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Developing an Information Flow to Support Process Management for Asian Automotive Company

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Thesis abstract

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This thesis was commissioned by Company X, an Asian automotive manufacturer. The aim of the thesis was to produce modelled structure of company's communication and information flow, as well as to develop a method that would support the order and delivery process of technical training cars.

Both primary and secondary data were used in the thesis study to obtain more reliable and comprehensive results. The primary data was constructed through semi-structured interviews and observations, whereas the secondary data was gathered from documents and publications. The theoretical part covers the effectiveness of communication and business process management, with the focus on subject-oriented style and modeling practices. In the empirical part, the company's current situation is discussed, areas calling for improvement are identified, and, finally, a suggestion for improvement is presented to the commissioner.

The study allowed modelling the current situation of the case company's communication and information flow, and their effects on the identified problems. The essential information exchanged within the process was discovered and used for development of the information flow. Consequently, a medium was designed to support process management in the order and delivery process of technical training cars.

¹ Keywords: information flow, process management, modeling

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Opinnäytetyö toteutettiin Yritys X:n, aasialaisen autonvalmistajan toimeksiantona. Opinnäytetyön tavoitteena oli tuottaa mallinettu viestinnän ja tiedonkulun rakenne sekä kehittää menetelmä, joka tukee teknillisissä koulutuksissa käytettävien autojen tilaus- ja toimitusprosessia.

Luotettavamman ja kattavamman tuloksen saamiseksi opinnäytetyössä käytettiin sekä primääri- että sekundääridataa. Primääridata kerättiin teemahaastatteluilla ja havainnoinnilla, ja sekundääridata kerättiin asiakirjoista ja julkaisuista. Teoriaosuus kattaa viestinnän tehokkuuden ja liiketoimintaprosessien hallinnan, jossa pääpaino on aihekohtaisessa suuntauksessa sekä mallintamiskäytännöissä. Empiirisessä osuudessa tuodaan esiin yrityksen nykytila, josta kehitettävät kohdat nostetaan esille, ja lopuksi esitetään kehitysehdotus yritykselle.

Tutkimuksesssa kyettiin mallintamaan viestinnän ja tiedonkulun nykytilanne sekä niiden vaikutus tutkittaviin ongelmiin. Prosessin sisällä vaihdettava olennainen tieto tunnistettiin, ja sitä pystyttiin hyödyntämään tiedonkulun kehittämisessä. Siten suunniteltiin viestintäväline tukemaan prosessinhallintaa teknillisten koulutusautojen tilaus- ja toimitusprosessissa

TABLE OF CONTENTS

Tł	hesis abstract1						
0	Dpinnäytetyön tiivistelmä2						
T/	ABLE	OF CC	NTENTS	3			
Pi	cture	es, Figur	es and Tables	5			
Terms and Abbreviations							
1	INT	RODUC	TION	8			
	1.1	.1 Purpose of this research					
	1.2	Researc	h and research questions	9			
	1.3	Limitatio	ns of the research	10			
	1.4	Previous	s research	10			
	1.5	Researc	h methods	10			
	1.6	S Research problem					
	1.7	Researc	h goals and limitations	11			
	1.8	Researc	h methods	12			
2	COMMUNICATION IN PROCESS MANAGEMENT						
	2.1	.1 Communication and its effectiveness					
	2.2	2.2 Business Process Management					
	2.3	Subject-	Oriented Business Process Management	16			
		2.3.1	Business Process Modeling	16			
		2.3.2	Business Process Modeling Notation	17			
		2.3.3	Analysis	18			
		2.3.4	Modeling	19			
		2.3.5	Validation	22			
		2.3.6	Simulation and optimization	23			
		2.3.7	Organization-specific implementation	24			
		2.3.8	Information technology implementation	24			
		2.3.9	Monitoring	25			
3	AUTOMOTIVE INDUSTRY						

