context to a larger audience.

1.2 Delimitations

To limit the scope of this research, the investigation of the implementation to the new ERP system will only be conducted between two departments of the company; the Digital finance department and the Finance department. This is because these departments have a large potential when it comes to cross-functional collaboration and would benefit from standardization and optimized ways of working.

1.3 Research questions

Implementing SAP S/4HANA is a complex process, requiring effective process standardization and cross-functional collaboration. The project spans over several phases which are influenced by both internal and external factors. This chapter defines the key research questions guiding the study, exploring how the implementation is affected by factors in different phases and how the implementation can improve cross-functional collaboration, standardization and coordination.

RQ1: Which are the organizational factors influencing the success of ERP implementation at the organization and how can the implementation be improved?

RQ2: In which phase of implementation do internal and external factors play the most significant role?

1.4 Structure of the thesis

The following section describes the seven chapters that the thesis consists of: Introduction, Methodology, Theoretical framework, Empirical results, Analysis, Discussion, and Conclusion and Recommendations. This will give the reader an instruction on how the thesis is read.

First chapter: The introduction aims at providing the foundational context necessary to understand the research presented in this thesis. It contains a background section with an overview of the electric automotive sector and the challenges it faces, then continues on how the focal company is trying to navigate in this context. Secondly, the aim and research questions are presented to establish what the thesis will research and try to achieve with this report.

Second chapter: The methodology chapter describes how the research was conducted. It will describe the general method of conducting a case study as well as how data was collected and analyzed. Lastly, it will describe how reliability, validity, and ethicality was concerned in the study.

Third chapter: The theoretical framework will bring a deeper understanding of the past academic literature in this field of study, as well as knowledge of ERP systems in general. It also consists of peer-reviewed scientific research about critical success factors when implementing ERP systems in addition to how internal and external factors affect organizations. This will serve as a foundation of a model constructed and to help guide and illustrate the discussion chapter.

Fourth chapter: The empirical results will present all data collected from the observations and interviews held with employees at the focal company. The main data collected will be divided into the three phases of implementation at the researched company: Pre-implementation, Implementation, and Post-implementation.

Fifth chapter: The analysis is the core of this study. It will analyze the implementation in relation to the internal and external factors that affect the outcome of the ERP

implementation. The factors will be analyzed with respect to the phase when they were most significant and will result in a comprehensive model presented in the discussion.

Sixth chapter: The discussion chapter will discuss the model of ERP implementation constructed based on the significant factors that affect the implementation at each phase. It will also discuss the empirical results in relation to the theoretical framework and highlight consistencies and inconsistencies between the two.

Seventh chapter: The conclusion and recommendations chapter will answer the research questions presented in the first chapter in a summarized way. Moreover, it will give both Polestar and comparable companies a list of recommendations of what should be considered and improved when implementing ERP systems regarding each phase of implementation.

2. Methodology

This section will describe how the research was conducted and why it was done that way.

2.1 Case study approach

This study explored ERP-system implementation in a cross-functional organization through a qualitative case study approach. By conducting semi-structured interviews with key stakeholders, employees and analyzing data from online databases, the research aimed to provide a deeper understanding of the current workflow structure, coordination mechanisms, cross-functional collaboration, and key resources necessary to facilitate the implementation of the new ERP-system (Bell et al., 2022).

In order to gain a deeper understanding of the context surrounding our research problem, the researchers conducted an initial pre-study. This involved informal discussions with employees at the company to explore their perspectives and experiences related to the research topic. These conversations provided valuable insights into the practical aspects of the issue and helped the researchers identify key stakeholders for potential future interviews.

Additionally, the researchers conducted a preliminary literature review to familiarize with existing theories, models, and previous research within the ERP area. This helped contextualize the study, refine the research focus, and ensure that the work builds upon established knowledge. Through these initial steps, the researchers were able to better define the research scope and purposefully select relevant interview candidates for the next stage of data collection.

2.2 Data Collection

A common way of collecting qualitative data is through interviews, and the main method that was used during the data collection in this study was with semi-structured interviews in person. The targeted participants were technical experts in the area of ERP systems and other employees who were directly involved in making workflows and tasks more standardized. According to Sreejsh et al. (2014), semi-structured interviews are used to allow flexibility to the interviewer while they stay within the desired topic. Based on this, the interviews had some predetermined questions that were supplemented with additional questions based on the outcomes of the different responses that occurred (*see Appendix 1*). Sreejsh et al. (2014) states that this methodology is specifically effective to use when interacting with technical experts.

The participants were chosen based on purposive sampling through conversation with supervisors at the company. In contrast to randomly selected sampling groups which is useful when the research is designed using quantitative data, a purposive sampling method is suitable when the main goal is to best enable the participants to answer the research questions (Rai & Thapa, 2015). The inclusion criteria are that the person should be part of either the department of finance or digital finance. One exception was made due to the fact that that person is involved in the “Post implementation” phase which is relevant for this thesis. Table 1 below gives a description of the participants and why they were chosen.

Table 1: Description of interview participants.

Identification	Role	Duration of interview [min]
A	Project Lead	93
B	System Architect	55
C	Consultant	51
D	Business Analyst	45
E	Business Analyst	38
F	Product Manager	88
G	Process Owner	53
H	Controller	56
I	Business Analyst	52
J	Data Analyst	62
K	Manager	65

Sample size is an important factor to consider to ensure validity in order to get a good range of answers (Mwita, 2022). In this research, 11 technical experts and staff at the departments were interviewed, due to the lack of both time and resources possessed by the researchers and the case company. Mwita (2022) mentions that semi-structured interviews are an effective way of gathering qualitative data to base the analysis on when the sample size is small. The author also mentions this as an effective method when conducting interviews at one single organization (Mwita, 2022). In this research, primary data was mainly collected from employees within the company, therefore, interviews such as semi-structured are preferred.

Olenik et al. (2021) mention a seven-step method that is effective when conducting, analyzing, and later reporting interview data that was collected using semi-structured interviews, which this research followed. The steps are the following:

1. Choose the best method to address the research objective
2. Participant recruitment and sampling
3. Design a structured way to collect data
4. Conducting the interviews
5. Analysis of the data
6. Conclusions with ground in the data gathered
7. Results reporting

Furthermore, the study also relied on observations and on online databases, such as “Google scholar” and “Chalmers Library” and relevant academic literature for the data collection. When studying online databases, keywords for limiting the search for relevant information were used, for instance: “Automotive”, “growth”, “expansion”, “Coordination mechanisms”, “cross-functional”, “key resources”, “ERP implementation”, “Critical success factors for ERP implementation”, “Critical success factors for ERP implementation”, “Post-implementation success of ERP implementation”, “ERP requirements”.

2.3 Data analysis

Research primarily seek to connect theoretical frameworks with practical observations (Dubois & Gadde, 2002). This research used a qualitative research model to gather empirical findings and observations. The objective of qualitative research is to grasp, interpret, and convey participants' perspectives and meanings using their own words (Ruona, 2005). Therefore, qualitative data analysis focuses on understanding and making sense of these meanings. The researchers' interpretation played a key role in shaping how meaning is constructed.

Qualitative data analysis relies on abductive reasoning to move from specific observations to broader theoretical insights (Ruona, 2005). A researcher examining workplace process problems may notice recurring complaints about inefficiencies, unclear communication, and excessive bureaucracy. By categorizing these responses, they identify patterns and ask why these issues persist. Drawing from organizational theory, they hypothesize that poor workflow design and hierarchical bottlenecks contribute to employee frustration. This process links raw data to established frameworks, forming a deeper explanation of systemic inefficiencies (Ruona, 2005). Thus, data analysis is not just about organizing information but about interpreting it within a broader conceptual context to generate meaning.

Case studies are valuable for understanding complex business networks but have limitations regarding generalizability (Dubois & Gadde, 2002). Many researchers criticize case studies for being too specific or poorly structured. In order to combat this, the researchers used systematic combining as a method of analyzing data. Unlike traditional research methods that follow a linear path (either deductive or inductive), systematic combining is a nonlinear, iterative process. According to Dubois & Gadde (2002), it involves a continuous back-and-forth interaction between the empirical observations and the theoretical frameworks, see *Figure 1*. Research issues and the analytical framework evolve together rather than being predetermined. This approach focuses on constantly adjusting the research problem based on findings from observations at the company. Instead of testing existing theories (deduction) or forming new ones from scratch (induction), systematic combining modifies and refines existing theories (abduction). The study direction has frequently been adjusted based on new findings. By avoiding purely inductive or deductive approaches, it helped achieve better alignment between theory and reality. The researchers did not rigidly follow a predefined structure but allowed empirical insights to shape the research process. There are no "natural" boundaries in real-world research, and researchers had to decide what to include. Expanding boundaries might help the researchers to uncover new interdependencies in the business network.

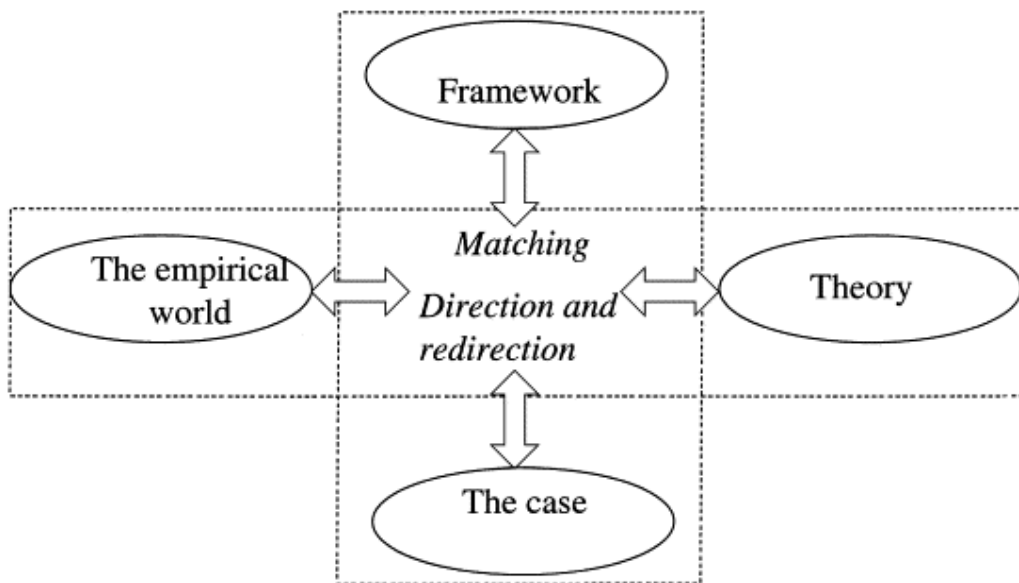


Figure 1: Illustration of systematic combining, according to Dubois & Gadde (2002).

In order to correctly analyze the data that was collected from interviews, the researchers recorded the interviews while taking notes to ensure that no important data was missed. When conducting a semi-structured interview with open-ended questions, taking notes might increase the risk of missing important details (Kabir, 2016). On the other hand, transcribing is

a tedious task that is an inefficient use of time. Though, the past years have seen an increased supply of AI-tools in order to transcribe recorded interviews to text, which the researchers used in this study. Later, the transcribed text was validated and completed by the researchers themselves, which according to Dalen (2015) is useful since it enables analysis at an earlier state.