	3.1	Automotive industry; the past and the future			
3.2 The significance of automotive industr			nificance of automotive industry	28	
	3.3 The importance of training the car dealers		portance of training the car dealers	29	
	3.4	Compa	ny X	31	
4	DE\ MAI	VELOP NAGEN	ING INFORMATION SYSTEM TO SUPPORT PROCESS	32	
	4.1	Compa	ny X's levels for information flow and approvals	32	
	4.2	Concep	tualizing the process structure and the issue	33	
	4.3	Forming	g the base – Analysis	34	
		4.3.1	Selection for the structure	37	
		4.3.2	Filing the gaps – Modeling	37	
		4.3.3	Interview with General Affairs Officer	38	
		4.3.4	Connecting perspectives	40	
		4.3.5	(Re-)modeling the structure	43	
		4.3.6	Seeking improvements – Validation, simulation, and optimization	45	
		4.3.6 4.3.7	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation	45 46	
		4.3.6 4.3.7 4.3.8	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation	45 46 47	
		4.3.64.3.74.3.84.3.9	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring	45 46 47 47	
	4.4	4.3.64.3.74.3.84.3.9Approa	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X	45 46 47 47 48	
5	4.4 COI	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X	45 46 47 47 47 48 51	
5	4.4 COI 5.1	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations	45 46 47 47 47 48 51	
5	4.4 COI 5.1 5.2	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re Usefuln	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations ess of the analysis	45 46 47 47 48 51 51 52	
5	4.4 COI 5.1 5.2 5.3	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re Usefuln Resear	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations ess of the analysis ch reliability and validity	45 46 47 47 48 51 51 52 52	
5	4.4 COI 5.1 5.2 5.3 5.4	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re Usefuln Resear Lesson	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations ess of the analysis ch reliability and validity	45 46 47 47 48 51 51 52 52 53	
5	4.4 COI 5.1 5.2 5.3 5.4 5.5	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re Usefuln Resear Lesson Future	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations ess of the analysis ch reliability and validity	45 46 47 47 48 51 51 52 52 53 54	
5 BI	4.4 COI 5.1 5.2 5.3 5.4 5.5 BLIC	4.3.6 4.3.7 4.3.8 4.3.9 Approa NCLUS Main re Usefuln Resear Lesson Future	Seeking improvements – Validation, simulation, and optimization Preparing for variables – Organizational Implementation Planning an information medium for the company – Technology implementation Continuous optimization – Monitoring ch for Company X ION sults and recommendations ess of the analysis ch reliability and validity research HY	45 46 47 47 47 51 51 52 52 52 53 54 55	

Pictures, Figures and Tables

Picture 1. Picture of spreadsheets on Excel for Form, Tracker and Log
Figure 1. A basic Business Process Modeling Notation (BPMN) process diagram (Harmon 2014, 219)17
Figure 2. Determining subject carriers from business object context at runtime (Fleischmann et al. 2012, 184)
Figure 3. Subject behavior diagram for the subject "employee" (Fleischmann et al. 2012, 81)20
Figure 4. Technical Training Manager's Key Activities to implement the trainings (Original idea Fleischmann et al. 2012, 81)
Figure 5. Swimlane Process Model for technical training car lifecycle (Harmon 2014, 219)
Figure 6. Communication structure according to BPMN diagram and Key Activities (Original idea Fleischmann et al. 2012, 184)
Figure 7. Affected Key Activities for Technical Training Manager from communication shortages (Original idea Fleischmann et al. 2012, 81)42
Figure 8. Communication structure with Training team involved (Original idea Fleischmann et al. 2012, 184)45
Figure 9. Technical Training Car Entry Form49

Table 2. Useful information that is exchanged between Distribution Coordinator and	
General Affairs Officer.	44
Table 3. If-clauses in different scenarios	46
Table 4. Technical Training Car Tracker for Order, Delivery and Deflect (Original idea	
Fleischmann et al. 2012, 87)	49