The data collected from the interviews was analyzed and summarized one by one in order to find common denominators between the interviews. After that, all interviews were summarized into three different subsections (Pre-implementation, Implementation, and Post-implementation) and presented in the empirical result chapter. Following this, the summarizations were analyzed based on the Enterprise Resource Planning implementation Model (ERPIM) presented in subsection 3.4. Lastly, the data and analysis were compared with relevant theory in the discussion chapter in order to form a useful research; not only to the company that the researchers worked with, but also the University and the academic community.

2.4 Reliability and Validity

To judge the quality of the study, analyze the result and design the study, reliability and validity must be considered, regardless of the type of study (Bell et al., 2022; Patton, 2002). Reliability refers to the ability to replicate a study, while validity determines whether the study measures what it intends to measure. In qualitative research, reliability is often challenging because social settings, which often influence responses (Bell et al., 2022), are difficult to replicate. Another challenge is ensuring that the research team interprets the data similarly and agrees on the meaning of participants' responses. Critiques of qualitative studies therefore argue that the studies will become subjective, difficult to replicate, generalization problems, and lack transparency (Bell et al., 2022).

To enhance reliability, both researchers were present during all interviews and collaborated in data interpretation. Additionally, to strengthen the reliability, interviews as a primary data source were used exclusively (Kabir, 2016). To ensure validity of the study, a commonly used way is to have a large enough sample size. This was a challenge in this study since the sample size to ensure saturation is approximately 9-17 interviews (Hennink & Kaiser, 2022), which was difficult to ensure at only two relatively small departments at the company with the limited time frame of the study. To ensure validity under these circumstances and counteract the small sample sizes, sufficient context was given during interviews by so-called “thick descriptions” (Bell et al., 2022). This was done to ensure that empirical findings are more transferable and comparable and therefore make it more valid across different settings.

According to Noble and Smith (2015), personal biases are important to acknowledge when conducting qualitative research reports. This is since personal biases such as employment can affect the outcome of the report and the conclusions. Personal bias might affect what type of answer the participant is giving based on which departments they work in. Therefore, it was important to have an objective approach in order to avoid biases. To ensure this, the same types of question format were used, the responses were anonymous and encouraged open-ended responses. To further decrease the risk of personal bias from the researcher, it has been made clear during the report that one of the authors was employed at Polestar during the time the report was written.

2.5 Ethical considerations

To ensure ethical aspects regarding this study, considerations regarding how the interviews were conducted were important to have in mind. The participants in the interviews were anonymous throughout the whole process in order to take personal integrity and confidentiality into account and to make the interviewee feel safe to answer freely without the risk of repercussions. No personal questions or questions that could reveal who the interviewee might be were asked in order to maintain integrity. All interviews were recorded, and notes were taken in the meantime. Participants also had to give consent to being recorded beforehand, and if it was a problem for that person, note-taking was the only viable option. Recordings of the interviews were deleted after completion of the study and were not shared with anyone except the examiner at Chalmers.

3. Theoretical framework

This section will cover the theories and past studies done in the field of ERP implementation and their connection to success. It will also cover important ways that organizing projects are done and what factors are important to be able to establish a context of the company and to be able to analyze it. First, a general description of what an ERP system is and the benefits will be covered. Secondly, how implementation is usually conducted, and critical success factors will be addressed. Lastly, external organizing and internal organizing will be covered in order to study which factors influence the implementation, both from an outside point of view, and an inside point of view.

3.1 Enterprise resource planning system

Enterprise Resource Planning (ERP) systems are integrated software solutions that streamline business processes across various departments, including finance, production, sales, and human resources (Meiryani et al., 2021). According to the authors it acts as the backbone of business operations and lays a foundation for companies. ERP enhances efficiency, data accuracy, and decision-making capabilities by providing a centralized system for managing organizational resources (Meiryani et al., 2021).

3.1.1 Definition of ERP

ERP systems consolidate business functions into a unified platform, eliminating redundancies, automating tasks, and ensuring real-time data access (Meiryani et al., 2021). The system consists of multiple modules that support key business areas.

According to Meiryani et al. (2021) there are usually four modules which are:

- Financial management modules facilitate accounting, investment management, and cost control.
- Logistics and manufacturing modules optimize procurement, production planning, and quality assurance.
- Human resources management handles payroll, employee administration, and recruitment processes.
- Sales and distribution modules ensure effective customer order processing and supply chain coordination.

Although each module functions independently, they share a common database which allows seamless communication between departments and enhances operational efficiency (Meiryani et al., 2021).

3.1.2 ERP Benefits

This section will explain what different benefits companies can experience from implementing an ERP system. Firstly, operational benefits will be presented. Secondly, financial and efficiency benefits will be shown, and lastly more long-term strategic benefits will be discussed.

3.2.2.1 Operational Benefits

One of the biggest benefits of implementing an ERP system is enhancing business process automation, eliminating manual tasks and streamlining workflows across departments (Chopra et al., 2022). Automation can help to speed up order processing, inventory tracking, and financial reporting, allowing businesses to operate more smoothly (Meiryani et al., 2021). This in turn also results in higher efficiency which later can lead to cost reductions (Chopra et al., 2022). Another key benefit mentioned by Meiryani et al. (2021) is real-time data integration, which ensures that all departments have access to the same information. This eliminates duplicate data entry and inconsistencies that can occur when using separate systems for different functions.

3.2.2.2 Financial and Cost-Reduction Benefits

According to Meiryani et al. (2021) ERP systems also contribute to cost reduction by improving resource allocation and eliminating inefficiencies. Businesses can reduce administrative expenses by automating repetitive tasks such as payroll, invoicing, and reporting (Meiryani et al., 2021). Financial modules help track expenses, manage budgets, and ensure compliance with financial regulations, which leads to more accurate financial decision making.

Chopra et al. (2022) continues by explaining that one of the most significant cost-related benefits is better inventory management, which can help companies avoid unnecessary storage costs and reduce the risk of product obsolescence. This is especially valuable for manufacturing and retail industries, where excess inventory can result in high costs and lost revenue (Chopra et al., 2022).

3.2.2.3 Strategic and Competitive Advantages

Meiryani et al. (2021) explain that ERP systems enhance strategic decision-making by providing managers with real-time insights into business performance. Integrated analytics allow companies to monitor key performance indicators and adjust strategies to respond to market changes more effectively (Meiryani et al., 2021). With access to accurate data,

businesses can identify trends, anticipate customer demands, and optimize pricing and production plans. Additionally, Chopra et al. (2022) mention that ERP systems support scalability, enabling businesses to expand their operations without major disruptions. As a company grows, its ERP system can integrate new modules and adapt to increasing complexity. Cloud-based ERP solutions further enhance flexibility by allowing remote access to business data, reducing IT infrastructure costs while maintaining security and data integrity (Chopra et al., 2022). These features help businesses maintain a competitive advantage in rapidly evolving markets.

3.1.3 ERP implementation and critical success factors

To be able to effectively implement an ERP system, there are several critical success factors that the company must have in mind. According to Saade & Nijher (2016), these factors can be grouped into five major categories: organizational state, business requirements, technical solutions, project implementation, and post-implementation usage. Each category represents a time-line of the ERP implementation process. They will be presented in the subsections down below.

3.1.3.1 Organizational State

The readiness of an organization to adopt ERP determines the implementation success in two main ways (Saade & Nijher, 2016). Firstly, cultural change readiness ensures that organizations foster an environment that embraces change, reducing resistance and facilitating smoother transitions. A corporate culture that values trust and sharing goals is also a key factor regarding culture (Somers & Nelson, 2001; Stefanou, 1999). Secondly, top management support and commitment are essential because strong leadership leads to better resource allocation, conflict resolution, and alignment of ERP objectives with business strategy.

3.1.3.2 Business Requirements

Before selecting and implementing an ERP system, organizations must clearly define their business needs and requirements (Soh et al., 2003; Somers & Nelson, 2001). A strong knowledge capacity production network ensures that organizations effectively capture, share, and apply critical business knowledge. Minimum customization is advisable to reduce complexity and maintain system stability. Legacy systems support ensures seamless integration with existing IT infrastructure, preventing data loss and operational disruptions. Ensuring ERP fit with the organization helps minimize costly customizations and integration challenges. Partnering with local vendors who understand regional business environments can

improve support and customization (Wang et al., 2008). Additionally, detailed cost planning is essential to prevent budget overruns and ensure cost-effectiveness.

3.1.3.3 Technical Solutions

Business process re-engineering may be necessary to align with ERP capabilities and ensure a better fit (Somers & Nelson, 2001; Bharathi & Parikh, 2012). Quality management ensures data accuracy and system reliability. Risk management helps identify and mitigate potential risks early to prevent implementation failures (Bharathi & Parikh, 2012). A detailed data migration plan is essential to ensure smooth data transition from legacy systems, minimizing errors and enhancing system usability (Xu et al., 2002).

3.1.3.4 Project Implementation

The implementation and execution require strategic oversight, effective communication, and a skilled workforce. Measurable goals allow organizations to track progress and measure success (Shanks et al., 2000). A small internal team composed of the best employees with cross-functional expertise enhances project efficiency (Saade & Nijher, 2016). Open and transparent communication fosters collaboration and reduces misunderstandings (Upadhyay & Dan, 2009). Base point analysis through benchmarking against industry standards ensures best practices are followed. To facilitate a high level of motivation in the project, Saini et al. (2013) concludes that morale maintenance is crucial in order to decrease the risk of staff leaving the company, which is one of the more common factors for implementation failure (Mandal & Gunasekaran, 2003). This could, according to Motwani et al. (2005), be achieved by recognizing team efforts and celebrating achievements. During the project implementation phase, it is also important to have a rigid contingency plan in place in order to prepare and handle unexpected challenges, which will ultimately arise and will ensure project continuity and risk mitigation (Saini et al., 2013; Mandal & Gunasekaran, 2003).

3.1.3.5 Post implementation success

Sustaining ERP benefits after the implementation phase requires continuous evaluation and improvement (Saade & Nijher, 2016). Saade & Nijher (2016) summarizes this with these 4 following terms: ERP success documentation, user feedback usage, maximum potential usage, and results measurement. ERP success documentation helps refine best practices and inform future projects at the company (Motwani et al., 2005). Incorporating user feedback enhances system usability and adoption rates (Rebstock & Selig, 2000). Maximum potential usage is encouraged to ensure full utilization of ERP features and maximize return on investment (Dowlatshahi, 2005). Results measurement through ongoing performance evaluations helps identify areas for enhancement and optimization (Umble et al., 2003).

After implementing ERP systems various issues and challenges can arise that in turn will negatively affect the efficiency of the ERP system (Butarbutar et al., 2023). Therefore, it is important to address these challenges to get the most value out of the implemented system.

3.1.3.6 Technology-Organization-Environment framework (TOE)

According to Butarbutar et al. (2023) the TOE framework aims to explain how information systems are adopted, implemented and used in businesses. The TOE framework is divided into three different aspects which are: Technology, Organization and Environment. The technology aspect describes how an information system's features, like infrastructure and technical knowledge, can affect its integration (Butarbutar et al., 2023). The organizational aspect covers factors such as the organization's size, management structure, readiness to use the system, and a supportive environment for its implementation. The last aspect highlights how external entities can affect the system's integration within the organization. Examples of this are engagement with third parties such as consultants or vendors (Butarbutar et al., 2023).