Terms and Abbreviations

BPM	Business Process Management
BPNM	Business Process Modeling Notation
CAFÉ	Clean Air for Europe
ERP	Enterprise Resource Management
EU	European Union
EV	Electric Vehicles
ICT	Information and Communication Technologies
ІТ	Information Technology
KPI	Key Performance Indicators
PPM	Process Performance Measurement
RBU	Regional Business Unit
S-BPM	Subject-Oriented Business Process Management

1 INTRODUCTION

"Communication is the flow of accurate information which people want, need and are entitled to have for successful completion of the job" (Adhikary, [ref. 24th January 2021]). In an article published by Westford University Collage, communication both verbal and written accounts for 90% of all the business transaction (Mohammad 2018). It is a crucial factor for any resulted outcome. Effective business communication descriptively means how well from the management down attain set goals, work in a line with company values and interact with each other (Martic 2020). It aims to enhance company practices, keep everyone informed and therefore minimize errors. According to Mohammad (2018) the importance of clear and effective communication reflects to positive results inside and outside of the company as growth of the business, transparency, loyalty, and trust. Abudy (2013) emphasizes that to successfully implement it in the complex matters is having to be even more detailed in the communication.

Over the year's development of information and communication technology and their transaction have speeded up changes in various business activities (Szmelter 2015). Nowadays global companies use variety of channels transferring information in the global supply chain. This phenomenon has made the flow of the information more efficient adding added value for the parties involved in the supply chain. However, some of the processes are still man-made rather than autonomous, which increase the possibility of human errors.

This thesis study is to identify communication obstacles in the process of technical training cars and seeks solutions to support information transfer in process management. As in automotive industry, widely scaled and distributed processes are common letting the business to be more influenced by communication and its possible errors (Liebel et al. 2016).

The first chapter introduces the research methods, the 2nd and 3rd chapters focus exclusively on theory. The 4th chapter gives an overview of the environment where the study was made and an implementation of theories. Lastly, chapter 5 concludes the study and suggests approaches for the Company X.

1.1 Purpose of this research

The thesis was commissioned by Company X, a global automotive manufacturer. The purpose and aim of the thesis were planned together with the company. The thesis is made as a case study, and the case company defined the frame in which the study is made. The purpose of this research was to identify how the company could best benefit from the clear and transparent communication in a particular process management. To turn the identified solutions into best practice in which the company can maintain the best value of the cars at the given time and to secure trainings delivered. The aim was to produce modelled process that could be used as a framework to support the whole process in all five Nordic markets where the company is operating. The thesis continues to find best possible options in the field of communication based on the company's resources, gathered information through interviews and other valid source to follow the aim of the research.

1.2 Research and research questions

After purpose and aim of the thesis, research problem was determined as follows:

Uncertainties in acquiring the technical training cars occurs yearly as information is not perceived neither on-time or at all.

Based on the purpose and aim of the thesis together with the research problem, the research questions are as follows:

- What is the information and communication structure of technical training cars process from training department's perspective?
 - What are the issues from training department's perspective?
 - How does the issues affect training department's work?
- What is the current process for ordering and delivering technical training cars?
 - What information is changed and communicated throughout the process?

- What information could be utilized to help Training Team?
 - How it could be best utilized?

1.3 Limitations of the research

The aim of the study is to support the existing process by clearing uncertainties with effective and informative connection with departments involved to achieve training departments' key performance indicators (KPI) as well as to maintain best possible value for the car at the given time.

The thesis will plan a best practice, but it does not implement execution of the outcome nor deep dive in the other departments' field of business in that matter. Meaning the thesis will only focus on training department side of the process helping other business units in a meanwhile as research proceeds.

1.4 Previous research

There is other research related to this study or some aspects of it. In Arins' (2013) Bachelor's thesis "Internal communication channels within a Multinational Organisation – GoldenMoments Ltd." internal communication channels of the case company are examined, measured, and suggested. Another study constructed by Ylitolva (2015) focuses on productive communication in the case Company X. Both previous studies focus on case companies and their communications, whether channels, productivity, or both. Arins' and Ylitolva's studies are constructed on case companies' purposes, meaning their results are likely to differ from each other.