According to Butarbutar et al. (2023) the technological context is also important to consider post implementation of an ERP system. This is one of the critical success factors since it lays the foundation for the system to be used. The authors claim that continuous improvements such as process enhancement, code and data cleaning, optimization and improved interfaces for users, and testing of the system are needed in order to achieve a successful post implementation phase.

The organizational context in the post implementation phase has a significant impact on the success of the system (Butarbutar et al., 2023). Key factors for successful ERP post implementation include support from top management, effective communication, project and change management, key competencies within the teams, teamwork, and thorough post implementation training. Butarbutar et al. (2023) continue by mentioning that in most implementations, the organization has thorough preparation and sometimes lacks the post implementation commitment.

The last context that Butarbutar et al. (2023) mention is the environmental context and its significance in post ERP implementation. Key influences include strong support from consultants and vendors, as well as active user involvement. External entities can help improve the organization's connections, creating positive synergies.

3.2 Internal organizing

In this section, the internal factors based on relevant theories that affect the organizing under the different phases in the ERP implementation will be presented. This will in section 3.4, together with the external factors, result in a model that will further be used in the analysis.

3.3.1 Cross-functional collaboration

According to Rowe et al. (2005), cross-functionality in business refers to the degree to which different organizational functions and processes are integrated, enabling cooperation across different departments. This integration enables employees to better understand how their roles contribute to broader organizational goals, ultimately improving efficiency, decision-making, and customer service. Rowe et al. (2005) continue with explaining that cross-functionality is about how well employees understand how different parts of the business are connected and work together, rather than just focusing on the technology that links them.

One key characteristic for cross-functional collaboration is that there is diverse expertise from different departments who bring different kinds of backgrounds and knowledge (Santa et al., 2011). The authors continue by explaining that cross-functional teams often have more to contribute to idea generation and innovation rather than individuals. Santa et al. (2011) claims that this in turn can foster creative solutions for the organization. With a culture of innovation within the company it also encourages team members to learn more and gain knowledge (Santa et al., 2011). McDonough (2000) continues with explaining the importance of shared goals between the teams in a cross-functional environment. This will in turn result in teams working within the same boundaries and therefore contributing to the common tasks set up by the team. McDonough (2000) also mentions the importance of the team leader and that they play a vital role. The team leader is responsible for enabling effective communication but also setting up clear goals.

Rowe et al. (2005) mention that the implementation of cross-functionality between teams also carries some challenges. One of them is that the implementation itself is complex and difficult. This is due to the fact that acceptance within the team to implement the new ways of working can be challenging (Rowe et al., 2005). Another difficulty is that conflicts can arise between functions that can hinder the adoption of working cross-functionally (De Luca & Atuahene-Gima, 2007). These conflicts of interest need to be managed effectively in order to ensure optimal performance between teams. Therefore, it is vital to have clear leaders and tasks which McDonough (2000) mentions. According to Santa et al. (2011), employees can often have conflicting goals regarding technological innovation, leading to misalignment between strategic objectives and operational execution. Additionally, a lack of a common

language and unclear project goals further hinder collaboration and decision-making (Santa et al., 2011).

3.3.2 Coordination mechanisms

To investigate which coordination mechanisms are used and how they can be developed at the company, a definition to base the analysis on is relevant. It is also relevant to bring up how the literature describes the different parts of it in order to examine the company's coordination mechanisms in use.

Coordination mechanism is, according to Cabitza & Simone (2013), a structured approach used to organize and manage activities within a group working toward a shared objective. As the complexity of modern cooperation in companies has increased, the importance of coordination mechanisms has become more important. To better understand the coordination mechanisms, it can be broken down into several smaller parts. A study of coordination mechanisms by March & Simon (1958) breaks it down into three different parts: Standardization, Planned coordination, and Coordination by mutual adjustment.

Firstly, standardization is about creating routines or rules for the units that are linked together in interdependent relationships in order to create clear paths. Secondly, planned coordination is about the establishment of schedules to regulate the activities of the interdependent relationships between units. Lastly, coordination via mutual adjustment is about knowledge acquisition and sharing between the units, to ensure that the coordination mechanisms are developed over time as new information is created. These three parts have later been further developed by Mintzberg (1979), who differentiates the standardization part between standardization of work processes, standardization of output, and standardization of skills. Mintzberg (1979) also added direct supervision as a part of the coordination mechanisms, which means that one individual takes responsibility to coordinate the work between units by instructing and monitoring them.

3.3.3 Change Management

The large change for the company during an ERP implementation can be difficult to execute and to ensure that the employees actually change the way they work and to make it as smooth as possible needs to be addressed. To manage the change, this research will use the concept of change management as the theory of analyzing the company's strategy. Change management is a structured approach aimed at implementing organizational changes, including new missions, strategies, structures, and processes (Hermold, 2022). The objective is to create a strategy for change that can achieve sustainable competitive advantage and long-term success.

Effective change management requires careful planning, execution, and adaptation. A successful change management strategy, according to Inca Soller et al. (2024), largely depends on leadership commitment, clear communication, employee involvement, and continuous monitoring. For instance, management must actively guide change initiatives, ensuring acceptance in the whole organization. Clear communication aligns employees with goals and reduces resistance. Engaging employees and providing training creates ownership and equips staff with necessary skills. Ongoing monitoring allows organizations to refine strategies based on feedback.

Change management can be broken down into three phases: preparation, implementation, and evaluation. Preparation involves assessing the need for change and developing an action plan (Puranik & Mulik, 2024). Implementation requires strong leadership, effective communication, and training (Chodos, 2007; Inca Soller et al., 2024). The evaluation phase measures impact, collecting feedback, and refines strategies and processes for continuous improvement (Oakland & Tanner, 2007).

In order to achieve effective change management on an operational level, there are some key success factors and failure factors that need to be addressed. These include clear communication, top management commitment, and active employee participation (Chodos, 2007). Failure factors include resistance to change, short-term focus, and lack of adaptability (Noroozi et al., 2024). Addressing these proactively further improves the implementation. On a strategic level, it is important to assess the organizational readiness, strong leadership, maintaining open communication, employee training and stakeholder involvement (Inca Soller et al., 2024). These aspects might help decrease resistance, which is often a consequence of fear of the unknown and loss of control (Noroozi et al., 2024).

3.3.4 Cultural context

To understand how a large change in a company is perceived and executed, the cultural aspects and context of the company will be relevant to discuss. A widely used theory to be able to conduct a cultural examination and find relevant factors of the effects of cultural context is Hofstede's Cultural Dimensions Theory. The theory will be used as a framework for understanding cultural aspects of the researched company. While it is originally used to explain and examine differences between countries, it has been used as a tool to understand corporate culture and corporate context (Lo et al., 2017; Khlif, 2016). The theory consists of six dimensions that explains how people in a certain culture act in different ways (Hofstede, 1984). To understand how Hofstede's cultural dimensions impact a firm, it is essential to explore the dimensions covered by the theory: power distance, individualism, masculinity,

uncertainty avoidance, long-term orientation, and indulgence (Hofstede, 1984). These dimensions influence the firms' behavior and management practices based on the context in which a firm is situated, largely depending on corporate culture and the national culture (Gallego-Álvarez & Pucheta-Martínez, 2021). According to Gallego-Álvarez & Pucheta-Martínez (2021), there are several positive and negative effects to a firm depending on which dimension the corporate culture leans towards, particularly the effects of innovation, where positive effects could be found for innovation when there is high power distance, masculinity, uncertainty avoidance, and long-term orientation. High individualism was associated with discouragements of innovation.

Furthermore, in the context of this research, Engelen et al. (2012) argues that cross-functional collaboration in individualistic cultures (e.g. Sweden) might be weakened, because employees in these cultures prioritize personal achievements over group goals. A strong corporate culture was irrelevant, since in an individualistic society it had no significant impact on cross-functional team success. Beyond cross-functional team success, Škerlava et al. (2013) argues that the national and corporate culture can have an impact on how employees share information and how they best learn new practices. For instance, in individualistic societies where people prioritize independence and personal achievement, their research suggests that managers should actively promote peer-to-peer information sharing i.e. encouraging employees to exchange knowledge and skills with each other. They should also create an environment fostering collective learning, where learning happens as a group, rather than just at an individual level.

3.3.5 Knowledge sharing

The SECI model, created by I. Nonaka and H. Takeuchi, explains how tacit knowledge is transformed into explicit knowledge (Gierszewska, 2012). It follows a continuous cycle with four stages: Socialization, Externalization, Combination, and Internalization. This process is key to knowledge creation in an organization, showing how knowledge grows and spreads from individuals to teams and the entire organization. It happens through dynamic social interactions between tacit and explicit knowledge.

Gierszewska (2012) explains that socialization involves the sharing of tacit knowledge through observation, practice, and shared experiences. When team members share their knowledge between each other they help shape the organization's culture and expand the tacit knowledge. The sharing of the knowledge often occurs when team members have been part of different projects but also collaboration between team members. According to Gierszewska (2012) this helps to create new knowledge within teams that can be utilized.

The second step is the externalization, this process transforms tacit knowledge into explicit knowledge using metaphors, analogies, concepts, or models (Gierszewska, 2012). Some examples of explicit knowledge are to have it written down in documents, knowledge pages, audio files etc. Gierszewska (2012) argues that by providing training, knowledge can improve among employees. Here managers for each segment can express training needs that are key for success and by doing this transforming the training needs to meet strategic objectives and goals.

The third step of the SICA model is combination, where different types of explicit knowledge are merged to create new knowledge (Gierszewska, 2012). This includes processing data into management information and developing strategies. Explicit knowledge is structured, applied, and shared across the organization, often relying on information management systems and technology.

The last step is the internalization step, where explicit knowledge is transformed into tacit knowledge, strengthening the organization's expertise (Gierszewska, 2012). This occurs as employees apply established policies and managerial decisions in their work, turning theoretical knowledge into practical skills through hands-on experience. Gierszewska (2012) argues that this process is essential for both daily operations and long-term growth, as internalized knowledge becomes a valuable strategic resource.

3.3 External organizing (ARA-model)

External factors that will affect the implementation in the different phases at the company will be presented in this section. The theory presented in this section is the ARA model, which is commonly used to determine interconnected processes in and across organizations.

Håkansson & Snehota (1995) explain the intercompany relationships within industrial markets, adopting a "relationship view" that focuses on connections between companies over time, rather than isolated transactions. The key dimensions explored include the development of activity links, resource ties, and actor bonds, all within a framework of stability and change.

3.2.1 Activity links

The activity links represent the connections formed when interdependent activities are coordinated between two or more businesses (Håkansson & Snehota, 1995). These connections affect how companies operate and shape the overall business network. According to Håkansson & Snehota (1995) activity linking refers to the mutual adjustments companies

make to align their operations more effectively. These adaptations can take various forms, such as exchanging information, modifying transportation and handling processes, adjusting payment routines, refining production methods, or adapting products to better fit business needs. Gadde et al. (2003) explains the activity dimension of the ARA model and emphasizes the key tasks required within and between firms. The authors continue by explaining that it is important to examine who is responsible for these tasks and how they are carried out using various resources, including human capital, technology, and raw materials. These activities are interconnected and depend on one another, making effective coordination essential. Achieving this coordination often requires clear communication and a smooth flow of information (Gadde et al., 2003). The way that activities are structured has significant financial consequences where costs, productivity, and overall profitability in both the short and long term are impacted. Learning how to manage these aspects effectively is vital for improving operational efficiency and fostering sustainable growth.