1.5 Research methods

A case study research approach is used to construct the thesis together with the context which was defined by Company X. According to Leinonen (2020), the case study seeks to find understanding of studied phenomena, which will benefit to illustrate objectives clearer. The approach allows diverse factors that correlates to the researched topic or are somewhat

dependent on it. Eriksson and Koistinen (2014, 4—5) define the case study where examining, analyzing, outcome and results are formed from one or more cases that are examined simultaneously. A case study is a good choice if researcher has only a little control of the events or the research questions try to look answers for the questions how, what, and when.

Eriksson and Koistinen (2014, 30) state the possibility of using a mixed data collection method. Often in case study, both qualitative and quantitative methodologies are used together with various resources. This renders the researcher to cultivate him or herself with the topic and allows to provide a more reliable end result.

1.6 Research problem

The purpose of the thesis is to find a best-practice model, which could be used as a framework across the Nordic Countries for acquiring and sell-out of technical training cars. Problems found on the purpose of the research are determined as follows:

Technical training cars acquiring process inside the Company X is not clear nor efficient as the Training department's further actions and tasks depend on the process. A transparent and structured model will delimit the depreciation of the cars as well as withhold any unnecessary confusions that are generating additional workload and expenses.

1.7 Research goals and limitations

The limitations of the research are limited to the implementations of the result. Outcome of the thesis identifies phases of the process that needs clarifications, examines them with the developed version to give arguments for the suggestions. It is a suggested plan and does not deeply research and implement certain factors of the process even though they will be somewhat examined in the thesis, for example department of Finance.

The research method selected for the study is qualitative. The approach, that will be used in the thesis is case study research. For the data collection, a mixed method is utilized, consisting of both qualitative and quantitative research, in order for the study to be more reliable for to be more reliable.

2 COMMUNICATION IN PROCESS MANAGEMENT

This chapter focuses only on theory. Theoretical background is based on communication and its effectiveness, business process management with the focus on subject-oriented approach and modeling practices.

2.1 Communication and its effectiveness

The word communication stands for transferring, sharing and an exchange of information (Editorial Team 2020). This transaction could be happening between different persons or systems and could be one-way or two-way process (Editorial Team 2020). The key elements of communication consist of a sender, who sends the information, and a receiver, who receives the information as well as the platform where this process happens. Fleischmann et al. (2012, 77) say the reason why people communicate in work is for "to exchange information and synchronize tasks, and we use the information or things which we receive from others to do something". Therefore, it is important to select appropriate platform to ensure the goal for the communication, which is conveying information.

According to Yankelevitch and Kuhl (2015, 10), communication in today's world has many channels for information exchange. Technology revolution has enabled both transmission and communication platforms that are efficient and at the same time supportive throughout the communication process (Fleischmann et al. 2012, 18). Communication is just any other tangible activity that can cause waste and errors (Yankelevitch & Kuhl 2015, 9). The length of communication chains contributes to increasing the changes for defects (Fleischmann et al. 2012, 72—73). The more stakeholders are involved in a communication in the process, the more difficult it is to keep things within deadline as well as it increases the misinterpretation of information. Then again, it could be harmful if an insufficient number of stakeholders are involved compared to activities needed to achieve business goal. Consequently, communication takes part in all interactions we do, whether verbal or nonverbal. Hence the importance of effective communication and its channels in business are crucial.

When understanding impacts of communication and ability to adapt it beforehand to different situations, it improves communication's effectiveness and therefore results in time and quality of the process (Abudi 2013). Quality goes in hand with information change between people in the process. Poor and even over-communication can have an effect on individual level and team level results. If poor communication takes place, it can contribute on overall inefficiency in a project or a process. Over-communication on the other hand might seem decisive solution but can also result in losing sight of actual aim of the stakeholder engagement. According to Fleischmann et al. (2012, 169), an employee or a company to be able to perform within promised quality, deadlines, KPIs and execute their tasks should be provided with the necessary amount of information that is relevant to them. Therefore, it is essential to know exactly what kind of information different stakeholders need and how this information is conveyed and when (Abudi 2013).