According to Håkansson & Snehota (1995) it is also important to look from a management perspective. Effectively handling business activities and their connections is crucial for improving a company's performance, capabilities, and strategic position. This involves three key areas: managing individual activity links, optimizing links across multiple relationships, and positioning within the broader business network.

First, businesses must synchronize activities within individual relationships to improve efficiency (Håkansson & Snehota, 1995). This means that businesses need to coordinate and align their activities with partners to improve efficiency including proper timing, structure, and quality adjustments. While assessing their impact can be complex, these links are essential for economic success. Håkansson & Snehota (1995) explain that clear responsibility and communication with partners help ensure smooth operations and reduce misalignments. Håkansson & Snehota (1995) continue with explaining that businesses must optimize their entire network of activity links. According to the authors some relationships are more critical than others and can be leveraged for cost efficiency, specialized performance, or long-term development. One challenge with this is to maximize benefits while avoiding disruptions in operations.

Lastly, Håkansson & Snehota (1995) explain that companies must continuously adapt their activity links to stay competitive. These connections not only help operations run smoothly but also provide a strategic advantage. Monitoring industry changes and adjusting accordingly is crucial for maintaining a strong market position.

3.2.2 Resource ties

According to Gadde et al. (2003) the resource value is based on how the resource is used and for what purpose. Therefore, it is important to understand that different combinations of resources can provide different value for the firm. By doing this companies can utilize the resource ties fully and improve efficiency and effectiveness overall in the business.

Håkansson & Snehota (1995) explain that resource ties in business relationships connect the resources of two companies, enabling the exchange, access, and shared use of these resources. These ties reflect the knowledge and skills required for resource utilization, as well as the technology used by the companies. The authors argue that such relationships help companies mobilize resources and make them available to others.

The value of a resource element depends on the number of resource ties (Håkansson & Snehota, 1995). In return, a greater number of ties can enhance resource utilization and make substitution more difficult. These ties link different resource elements, which means that any change in one resource requires coordination among others. Additionally, changes in resource use affect all those who rely on or provide resources through specific ties.

According to Håkansson & Snehota (1995) business relationships act as a key mechanism for companies to access and develop resources. Resource ties influence a company's ability to innovate by allowing firms to acquire or access specific resources from others and integrate them into their own resource base. However, these ties can also be a negative for the company, placing constraints on a company's strategic flexibility. Managing resource ties effectively is important for securing access to existing resources and fostering resource development (Håkansson & Snehota, 1995). Relationships not only provide a way to acquire resources but also serve as a means to develop them. Leveraging the resource dimension of a relationship requires investment, which can have both positive and negative effects on a company's resource portfolio and that of its business partners.

3.2.3 Actors bonds

Gadde et al. (2003) explain that the actor dimension is the one that is responsible for coordinating and organizing the resources and activities. This means that the actors are the ones that perform the activities with the resources. The actors are responsible for planning strategies, coordinating tasks efficiently, and responding to changes in the business environment. Through effective resource and activity management, they contribute to the organization's success and help sustain its growth and competitive edge. From a network perspective, actors influence and compete with each other while shaping and being shaped by the network in which the company is situated (Gadde et al., 2003). Ultimately, the network

perspective shifts the definition of an actor from an internal focus to an external one, where firms are defined by the resources they mobilize and the activities they engage in.

3.4 Enterprise Resource Planning Implementation Model (ERPIM)

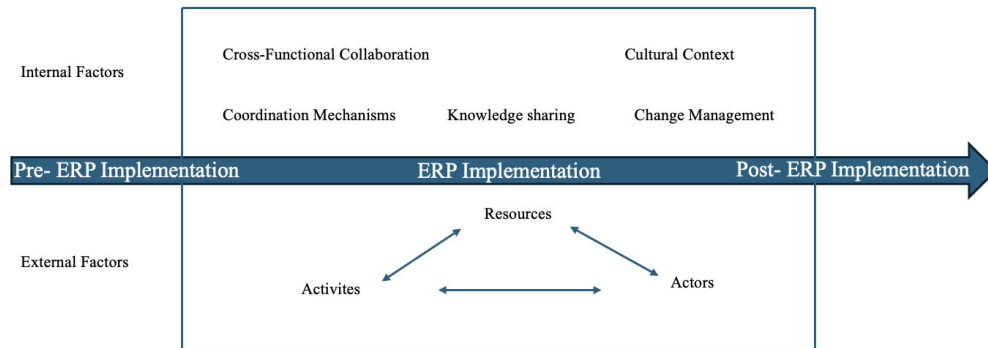


Figure 2: Conceptual model for analyzing ERP-implementation.

To be able to answer the research questions, and to support the analysis of the interview data, the researchers developed a conceptual model that captures the key factors influencing ERP implementation across its different phases: pre-implementation, implementation, and post-implementation (see Figure 2). The model has been developed to offer a clear structure for understanding the ways that internal and external factors influence each stage of ERP implementation. The internal factors stated in the upper part of the model, such as cross-functional collaboration, coordination mechanisms, knowledge sharing, culture, and change management are highlighted due to their critical roles as success factors in shaping ERP implementation outcomes which is described above in section 3.2 covering *Internal organizing*. The lower part of the model draws on the ARA-model developed by Håkansson and Snehota (1995), which is covered above in section 3.3 under *External organizing*, which highlights the dynamic relationships between activities, resources, and actors. These are treated as external factors in this study, as they shape the broader context in which ERP implementation takes place. By incorporating the ARA-framework, the model acknowledges that ERP projects are not only driven by internal organizational dynamics but also by the interactions and dependencies among various actors, the resources they control, and the activities they engage in. This approach helps capture the interconnected nature of ERP implementation, where outcomes depend on how well the parts in the ARA-model and internal factors are aligned and managed throughout the project. By using this model, the aim is to enable a systematic and consistent analysis of the empirical data, ensuring that relevant themes are identified and interpreted within a coherent analytical framework.

4. Empirical results

This section will cover the results from the pre-study, data and extractions from the interviews, and findings from the literature study.

4.1 Polestar background

The global electric vehicle (EV) market has experienced rapid growth over the past decade, driven by increased environmental awareness, technological advancements, and supportive government policies. However, it stands for a big challenge with rising uncertainty around the world with new trading policies and tariffs that might affect global trade. The recent tariffs imposed by the USA at a rate of 25% for all imported cars forces several actors to look over their supply chains. Following this, China has imposed retaliatory tariffs on US goods as well. As of today, Polestar has production in the USA and China, however it is only the Polestar 3 that is manufactured in the factory in South Carolina and Polestar 2 and 4 are currently manufactured in China, but Polestar 4 will complementary be manufactured in South Korea sometime in 2025.

Polestar as a company does not own the production itself, rather it has outsourced it to its owners Geely and VCC. When Polestar gets a car order, they in turn order the cars from VCC's or Geely's production sites using their ordering systems. Polestar does not handle either scheduling or distribution to their customers as well. This imposes loss of control from Polestar's point of view and therefore the company wants to have full ownership of these ordering processes in the future. Thus, implementing a better and more scalable ERP system like SAP is necessary to support this vision. Polestar additionally wants to own its financial data and have a process where they can independently operate in SAP and not rely on VCC and their current system, which is now the current state. There is also much financial data that is lost during this transition, which makes it necessary for Polestar to have ownership over this. The current ERP system, which is Workday, is described as not sufficient to support the current market regulations and the future vision of Polestar, mainly in terms of financial reporting and supply chain management. The company started the project in a different time and context. Due to Polestar's growth the past years, the landscape for the project and structure of the company has changed, which have in turn led to changes in the prerequisites for implementation.

4.2 ERP Implementation at Polestar

This section will cover the data collected from the interviews. The data is grouped based on which phase in the implementation it covers. The three different subsections will be the

following: Pre-implementation Phase, Implementation Phase, and Post-Implementation Phase.

4.2.1 Pre-Implementation Phase

In the pre-implementation phase, the stages Polestar has to go through before implementation, include pre-study, planning, contracting with technical supplier and consultancy firms (Solution integration partners or SI-partners).

Across nearly all interviews the main decision to transition to SAP S/4HANA was said to have been driven by the need for independence from VCC's existing SAP system called SAP ECC environment and the incapacity of the Workday system for a comprehensive enterprise resource planning solution for their entire supply chain. Another important driver for change, the most basic one according to some respondents, was to become IPO ready in the US stock market, e.g. to fully follow the current regulation to enter the US stock market, which comes with regulation in place that makes it problematic for Polestar to continue to use VCC's SAP ECC system. This is largely because VCC is now seen as a competitor, and the sharing of platforms creates many issues regarding rules of competition. Respondents also frequently cited Polestar's market expansion, organizational restructuring, and pressure from SAP itself as critical catalysts that indicated the need for the implementation. For example, Respondents A, B and K pointed to pressure from SAP's announced discontinuation of the SAP module ECC as reasons for adopting the new SAP module S4/HANA. Respondent G also emphasized the inefficiencies of managing operations across all the current ERP systems in place and explaining the complexity of coordinating everything. Respondent F pointed to the need to change ERP system because of the large expansion the company has gone through, which have made controlling and accounting operations more resource demanding.

There was a notable consensus regarding organizational unreadiness for such a transformation on a large scale. Every respondent except for one described a general perception initially of the ERP implementation as an "IT project", rather than a company-wide business transformation. This mischaracterization led to a lack of engagement from several departments and insufficient buy-in from leadership during the planning stages. Respondents A and I were especially critical of the former management's failure to communicate the strategic significance of the project and to allocate resources for foundational tasks such as data cleansing and change management. Another frequently mentioned factor that they lacked initially was knowledge and expertise about the implementation, which made scoping and planning for the implementation inadequate. Some respondents said that, as a consequence of the lack of expertise, the scope became too large and undefined, which caused fundamental

processes not to be established at first. The initial planning and scope were seen as a bit too optimistic for some respondents, which caused doubt.

The majority of the finance representatives generally expressed a high level of motivation to switch to the new SAP S/4HANA system. This motivation was rooted in the eagerness to gain ownership over more effective systems and by having a better overview. However, there has been a general lack of alignment between departments which was an issue and has contributed to the delay of the project. Both Respondents B, D, J and K observed that early communication across departments was limited, and that roles and responsibilities were not clearly defined, leading to fragmented efforts during the initial phase. The predominant portion of the digital employees often mentioned the lack of clear goals, a general uncertainty of the project, and an absence of change management, though some respondents in this department thought their team was well prepared and well trained for the implementation.