Projects and processes that have many stakeholders it is not merely on manager's responsibility to have initiative to communicate with everyone nor be the one up-holding it (Abudi 2013). It is everyone's job in their respected field of responsibility and expertise in a particular project or a process to be involved in the communication. However, the way people want or need to be communicated differ from one another. For this, Abudi (2013) suggested to inquire from the stakeholders their needs for communication. It helps to adjust the communication for overall satisfaction and therefore to achieve effectiveness of it in a process.

Effective communication should bring value to the stakeholders, meaning the information is exchanged with minimum effort and time (Malcolm 2018). This means it should be clear and provide all the necessary information to the stakeholders they need. In essence, effective communication consists of understanding message's delivery, purpose and reception and successfully convey it from the sender to the receiver (Kashyap, [ref. 4 May 2021]). Therefore, processes to run efficiently and successfully be executed, also the communication and information that is exchanged inside the process need to be effective.

2.2 Business Process Management

Harmon (2014, 56) states that corporate strategy is a foundation from which other processes inside value chains reflect while obtaining their own desired strategies. Porter (1996, 2) defines strategy as: "A creation of a unique and valuable position, involving a different set of activities".

Processes help people in the organization allocate resources accordingly making streamlining activities easier improving overall efficiency (Kissflow 2021). Business processes in organization are defined as series of activities in a block to achieve certain target. According to Fleischmann et al. (2012, 5, 20), activities are usually formed by subjects; a sender and a receiver who execute an action dedicated to them. This sequence of activity consist communication between stakeholders involved and information technologies. Both communication and information technologies are essential parts for successful completion of work. In fact, it is studied that insufficient understanding of a process creates the most effort in the process management. Moreover, inadequate process descriptions increase unsuccessful completion of work and assumptions how it should be executed. Therefore controlled, clear and transparent processes are vital, especially for the people to whom these processes are essential for their work (Kissflow 2021).

Business Process Management (BPM) is more like an approach to design, management and continuously enhance process flows (Veyrat 2015). In other words, it can be seen as a practice for comprehending workflows inside organization by distinguishing parallelisms and discrepancies of these workflows and their effect on each other. In addition, it makes easier to discern responsibilities and goals of these processes (Harmon 2014, 54).

There are a lot of different tools for well-defined and managed processes. However, modeling is therefore very important for reducing knots and complexities inside the processes. It helps to capture relevant as well as negligible points for particular process and convert these for the benefit of the process.

According to Fleischmann et al. (2012, 50), it helps to enhance the understanding of core, management, and support processes and how they collaborate one another. They explain these processes as:

Core processes and value-adding processes (execution processes) describe the actual operational processes.

Management processes are processes for creating a strategy, planning, and control. They may also be referred to as meta-processes for process management, which as such affect other processes, in particular execution and support processes.

Support processes are required to provide the resources needed for the management and execution processes. These include for instance staff management, financial management, or IT management.

2.3 Subject-Oriented Business Process Management

As previously defined, process consists of various interrelated activities that work to achieve a certain business object. Similarly, both S-BPM and BPM follow the common logic of activities in process management with an exception in S-BPM where implemented or unrealized of activities trigger indirect effects and events (Fleischmann et al. 2012, 31). According to Fleischmann (2012, 5—6, 40, 54, 150), S-BPM is a practical approach to BPM, where center of observation is more on objects that are essential for the communication and on those activities performed by these stakeholders that aim to work with the respect to those objects. This way S-BPM has a long-term support for individual actors with their work and performance. Moreover, blended technical and business perspective in the approach provide a tool for understanding roles and developing communication in the organization and processes.