A further shared theme was the heavy dependency on external SI-partners during this phase. The reliance on SI-partners is rooted from the lack of internal expertise at Polestar, necessitating external support. Respondents A, F, and G noted that the strong dependence on SI-partners caused a lack of internal ownership and knowledge transfer between SI-partners. This dependency later contributed to control issues as the project matured. During the duration of the pre-implementation, two SI-partners were used. The first one was a part of the earliest stages of planning and the pre-study, but due to their perceived high cost, the contract was terminated. The reason for the high perceived cost was due to inadequate contracting and specification of what the SI-partner should deliver. The collaboration with this firm was, however, described by the majority of respondents as a favorable partnership and good collaboration. The latter SI-partner was chosen due to their lower cost, but this has resulted with some consequences according to some respondents. The SI-partners were initially based on-site at Polestar, but after a renegotiation about the contract, the SI-partners were mostly moved abroad, which a few respondents claim to have led to some inefficiencies and miscommunications. The latter SI-partners were also perceived as lacking change management skills and project management competency which, from Polestar's perspective, was something that was seen as a prerequisite for the project.

4.2.2 Implementation Phase

In the implementation phase, the project will move from strict planning for the change but take actionable steps towards technical and organizational implementation. Rigorous evaluation, data migration, inspection, and testing will be conducted in this stage. Process creation, establishing routines and standards are also central parts of the implementation

stage. System viability, security, and system functionality are vital. After the go-live date, only limited sections of the entire ERP system of SAP S/4HANA will be implemented. More and more parts of the whole ERP system will be added gradually until the system is ready to go-live in the entire organization. Training is also a large part of this stage but will mostly consist of training of “super-users”, who will be in charge of training the end-users in a later stage of implementation. Polestar calls this “train-the-trainer” and these employees will also be the first line of support when the system eventually goes live. The go-live was planned to occur in early May 2025 but after an abrupt decision from current management, the project was postponed to sometime in 2026.

During the implementation stage, the project became increasingly complex. One of the most consistent observations was that collaboration improved over time but began from a very fragmented state. Respondents B, C, and G, which are all from different departments, described how teams initially worked in silos, which only later evolved into more cross-functional collaboration, particularly as testing and integration required broader involvement. However, challenges in collaboration persisted throughout the implementation. Respondent F noted that departments were moving at different speeds, resulting in misalignment, while Respondent A described the interdepartmental trust as “disastrous”, with a culture of blame emerging due to poor communication, low confidence, and distrust in team competencies.

The ways of communication during implementation between departments varied widely depending on the departments that the respondents worked in. Respondents B and H referred to structured weekly meetings and dedicated spokespersons, while others, such as Respondents D and F, indicated that communication was largely ad hoc and unstructured. Respondent A criticized the absence of designated contacts and the over-reliance on email chains for communication, describing a lack of structured communication pathways as a key problem.

Communication between management and operational teams was frequently criticized. Respondents D, F, and I specifically pointed out that managers often failed to attend workshops or training sessions, leading to a perceived lack of endorsement from leadership. This lack of visibility discouraged engagement from those lower in the hierarchy, who interpreted this absence as a signal that the project was not a priority. As Respondent E observed, the absence of managers during training “sent the wrong message”, especially to super-users who were expected to take on significant responsibilities without institutional backing.

Training was widely recognized as essential, but its implementation varied significantly. Several respondents, including C, E, and G, noted that training was often incomplete or delayed due to shifting go-live dates. A common issue was the lack of hands-on training, respondents like H and E emphasized that much of the instructions remained theoretical. This gap in practical preparation was further compounded by the limited involvement of key users in some areas, which Respondent F warned could lead to problems after go-live. Some respondents mentioned that super-users were unaware of their role as first-line support, which indicated lack of communication around roles and responsibilities.

Testing activities were a central concern in many accounts. Respondents D, G, and H identified testing delays and incomplete validation, as significant contributors to project delays, especially in complex areas such as outbound logistics and vehicle configuration. Respondent D, in particular, described the testing phase as a discovery of the deep interdependencies within the system and the complexity of it, which many teams were initially unaware of. This in turn resulted in more work that needed to be done and tested in order to be ready for the go-live date.

Leadership and decision-making processes were another recurring area of concern. Respondents I and A criticized management and felt that they failed to make timely decisions and for providing unclear delegation of authority, which led to slow progress. Respondent C similarly observed that disagreements over decision-making authority often stalled negotiations with SI-partners. However, at the same time some respondents felt that there was good support from the management, especially with the new management. The old management was perceived as both naive when it came to time management and also a lack of expertise to be able to lead an entire organization through an implementation of such a large scale that an ERP implementation represents.

Ownership and accountability continued to be problematic during implementation. Respondents A, D, and I all noted that few departments took clear responsibility for their areas and that no one is in charge, or at least that it was unclear if someone is in charge. This was particularly evident in master data management and data migration, something that was mentioned across nearly all interviews, but was noticeable in many aspects of the project.

4.2.3 Post-Implementation Phase

In the post-implementation phase, process enhancements, continuous improvements, further user-training and system maintenance will have a large focus in order to ensure efficiency, effectiveness and further development in the new ERP system. SAP frequently launches new

updates because new rules and regulations in different countries will affect how business needs to be conducted. This could be for example taxation, tariffs or regulations. In order for the updates to work, as few customizations and modifications in the system as possible is desired so issues in the system can be minimized, which is called the concept of “Clean core”. A clean core is maintained using standardized systems and reduces long-term costs by simplifying the system landscape, increasing the scalability, reduces the risk of errors and issues after updates, and avoiding extensive custom development that requires ongoing support.

Looking ahead, respondents expressed both optimism and concern about the post-implementation phase. A key theme was the challenge of maintaining and developing the system without reverting to manual workarounds and shortcuts. Respondents A, B, and G emphasized that while some manual processes had been temporarily introduced to address earlier issues, there was a risk of them becoming permanent if not properly phased out. However, respondent B also noted that certain tasks were best kept manual, as fully automated tasks were not always practical or cost efficient.

In addition to concerns about data quality and technical readiness, respondents A, G, and H highlighted the risk of under-utilizing the system after launch. Without sustained efforts in training, ownership, and continuous improvement, the system could stagnate, leading to inefficiencies and an increased reliance on manual workarounds, which could ultimately undermine the intended benefits of automation and standardization in the new system.

The concept of continuous improvement surfaced in many interviews. Respondents A, C, H, and F discussed plans for data cleaning and process optimization, but also emphasized that these efforts would depend on prioritization and sustained leadership commitment. Respondent A and F warned that without proper attention to master data control, the benefits of the ERP system could be undermined. Many respondents mentioned that it was unclear whether the project had a plan for data cleaning. If not properly addressed, future problems could arise according to the respondents, leading to costly post-implementation fixes and inefficiencies due to large amounts of bad data entering the new system. As one respondent referred to how the entry of bad data could affect the post-implementation: “Shit in, shit out.”

Support and maintenance responsibilities were also widely discussed. Most respondents agreed that the current SI-partners would be phased out gradually, with internal teams taking over. However, there was significant uncertainty about governance structures and process ownership. Respondents F and I expressed concern that business modules lacked clear

responsibility post go-live, while others, such as H and D, noted that master data ownership remained unresolved which they meant as being a very urgent task to solve. After go-live and the hypercare phase, an external support provider will handle supporting activities such as ticket resolutions and malfunctions in the system. Hypercare refers to the period immediately following the go-live phase of the SAP S/4HANA implementation, during which additional support, monitoring, and troubleshooting are provided to ensure the system runs smoothly and any issues are quickly addressed. There is a unified consensus that this period will be supported by the current SI-partner and the external support provider. After this period, the SI-partner will no longer be a part of the post-implementation phase, and the responsibilities will shift to the external support provider. There was also a feeling of concern about the strong reliance on external expertise. Some respondents expressed anxiety about knowledge transfer and long-term sustainability. The implementation plan from consultants to internal teams remained vague for many, and few respondents felt confident that the company would be self-sufficient post-implementation.

Training remained a prominent topic. Respondents E and F worried that the inconsistent engagement during training would lead to high dependency on limited key users after go-live. Many respondents noted that too few employees and managers attend these training sessions, and when the manager does not attend the employees might feel that the training session is not a priority and ultimately would postpone it. As a consequence of that, the employees might prioritize other tasks that feel more urgent even though they are not, hence managers' engagement and support is crucial for this to be addressed. Support channels such as Teams chats and on-site assistance were being set up, but several respondents doubted their sufficiency given the scale of the change in ways of working in the new system.

Despite the many challenges, most respondents expressed a belief in the long-term potential of the new ERP system. Improved data quality, greater automation, and enhanced process ownership were seen as achievable goals. Ownership of the data was also seen as a long-term benefit and to phase out the dependency from VCC. Currently, the access of certain types of data is either not available or very difficult to get, meaning that the lack of control at the moment leads to inefficiencies in the supply chain that they do not know about. Respondents C, G, and H emphasized the opportunity to standardize operations and lay a foundation for scalable global processes. However, they stressed that this would only be possible with continued investments and engagement in training, governance, and cross-functional collaboration. Without these, the implementation risks stagnation, limiting the intended benefits of automation and data control.

5. Analysis

In this chapter, the internal and external factors presented in the Enterprise Resource Planning Implementation Model will be analyzed at Polestar, which stems from the theoretical framework. The analysis will result in a complete model for the different phases and where different internal and external factors are the most important or most influencing.

5.1 Internal Factors

The internal factors will consider how the company is affected by internal context and processes, as well as leadership and decisions.

5.1.1 Cross-Functional Collaboration

Cross-functional collaboration was a critical but inconsistent internal factor throughout the ERP implementation lifecycle. During the pre-implementation phase, a big issue was the mischaracterization of the ERP implementation as merely an "IT project." This framing seemed to have reduced engagement from key business departments and the involvement of stakeholders to a limited technical group. As noted in the results, departments operated in silos, and collaboration was weak due to unclear responsibilities and poor communication. Respondents claimed that many important decision makers failed to see the ERP initiative as a company transformation, and as a result, they overlooked the need to involve expertise from different departments early on. The absence of cross-functional teams early in the project led to delays and misalignments that also continued into later phases. For example, the failure to properly scope the project, as described in the results, could be linked to insufficient input from key departments such as finance, purchasing, and HR, who would be directly impacted by the new system.

In the implementation phase, there was a gradual but notable shift towards improved collaboration, primarily driven by the practical demands of system testing and data integration. As teams recognized the interdependencies within SAP S/4HANA, they needed to collaborate between departments. However, this shift was reactive rather than strategic, driven by immediate operational needs instead of a shared vision. There was a perceived trust issue between different departments and the rise of a blame culture might have hindered further collaboration. The trust barriers also led to double checking of the work from other departments, knowledge sharing was hindered, and communication absent, which created inefficiencies. Departments largely differed in terms of how well the new system was perceived and how the implementation was proceeding. The Digital department was mostly negative and felt that the organization was not ready. The Finance department had a

completely opposite view of it. Their experience of the first part of the implementation is mostly positive and that the project would continue as planned. This might be a cause of lack of communication and alignment, but certainly a lack of understanding of other departments' issues and challenges, which clearly indicates a lack of cross-functional collaboration.

Despite these limitations, some departments successfully developed more effective working relationships during this phase, with project management and other employees playing a key role in bridging departmental divides. This progress demonstrates that cross-functional teams at Polestar can be created and succeed if given the right resources, support, and project lead.

In the post-implementation phase, the need for a capable cross-functional collaboration became even more obvious for the company. The risk of going back to silos can weaken the system's intended benefits, such as automation and standardization between departments. Respondents expressed concern about maintaining collaborative efforts, particularly in areas like process ownership and data governance.

As a conclusion, we believe that cross-functional collaboration was an important factor that affected the outcome of the implementation in all phases. It became clear from the respondents' point of view that the organization was not ready for this implementation because of limited cross-functional collaboration and lack of trust. Though cross-functional collaboration determines the level of success in all phases, the organization needs it as a foundation in the pre-implementation phase in order to build everything else. Because of the nature of an ERP system as an organizational-wide platform, the need for cross-functional collaboration then continues both during the implementation and post-implementation phases.

5.1.2 Coordination Mechanisms

Coordination mechanisms were both underdeveloped and inconsistently applied throughout their ERP implementation, impacting the efficiency and unity of the project. In the pre-implementation phase, coordination was minimal. Many departments reported working independently, stated above as silos, and several respondents mentioned that this directly led to lack of clearly defined roles, timelines, and accountability structures. The absence of standardized processes led, for instance, to fragmented planning and scope definition. Planned coordination in the form of structured meetings or shared platforms was not institutionalized, which led to confusion, especially in relation to decisions that were made. The coordination was also affected by the dependency on external partners, such as VCC, but without formal coordination mechanisms resulted in knowledge gaps and reduced internal ownership, complicating the implementation.

During the implementation phase, some improvement was noted. Structured meetings and the designation of spokespersons within certain departments indicated a move towards planned coordination. This also increased knowledge sharing between departments. However, the variation in coordination quality across departments highlights a lack of central governance. Communication remained ad hoc in many cases, and mutual adjustment, adaptation based on shared learning and interaction, was limited. This is particularly problematic in ERP projects, which require synchronized efforts across technical and operational teams.

It is worth noting that some teams were able to implement more systematic workflows and use regular checkpoints to better manage their responsibilities. These initiatives reflect growing maturity in coordination practices within parts of the organization.

Post-implementation, unresolved coordination issues pose significant risks. Without standardized processes for governance and support, there is a likelihood of duplicated efforts, inconsistent data management, and increased reliance on informal workarounds. Respondents mentioned the unclear division of responsibilities between internal teams and external support providers, which is a signal for failure to implement rigid coordination mechanisms into the operational processes of the organization.

Coordination mechanisms, in the context of ERP implementation and success, are an important factor in all phases, but to reduce the risk of costly changes later on, it is crucial to have effective and standardized processes and routines. It is also crucial in the sense that activities in an ERP implementation are highly interdependent, and without clear schedules to regulate the activities the planned coordination between units fails. As noted in the implementation, new information and challenges have been exposed during the lifecycle, and by acquiring and sharing this information, the coordination mechanisms can be developed over time via mutual adjustments. This makes coordination mechanisms central in an implementation of this magnitude. These mechanisms have to be established before implementation.

5.1.3 Change Management

Change management was consistently identified as a major weakness across all implementation phases. In the pre-implementation phase, the lack of a structured change management approach led to a fundamental misalignment between the ERP project's strategic objectives and the perceptions of key stakeholders. In addition, former management failed to

articulate the importance of the ERP implementation and to provide necessary support for early-stage activities like data cleansing and stakeholder onboarding.

As a result, the implementation began with inadequate preparedness, particularly in terms of employee mindset and organizational readiness. This lack of preparation directly impacted the implementation phase, where uneven training and poor leadership visibility were repeatedly cited. Respondents noted that key users were unaware of their responsibilities, and managers were often absent from training sessions, sending a message that the project was not a top priority. Nevertheless, the appointment of super-users and the adoption of a train-the-trainer model represent a structured attempt to manage change, indicating that the organization recognized the need for internal change agents. These elements form a useful foundation for building a stronger change management strategy.

In the post-implementation phase, change management remains an ongoing issue. Manual workarounds, while sometimes necessary, have the potential to become permanent solutions that erode the benefits of standardization. The workarounds seem to be a response to the lack of engagement and lack of vision for the overall users, who instead of using the new system finds it easier to make up their own routines, which will pose a future problem regarding standardization. Respondents expressed concerns that without long-term leadership support and structured follow-ups, the system's potential would remain underutilized. Polestar's vague governance plans and reliance on key individuals suggest that change management is not yet institutionalized, which could hinder the sustainability of the ERP system.

To conclude, change management has been shaping the perception from the perspective of the employees of the implementation at Polestar notably. When it comes to the importance of it during the lifetime of the project, it is most reasonable based on the data to determine that it is most influential during the implementation phase. It is when super-user and other operational users will need to be trained and change their ways of working. The organization as a whole need to be adapted to this change and that becomes heavily visible during the implementation phase. It is worth noting that change management is also about preparation and evaluation, which occurs in the pre-implementation and post-implementation phase respectively, which makes it important in both of these stages as well.

5.1.4 Cultural Context

Cultural factors played a subtle role throughout the ERP implementation project. Polestar operates within a Swedish organizational context, which is often characterized as highly individualistic with low power distance. In the pre-implementation phase, this cultural context

might have manifested in decentralized decision-making and reluctance to engage in collective ownership of the project. Respondents described the early project environment as uncertain, with leaders hesitant to take responsibility and leadership failing to enforce centralized strategic control.

During implementation, these cultural dynamics contributed to a fragmented and sometimes dysfunctional working atmosphere, which aligns with respondent descriptions of a blame culture and the absence of trust. However, Polestar's collaborative values and open communication channels, typical of Swedish corporate culture, were viewed positively by some respondents, particularly in terms of accessibility to colleagues and horizontal communication. However, the knowledge transfer between departments was also described as lacking, which might be because of the cultural tendency towards independence and decentralization. The training sessions that were imposed were mostly voluntary participation, which might have led to lower participation rate due to the cultural context of prioritizing individual goals above group goals. Some respondents also pointed to an overall resistance to change at the organization in some areas or departments, which could be a signal of a dysfunctional corporate culture. This is also strengthened by the blame culture and the departmental divide that were noticeable.

Cultural tendencies toward decentralization and individualism affected leadership clarity, strategic alignment, and stakeholder ownership from the start of the project. This later on affected communication between departments and training in the implementation stage. There is little you can do in the implementation stage to mitigate this when the damage is already exposed. Polestar should have analyzed the cultural context before and during pre-implementation in order to make better risk assessment and a more adequate roadmap that takes the culture setting in the organization. Therefore, our analysis concludes that the cultural context is something that must be explored in the start of the pre-implementation.

5.1.5 Knowledge Sharing

Knowledge sharing, particularly the internalization of knowledge from external consultants, was a critical shortcoming throughout the ERP project. The pre-implementation phase was marked by a heavy reliance on SI-partners, a necessity due to Polestar's lack of internal ERP expertise. The results indicate that this reliance hindered effective knowledge transfer. It became apparent that both socialization and externalization are key to building a sustainable knowledge base. Polestar's failure to establish mechanisms for documenting and disseminating expert knowledge early in the project led to significant challenges during implementation. The change of SI-partners several times during the pre-implementation phase

in combination led to inadequate transitions and loss of important knowledge which was lost. The loss of important key personnel during the duration of the project also led to loss of important knowledge. It is evident that there is a lot of tacit knowledge in the company, but due to departmental silos this knowledge is not shared through socialization. One reason for not sharing the knowledge and documentation can be that there is a lack of time and is not required. This is based on the fact that many respondents expressed that they had a lot of time pressure and because of this they may not prioritize explicitly writing down the knowledge. Another reason can be that there is no real structured way of doing this, the company may lack the structure to facilitate such documentation. This is strengthened by the fact that documentation has occurred in some parts of the project but rarely read or used.

In the implementation phase, efforts such as the "train-the-trainer" model were introduced to externalize tacit knowledge into explicit knowledge. Some super-users were not fully aware of their roles, and many employees received only theoretical training without practical moments. The combination and internalization stages, where explicit knowledge is merged and created into tacit and operational expertise, were poorly executed. This is particularly concerning given the complexity of the ERP system and its reliance on informed user input for accurate data migration and testing. With that said, several departments did manage to build informal peer-to-peer learning networks, which helped to circulate knowledge between users. These initiatives are positive signs of a developing knowledge-sharing culture within the organization, where tacit knowledge is turned into explicit knowledge.

In the post-implementation, the respondents recognized the importance of knowledge sharing by for example the introduction of support channels and on-site assistance for users. The phasing out of current SI-partners was also something that was identified as crucial, and that it would be done gradually in order to preserve important knowledge and maintain a good implementation. However, the respondents acknowledged the risk of being too dependent on external partners in the long run, which might be because it can lead to loss of internal knowledge and control. This could also lead to a weak position relative to the external actors, which can be exploited and leveraged against Polestar. It will also be important for Polestar to develop a consistent knowledge management strategy that can support ongoing feedback and documentation, which was something that was absent from the interviews but surely exists. Another risk that exists is that overreliance on a few internal individuals that was not addressed. If these individuals transfer to another company, significant losses of knowledge can be the effect if documentation and proper transition is not made. It is important to note that this is not a risk only in the post-implementation, but in all three stages.

It became evident that there is a difference between external knowledge sharing and internal. This is due to the fact that at the beginning of the project the majority of the expertise and knowledge comes from outside actors such as the SI-partners. In this stage it is important to learn from this tacit knowledge and document it so that it later on becomes internal knowledge. This can later on then be shared internally within the company through socialization and by that also create new knowledge. Therefore, the conclusion can be drawn that external knowledge is important in the pre-implementation phase, but as the project moves forward it becomes internal knowledge.

5.2 External Factors

The external factors will consider how the company is linked and affected by forces that connect different aspects of the company and the interplay between them. These external factors might also affect the internal procedures as well which will be analyzed.

5.2.1 Activity Links

Activity links, which refer to the coordination and integration of interdependent tasks between firms, were notably weak during Polestar's pre-implementation phase. The interviews reveal that teams operated in silos with fragmented planning processes and minimal cross-departmental coordination. Effective activity links require mutual adjustments and structured collaboration between parties, both of which were lacking. As departments approached ERP implementation without aligning their timelines or processes, coordination gaps widened, especially when engaging with external SI-partners.

In the implementation phase, activity links began to strengthen, although they were seen as reactive. Integration testing and data migration revealed interdependencies that were previously unaccounted for, forcing departments to work more closely together. However, these adjustments were not seen as very proactive. Rather, they emerged out of necessity, and by that causing delays and rework. Respondents described a lack of responsibility and trust, which further hindered smooth activity alignment. Another form of lacking activity links was that the different teams that collaborated worked unpaced and out of sync. This resulted in delays between departments and frustration was building.

Despite these challenges, improvements were observed during the implementation phase, where certain departments began implementing structured weekly meetings and clear spokespersons. These developments indicate a growing awareness of the need for coordination and represent a positive step toward more integrated workflows.

In the post-implementation phase, activity link management becomes crucial for maintaining system coherence and driving continuous improvement. Respondents noted concerns over reverting to manual processes and inconsistencies in how departments engage with the new system. If activity links are not continuously reviewed and optimized, the risk is a gradual breakdown of standardized processes. To address this, structured coordination efforts such as interdepartmental feedback loops and centralized monitoring mechanisms are necessary to reinforce alignment and ensure long-term operational efficiency. It is also crucial that teams embrace the dependencies between each other and by that enhance the activity links in the post-implementation phase.