2.3.1 Business Process Modeling

Business processes modeling is a tool which helps visually identify improvements through diagrams or charts (Creatio 2021). These allows examining and representation of activities that the process consists. According to Fleischmann et al. (2012, 30—31, 297), modeling itself consist sequences of activities that are important for process management. These activity stages are "analysis, modeling, validation, optimization, organization-specific implementation, information technology implementation and monitoring". Conversely to BPM, the S-BPM modeling can start from any of the stages and completion of stages can

be other than linear whereas in the traditional BPM approach modeling starts always from the analysis proceeding linearly and executed sequentially. Moreover, S-BPM approach describes these sequences better as well as stakeholders involved. It helps to understand points of development by distinguishing different stages.

2.3.2 Business Process Modeling Notation

According to Harmon (2014, 215, 218), notation is often included in the modeling for its usefulness to support the modeling. For overall understanding in an organization process diagrams as Business Process Modeling Notation (BPNM) are easy and efficient way to demonstrate complex processes. It shows visually the steps and information from the start to the end that are needed for the execution of a process as in the process diagram in Figure 1. The diagram demonstrates a process with swim lanes that are horizontal (Harmon 2012, 219).



Figure 1. A basic Business Process Modeling Notation (BPMN) process diagram (Harmon 2014, 219).

The process starts from the swim lane at the top and proceeds from left to right. Everything that happens between is visualized with their respective lanes in the diagram. The lanes

represent a function who is responsible of the activity in the swim lane. These can be a person, department or a subcontractor who executes these activities.

2.3.3 Analysis

According to Fleischmann et al. (2012, 44, 46, 52), process analysis sets the basis for successful study in process modeling, it provides relevant information to other stages in the process model for their successful description and execution. This information contains details of existing processes such as definitions of these processes, KPIs, as well as documents that are relevant for meeting process' quality standards. Similarly, stakeholders should be understanding their responsibilities and tasks to meet these standards and with a great success to execute their tasks. Therefore, already in the first step, analysis should have well defined concrete target to be achieved.

Diverse points of views for drawing targets are essential for analysis (Fleischmann et al. 2012, 47). Therefore, people or resources who are not in straight scope of performing a certain work task in the process should also be counted in for analysis. These people or resources contribute their efforts on creating value in the process indirectly. For example, a subcontractor who work on logistics is not part of internal organizational structure but responsible of a task, which again influences to products or services and to the value of them that the company sells or represents. According to Fleischmann et al. (2012, 48), people who then are directly performing a work task are again useful for data collection. Data needed for analysis is either "explicit" or "tacit". Explicit data that is considered as saved and documented. Tacit on the other hand is not saved and is considered as something that only stakeholders of process instances know themselves and hence is important for analysis.

Fleischmann et al. (2012, 183—184) suggested that for helping to determine business object executors, visualizing these subjects respectively with their business objects as in Figure 1 is helpful.



Figure 2. Determining subject carriers from business object context at runtime (Fleischmann et al. 2012, 184).

There are two ways of approaches how analysis could be conducted, either from the management level down to the process instances that stakeholders execute or other way around (Fleischmann et al. 2012, 51). The first approach helps keep and maintain business objects in the analysis whereas the latter approach helps identifying actions on individual level. Acknowledging specific task procedures helps specify processes, though maintaining organizational business objects could suffer. Therefore, for best possible analysis could be done by combining these approaches to have advantages from both.

2.3.4 Modeling

Process modeling in S-BPM helps to find answers to the question "which activities are performed by whom to yield a result of value?" (Fleischmann et al. 12, 66). It gives a better understanding and helps visualizing how a certain process work. According to Fleischmann et al. (2012, 65), process model gives a framework in which systems and people work and perform business instances in accordance with. As modeling is a process-specific related activity, modeling is hence done for various processes in an organization.

Subject behavior diagram represents behavior of stakeholders within the process. According to Fleischmann et al. (2012, 80-81), it gives a good understanding what information is

exchanged and to whom this information is sent to. Moreover, it gives overall picture of the information pattern and stages between the start and the end of it.