It is important to acknowledge that activity links are very important to consider during all of the three implementation stages. However, it can be argued that it is especially important in the implementation phase. The reason for this would be that this then sets the tone for the upcoming post-implementation phase. If these activity links are acknowledged and clear for everyone in the project, they will more easily understand how the different teams connect with each other and depend on each other. This can also be tied to the cross-functional collaboration making it important to set a good collaborative foundation that is later also maintained during the post-implementation phase.

5.2.2 Resource Ties

Resource ties are the connections formed through the shared use and development of resources which played an essential yet problematic role throughout Polestar's ERP implementation. In the pre-implementation phase, Polestar relied heavily on external SI-partners due to limited internal ERP expertise. Resource ties allow firms to access capabilities beyond their own boundaries. However, they also require strategic oversight to prevent dependency. Therefore, it can be seen as Polestar being dependent on the resource, which in this case is knowledge, that the SI-partner had. At Polestar, the switch from a high-cost but competent SI-partner to a lower-cost alternative compromised both resource alignment and long-term capability development.

Polestar in general also has strong resource ties to VCC. This is since Polestar currently uses VCC's SAP system and is therefore strongly dependent on their resources. They are also dependent on the factories that Geely and VCC provide for production of the cars. All of Polestar's cars are produced in outsourced factories that are owned and operated by other actors. Based on these resource ties, Polestar is as a company affected by how these resources get affected and changed. For example, by using VCC's SAP ECC system, Polestar is dependent on what actions VCC does. But another resource dependency to account for is SAP

in general. SAP is expected to end support for the ECC module by 2027. This means that Polestar is forced either way to change from the current ECC to the new S/4HANA module.

During the implementation phase, the reliance on external resources intensified. Many respondents pointed out that internal teams lacked ownership and knowledge, making them dependent on consultants for core ERP tasks. This dependence can be considered as lacking resource integration, where knowledge and tools were not effectively transferred into the organization. However, on the other hand it may not be possible to transfer a huge amount of knowledge and expertise in the time of the project.

Nevertheless, some efforts to improve internal competence were initiated. The train-the-trainer model and the designation of super-users indicate a strategic intent to internalize external expertise, even though these efforts faced executional challenges. This approach shows that the organization recognizes the importance of sustainable resource ties and is working towards reducing external dependency.

Regarding the post-implementation phase Polestar has resource ties with the external support providers. They are the ones that will handle the support and day to day issues with the new S/4 HANA module. This can be considered as a weakness, due to dependencies on external factors. However, it is also important to consider that this is a strategic choice, and internal resources can instead focus on more value providing activities.

Resource ties is something that is seen through all the three stages of the implementation. However, it can be considered as most “affecting” and “visible” in the pre-implementation phase. This is since the resource tie in the beginning somehow affects choices later down the implementation phase. For example, that Polestar uses VCC’s ERP system has most definitely had an impact on the ERP choice that they make.

5.2.3 Actor Bonds

From a network perspective, actor bonds are essential in ERP projects because they connect the people and organizations who plan, organize, and carry out activities using shared resources. These actors influence how the project moves forward and how well it adapts to change. At Polestar, the relationship between these actors was often perceived to be fragmented and reactive, changing over time but not always in a planned or consistent way.

In the pre-implementation phase, weak internal actor bonds made it hard to create a shared understanding of the ERP project. Instead of building strong cooperation across departments,

many viewed the implementation project differently. Some view it only as an IT issue while others understood that the company was in for a bigger change and understanding its core purpose. This lack of alignment between key functions made early collaboration difficult.

The first SI-partner was generally seen as competent and cooperative, but Polestar later switched to a partner that was perceived to have lower cost. This decision disrupted the working relationships and delayed the work since some transition needed to be made from the old SI-partner to the new. This transition period was decided by the actors, to be about two weeks. A conclusion that can be drawn from this is that two weeks is too short of a time to conduct a good transition. The result of this was that the new SI-partner needed to perform activities, they from the beginning were not contracted for. This misunderstanding might have had a negative effect on the relationship between Polestar and the new SI-partner. In the beginning the new SI-partner was present at the office and engaged, however later they offshored some of the competence to other countries, presumably due to cost efficiency but also maybe because of the damaged relationship. When the new SI team moved abroad, the distance added to communication problems and made real-time adjustments more difficult.

Post-implementation there were some issues that continued. As the company moved support responsibilities from external SI-partners to internal teams and a new service support provider, there was confusion about ownership and accountability. Many respondents were unsure about who was responsible for system governance and data management. This uncertainty shows that actor roles were still not clearly set, and that strong leadership and structure were missing.

That said, there are signs of improvement. The new management team received positive feedback for being more engaged and supportive, which shows potential for stronger internal collaboration. With continued focus, Polestar can improve actor relationships by clearly defining roles, promoting teamwork between departments, and encouraging more visible leadership.

By strengthening actor bonds in these ways, Polestar can better support the ERP system over time and avoid the risks that come from unclear roles and weak collaboration. These improvements would also bring the company closer to the type of better connected and adaptive actor network.

6. Discussion

The purpose of this chapter is to interpret the empirical findings in relation to the theoretical framework presented earlier. This chapter will firstly discuss the ERP implementation model presented in 3.4. Secondly, the discussion will highlight both consistencies and inconsistencies between theory and practice, which provides insights into how Polestar's ERP implementation process compares with established models of ERP success. Lastly, a broader view of the challenges the automotive sector experiences in relation to their supply chain and ERP systems.

6.1 Significant resources during phases of implementation

The model which was presented in 3.4 was combined with the data from the empirical result and the analysis into a comprehensive model that illustrates in which phase the internal and external factors play the most significant role in the ERP implementation project life span (see Figure 3). If the factor impacts several phases significantly it is indicated by an arrow that spans over two or more phases. This study has examined five key internal organizational factors that have significantly influenced the outcome of the implementation of SAP S/4HANA at Polestar: cross-functional collaboration, coordination mechanisms, change management, cultural context, and knowledge sharing. Three external factors were also examined, which stemmed from the ARA-model: activities, resources and actors. While all five internal factors and 3 external factors play roles throughout the ERP implementation life cycle, their relative impact varies across the pre-implementation, implementation, and post-implementation phases.

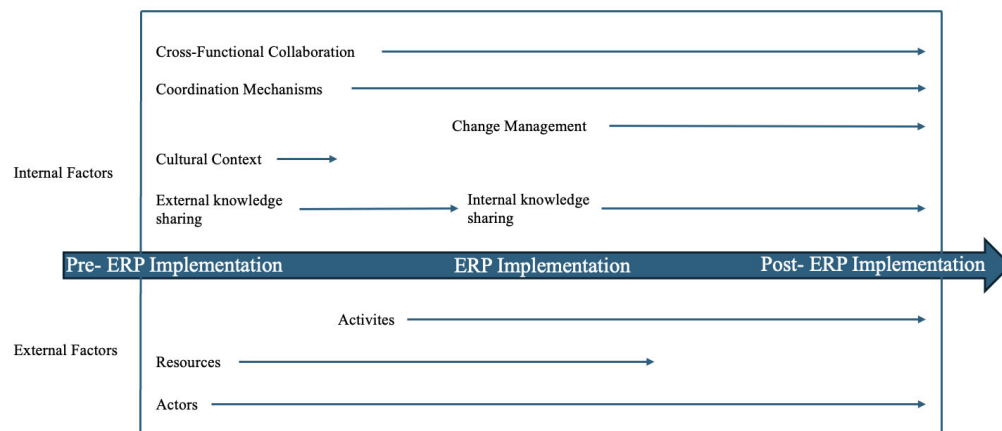


Figure 3: Enterprise Resource Planning Implementation Model.

6.1.1 Significant internal factors

Cross-functional collaboration was identified as a fundamental enabler of successful ERP implementation. The impact is most significant in the pre-implementation phase, where cross-functional collaboration serves as a platform for aligning different departments, building mutual understanding, and establishing the initial organizational integration needed for later phases. During the implementation phase, collaboration remains important in synchronizing interdependent processes between various functions and departments and resolving emerging issues. In this phase, it becomes obvious if the organization is ready for the cross-functional collaboration that the ERP system requires due to its complexity and interdependencies between departments. In the post-implementation phase, it supports continuous system use and improvement between functions, facilitating the ERP system's integration into daily workflows across departments. This is indicated in *Figure 3* which illustrates that cross-functional collaboration remains vital across all phases.

Coordination mechanisms are particularly critical during the implementation phase, when activities become highly interdependent. Effective coordination structures such as standardized processes, defined schedules, and clear communication routines reduces the risk of misalignment and costly delays. Furthermore, coordination should begin in the pre-implementation phase, with the design of decision-making frameworks and clear view over ownership of processes and resources, as well as resource allocation models. These mechanisms must remain adaptive and agile throughout the project, especially in the post-implementation phase, to support improvements and operational stability. As shown in *Figure 3*, coordination mechanisms are still important across every stage of the implementation.

Change management played a significant role in shaping how employees and users perceived and responded to the ERP implementation. According to the empirical data, its influence peaked during the implementation phase, where end users and particularly super-users and operational staff were expected to adopt new processes and tools. At this stage, the ability to manage resistance, provide adequate training, and align expectations is crucial to securing buy-in and ensuring behavioral change across the organization. At this stage, the consequence of not ensuring behavioral change for employees can result in manual workarounds and customizations in the core of the ERP system which in turn leads to a decline in standardized ways of working. As a result, it will lead to an inadequate clean core, thus destroying the intent of ERP system outcome and the collaboration and coordination between departments could therefore fail. However, change management is not confined to implementation. In the pre-implementation phase, it involves preparing the organization, identifying potential resistance points, and planning interventions, though the impact is first visible in the

implementation phase when all users are involved. In the post-implementation phase, change management contributes to evaluating the outcomes, embedding the changes into daily practice, and adjusting strategies based on feedback from users. Thus, although most visible and significant during implementation and post-implementation, change management must be addressed throughout the entire ERP lifecycle.

The organizational culture at Polestar, which is characterized by decentralization and individualism, was a major influencing factor, particularly during the pre-implementation phase. These cultural traits were indicated to have undermined leadership clarity, strategic alignment, and stakeholder engagement, resulting in fragmented communication and insufficient process ownership. Once these issues manifested, the implementation and post-implementation phases offered limited scope for adjustments and improvements. A thorough cultural analysis at the start of the project would have allowed for better risk identification and a roadmap more aligned with the organization's values and behavioral norms. In the post-implementation phase, culture continues to play a role together with change management in user adoption and system sustainability, though its effects are more passive compared to earlier stages.

Knowledge sharing plays a varied role across all phases of the ERP project. In the pre-implementation phase, the organization relies heavily on external knowledge coming from consultants and SI-partners. Capturing and documenting this tacit knowledge is essential for building internal competence. As the project moves into the implementation phase, there is a shift towards internalization of that knowledge. Super-users and internal teams must translate external expertise into contextual understanding, which is then spread through formal training and informal interactions to the rest of the organization. In the post-implementation phase, this internal knowledge base supports continuous improvement and enhances the organization's long-term capability to manage and evolve its ERP system. This is illustrated in *Figure 3*, where external knowledge transfer is highlighted as significant in the pre-implementation phase and the implementation phase, and then it shifts towards internal knowledge transfer being more impactful in the later part of the implementation phase and post-implementation phase.

6.1.2 Significant external factors

Activity links are critical across all phases, but their influence is particularly significant during the implementation phase. This is when the interdependencies between different teams and activities must be effectively coordinated to ensure the foundation for successful post-implementation operation. Recognizing and aligning these activity links fosters cross-

functional collaboration, which is essential for both the short-term progress and long-term sustainability of the ERP system. Failure to do so can lead to fragmentation and reduced efficiency in later stages. The reasons for the placement in between the pre-implementation and implementation phase highlights the importance of activity links in the later part of the pre-implementation phase, while it remains most significant in the implementation phase (*see Figure 3*).

Resource ties are most visible and impactful in the pre-implementation phase but also during all of the implementation phases as illustrated in *Figure 3*. This is due to the fact that there are always resource interconnections between the focal company and other actors. The foundational choices regarding technological and organizational resources such as Polestar's reliance on VCC's ERP infrastructure shape implementation decisions. These early resource alignments set boundaries and opportunities for the rest of the project, often constraining or enabling certain paths depending on how integrated or flexible the ties are.

Actor bonds are particularly influential in the pre-implementation and post-implementation phases, though their effects have an impact throughout the project lifecycle. During the pre-implementation phase, weak internal bonds and fragmented understanding of the ERP's strategic purpose limits early collaboration. This lack of shared vision can undermine collective efforts and contribute to siloed perspectives. The change between several different SI-partners during the implementation phase further disrupted relationship continuity, illustrating the vulnerability of inter-organizational bonds. The rapid transition period and unclear expectations of the new SI-partners damaged trust, collaboration and operational efficiency. In the post-implementation phase, ongoing confusion about responsibilities and ownership of system governance and processes further emphasized the consequences of weak actor bonds.

6.2 Alignments Between Theory and Practice

Several aspects of the ERP implementation at Polestar closely aligned with the literature, validating key theoretical insights. The theoretical importance of cross-functional collaboration in ERP projects is well documented (Rowe et al., 2005; Santa et al., 2011). The empirical data confirms this, as lack of initial collaboration across departments was widely cited by interviewees as a significant barrier to progress. Over time, departments began to work more closely, particularly as system interdependencies became clearer, which corresponds with the theoretical view that ERP systems require shared understanding and integration across organizational functions (McDonough, 2000).

Coordination mechanisms, particularly those described by March and Simon (1958) and further developed by Mintzberg (1979), were clearly relevant in Polestar's context. The theoretical model highlights the importance of standardization, planned coordination, and mutual adjustment. The lack of clear routines and schedules, especially in communication and task delegation, resulted in disjointed efforts and inefficiencies. This supports the theoretical claim that structured coordination is essential for managing complex interdependencies in ERP systems (Cabitza & Simone, 2013).

The empirical results also reflect the critical role of change management as described by Inca Soller et al. (2024) and Hermold (2022). Respondents pointed to weak leadership involvement, unclear communication, and low employee engagement as barriers to a smooth implementation. These are consistent with theoretical failure factors, such as lack of leadership commitment and resistance to change (Chodos, 2007; Noroozi et al., 2024). The importance of leadership visibility and ongoing support, emphasized by theory, was reinforced by multiple respondents who criticized management's absence during key activities like training and workshops.

The SECI model (Gierszewska, 2012) emphasizes the transformation of tacit knowledge into explicit knowledge through training and shared experiences. Polestar's reliance on "super-users" to support knowledge transfer, and the challenges in training and information flow, confirm the theoretical value of internalizing and externalizing knowledge. The difficulties in ensuring consistent engagement during training and weak dissemination of system knowledge support the importance of deliberate and well-structured knowledge-sharing processes.

6.3 Divergences Between Theory and Practice

Despite several alignments, the empirical findings also revealed deviations from theoretical expectations. Successful ERP implementation is influenced not only by internal factors but also by managing activity links, resource ties, and actor bonds with external parties. However, in Polestar's case, these external organizing principles were only partially reflected. Although strong dependency on SI-partners was noted, the relationship was largely transactional rather than strategic. For instance, poor knowledge transfer, lack of continuity between partners, and weak governance over external involvement suggest that Polestar did not fully leverage or manage these external ties as the model suggests. This deviation likely contributed to limited control and knowledge retention internally.

While theory strongly emphasizes the need for sustained governance and continuous improvement after system deployment (Saade & Nijher, 2016; Butarbutar et al., 2023),

empirical data showed uncertainty regarding roles, responsibilities, and long-term ownership at Polestar. The lack of clarity around who would maintain and develop the system post go-live—particularly in areas such as master data ownership and business module responsibility—contradicts theoretical recommendations. Without a robust post-implementation plan, the risk of system underutilization and reversion to manual workarounds increases, as respondents themselves acknowledged.

The theoretical framework also considered Hofstede’s cultural dimensions and their implications for organizational behavior (Gallego-Álvarez & Pucheta-Martínez, 2021; Engelen et al., 2012). However, there was no explicit reference to national or corporate cultural factors in the empirical data. While some symptoms—such as departmental silos and lack of collaboration—may be culturally influenced, these connections were not clearly articulated by respondents. Thus, while theory suggests potential cultural barriers, these were not directly evident in the empirical results, leaving a gap in confirmation.

7. Conclusion

This study aimed to investigate the organizational factors that influence the success of ERP implementation at Polestar and to understand how both internal and external organizational factors shape this success across different project phases. The findings provide important insights into the challenges and improvement opportunities related to ERP implementations in complex and growing organizations. Below will both research questions that were presented in section 1.4 be listed and concluded.

RQ1: Which are the organizational factors influencing the success of ERP implementation at the organization and how can the implementation be improved?

The success of the ERP implementation at Polestar has been influenced by several critical organizational factors. Among the most significant are cross-functional collaboration, coordination mechanisms, change management, cultural context, and knowledge sharing.

A major limitation during the project was the perception of the ERP implementation as solely an IT initiative, which hindered cross-departmental engagement and created organizational silos. As a result, responsibilities were unclear, collaboration was limited, and early planning and scope-setting suffered. Improvement can be achieved by ensuring early and continuous involvement of all relevant departments and by framing ERP projects as organizational transformations rather than technical upgrades.

Another central issue was the lack of structured coordination and standardized processes. Delays and miscommunication often resulted from ad hoc planning and unclear decision-making structures. To improve, Polestar should institutionalize coordination practices such as regular cross-departmental meetings, clearly defined roles, and project governance frameworks.

Change management was identified as one of the most underdeveloped areas. The absence of early engagement, inconsistent training, and weak leadership visibility contributed to resistance and low user preparedness. For future success, Polestar must prioritize change management throughout all phases, particularly in the implementation phase. They need to achieve more active leadership involvement, comprehensive training strategies, and clearly communicated responsibilities for all users, especially key ones such as super-users and team leaders.

Finally, insufficient internal knowledge and overreliance on external consultants led to challenges in ownership and sustainability. To improve, Polestar needs to strengthen its

internal expertise through structured knowledge transfer processes and documentation, minimizing dependency on external actors over time.

RQ2: In which phase of implementation do internal and external factors play the most significant role?

One conclusion that can be drawn is that a lot of the factors that were investigated determine the success of an ERP implementation in the pre-implementation phase because the factors lay the foundation for the rest of the project. The most significant of these during the earlier stages, in the pre-implementation, were cross-functional collaboration and coordination mechanisms. Without these, an effective ERP implementation is predetermined to fail, because of the large organizational transition a new ERP system is. The culture context is also something that dictates the outcome but is not easily changed and needs to be considered when planning in the pre-implementation phase. An ERP-implementation requires technical expertise, which is something that the company usually does possess, and is bought from SI-partners. During the pre-implementation phase, it is crucial that the knowledge sharing and exchange between SI-partners and the company works, which is something that will affect later phases. During the implementation phase, internal knowledge sharing becomes more and more significant. The knowledge gathered from experience and SI-partners needs to be transferred into the organization in order to create an environment where leaders and users have the necessary skills to use and further develop the ERP-system. Change management also becomes critical in the implementation phase, especially since the system will fundamentally change how the employees operate their day-to-day tasks.

Regarding the external factors, our analysis and discussion indicates that actor bonds were the most important from the beginning of the implementation and throughout the whole lifetime of the project. This is due to the fact that actors take critical decisions during each phase of the implementation and are the actual performers of the work. When it comes to resource ties, they are similar to the actor bonds, the most important during the pre-implementation and implementation phase. This is because they are the most significant during this period and affect the project the most. During the post-implementation phase, resource ties are also visible, however not as significant. Lastly, the activity links were most visible during the implementation phase and the post-implementation phase. The reason for this is that in the pre-implementation phase there is more planning of the project than an actual execution of the project. Therefore, the activities are not as correlated with each other as they are in the other two phases.

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Appendix 1: Interview guide used in data collection

General Questions

1. What is your job title and what are your main responsibilities?
2. How are you involved in the ERP implementation? (Planning, implementation, post-implementation?)
3. Can you briefly describe your tasks related to the SAP implementation?

ERP-Specific Questions

Pre-Implementation & Current State

1. When was the decision made to implement SAP?
2. Why are you replacing the current system?
3. What is the vision behind the change?
4. What major issues are you trying to solve?
5. How is the workflow expected to change with the new ERP system?
6. How long has the implementation been in planning?
7. Is the organization ready for this change? Is the reason for the change clearly communicated? Why or why not?
8. Do you have sufficient resources for the implementation? Why or why not?
9. How would you describe the level of support from leadership during the planning, implementation, and post-implementation phases?
10. How well is the ERP implementation anchored among employees? What is the general sentiment?
11. Who have been the key stakeholders in this phase? (e.g., vendors, consultants, top management, etc.)
12. Internal vs. external actors: Who has contributed the most during this phase?
13. What have been the most important activities in this phase?

Implementation Phase

1. How long is the implementation phase expected to take?
2. Are different departments involved during the implementation?
3. How has the collaboration and communication been between departments?
4. What communication methods do you use?
5. Are there key individuals responsible for communication and collaboration?
6. What challenges have you faced in cross-department collaboration?
7. What aspects of the implementation have gone well?
8. What difficulties have you encountered during implementation?
9. What are the reasons for any delays in the implementation?
10. How involved are the consultants at this stage, and how is the collaboration working?

11. What are the major current challenges and risks associated with the new ERP system at Polestar?
12. Do you have a contingency plan (Plan B) in case something goes wrong?
13. ERP implementation involves significant organizational change:
 - How committed is top management?
 - How involved are employees in the process?
 - How is information communicated?
 - How will employees be trained, and when will this occur?
14. Would you say the organization generally supports or resists change?
15. How long-term is this implementation effort?
16. How have recent reorganizations affected the SAP project?
17. Who have been the key stakeholders in this phase? (e.g., vendor, consultant, top management, etc.)
18. Internal vs. external roles: Who has driven this phase?
19. What have been the most important activities during this phase?

Post-Implementation Phase

1. How will system maintenance be handled?
2. How will you work with continuous improvements (e.g., data cleaning, process enhancements, etc.)?
3. Who are the key stakeholders in this phase? (e.g., vendor, consultant, top management, etc.)
4. Internal vs. external actors: Who is responsible for what?
5. What will the role of consultants be, and how will they be involved?
6. What are the major future risks and challenges of the new ERP system for Polestar?



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