Figure 3. Subject behavior diagram for the subject "employee" (Fleischmann et al. 2012, 81).

According to Fleischmann et al. (2012, 64—65), process instances on the other hand are relevant solid incidents within the process that again process model describes. These can be for example stakeholders, tasks they perform, information they change as well as affected business objects. Primary reasons for creation such instances could be many, for example instances originates as time intervals or when a certain need or demand arises.

According to Fleischmann et al. (2012, 66), creation of model in an organization follows a pattern and is detail oriented. These sequences can be divided into four parts:

- 1. Identifying processes: provide an overview of factors related to the process.
- 2. Definition of communication structure: according to the identification of stakeholders and interactions they perform communication as well as messages are described.
- 3. Definition of stakeholders' actions in the process: tasks and guidelines within stakeholders involved in the process perform are described.
- 4. Definition of information: original and modified information that are changed through messages by stakeholders involved in the process.

Providing data that is relevant for the process model saves further unnecessary actions on sorting things out (Fleischmann et al. 2012, 171). This applies too on how and where such data is presented, if the data itself is flawless but the design how it is presented is poor or difficult to interpret, it could be considered as point for development. Fleischmann et al. (2012, 171) suggest digitalizing and automizing tasks where inserting information could be combined with multiple other data entries without compromising their validity.

According to Fleischmann et al. (2012, 86—88), it is essential to define data in more detail to gain comprehensive understanding of it if interpreting data from its attribute is difficult or impossible. Therefore, visual tool that shows necessary data items helps to achieve the certain business object is essential. One of example of this could be status information. It shows only information that is gathered from business processes and their main business objects. It shows essential business objects' statuses from distinctive processes that matter and have relation for overall business object. As an example of status information in Figure 3 distinctive business processes are request for a trip, approving the trip request and booking the trip. Without going in into more of each process, status information shows merely business objects of these process that are: requested cancelled request, approved, or declined request, booked, or declined booking. Status of different business objects is important for different stakeholders depending on their individual objective. It does not only

help to keep track what is relevant for each and everyone's job but also to minimize and avoid things that do not contribute to business success.

Data structure/Data element	Meaning	Data type	Can/must	Value range/Default			
Data requester	Jata requester						
Last name	Last name	Character	М				
First name	First Name	Character	М				
Date of trip	Date of trip						
Start trip		Date	М	Within 1 year from current date/current date			
End trip		Date	М	Start trip plus 1 year/start trip			
Travel destination (city/country)		Character	М				
Date of booking							
Contracted hotel chains	Approval comment	Character	М				
Deadline of booking confirmation		Date	С				
Booking confirmation		Date	М	y/n			

Table 1. Business object business trip request in the status "booking business trip" (Fleischmann et al. 2012, 87).

2.3.5 Validation

According to Fleischmann et al. (2012, 144—149), validation is a stage where it could be triggered from an existing process where process' stakeholder notices possible points of development in the process or alternatively from a new process creation. It is a stage where modelled process is tested and observed to see if the process is working correctly and resulting wanted outcomes. Consequently, it is often done from a strategic view rather than in the environment where the process would be eventually implemented. Therefore, it gives room for modifications and improvement for discrepancies in the process.

Results from analysis and modeling of process provide basis objects for validation, for this reason, following steps in process modeling help for systematic implementation of validation as well (Fleischmann et al. 2012, 297). Fleischmann et al. (2012, 145) mentioned that for comprehensive validation it is crucial to overview the process together with its responsibilities, business objects and other process' attributes to minimize biases and other inadequate descriptions of models. Hence, it is also crucial to involve process' stakeholders in validation to have optimal coverage for coherence understanding.

2.3.6 Simulation and optimization

A simulation is experiment where process modeling is executed fast paced providing information about the lack of process flow in quantity and quality with people involved (Fleischmann et al. 2012, 165—166). Consequently, this is done to understand time and cost of the different process' stages. It can be executed various times with different variables to have understanding of different outcome scenarios. According to Fleischmann et al. (2012, 165—167), simulation gives a tool for identifying performance of modelled process and possibility for optimization detected defects. However, simulations are not always necessary work of action for identifying deficiencies, sometimes they could be recognized by tracking process and its results for sufficient period of time.

Center of focus in optimization is minimizing resources and time (Fleischmann et al. 2012, 158). According to Fleischmann et al (2012, 167—168), sometimes process can be running without any further need for improvements until breach in process requirements or unachieved goals are detected. These deviations are sometimes unambiguous and could be reflected from human errors or out-of-dated systems. Furthermore, it is possible that deviations occur from both where the root problem is in both autonomous and inserted information to the systems.

According to Fleischmann et al. (2012, 157, 160), company and process goals give objects for optimization as well, these can be identified for example as time, quality, or expense constraints. Only activities that have relation to process' business goal should be containing in the process. Correspondingly, irrelevant, or unnecessary tasks, communications and actions should be considered points for optimization. These identified objects for improvements are then proceed for optimization creating optimized costs, time, and quality.

Stakeholders is a crucial part in optimization since different person in a process are their expertise in their own field (Fleischmann et al. 2012, 159). Fleischmann et al. (2012, 163, 168) states that everyone should be familiar of his or her responsibilities in the process. This is significant for optimization when best way of doing only knows best the people responsible of them. Because of this, mutual improvement is should be considered for best optimization for process overall.

For better understanding cost, time, quality optimization goals, it is essential to define the following questions: "What? How much? Until when? By whom?". Values for the questions can be either gathered from assumptions of desired values in the process, preexisting process' appraisals or by benchmarking.

2.3.7 Organization-specific implementation

A detailed process and abstract concepts are ready for implementation in practice; therefore, it is important to acknowledge possible challenges during implementation (Fleischmann et al. 2012, 172). According to Fleischmann et al. (2012, 174, 183), these can occur when abstract concepts face practical systems and environment or incompetent people handling information that they are not specialized in. Therefore, it is important to follow modelled process and involve implementation every stakeholder who should be part of the process with their respected field of specialization.

Stakeholders who are responsible for transferring an information should be put into respected fields of responsibility. Then again, to minimize errors and to maintain seamless process flow, back-up persons for responsible stakeholders should be appointed for if-the scenarios (Fleischmann et al. 2012, 177, 184—185). Consequently, both person responsible of and back-up person roles and responsibilities should be described as well as work tasks added or removed if needed (p. 187). Even so, everyone should be thinking process as a teamwork as well as participating in solving biases in the process for agile operation to achieve business goals.

2.3.8 Information technology implementation

In an organization are several solutions of information technology (IT) and its implementation and monitoring. According to Fleischmann et al. (2012, 190—193), solutions vary from data accesses, its protection to its validation. In order to implement these solutions business processes should have an appropriate workflow. In addition, for best implementation it is important to think the operations and stakeholders' perspective and information systems involved. Working process require operational coherence with its systems and services (Fleischmann et al. 2012, 190). According to Fleischmann et al. (2012, 192), this can be achieved by understanding workflow in detail. They say that workflow can be manual or automated, it has formal description of activities and stakeholders that perform them as well as systems that interacts with the stakeholders, it has objects, and it is guided by business rules and controlled by business logic.

Stakeholders that need the access to IT for their work should be granted access but right of use can be determined by their business instance they are responsible of (Fleischmann et al. 2012, 193). These accesses could be changed along the way or be static, as long as it is not hampering the performance of stakeholders. It is important to bear in mind stakeholders who are not directly responsible of performing such instances but could be back-up persons. Therefore, it is essential to grant an access for them to secure further lack in the workflow.

According to Fleischmann et al. (2012, 194, 197), automation should be used to minimize human intervention in the workflow but in some extent to grant control requirements for task completions. However, human interactions are often needed, therefore user interface should be designed in a way that it convenient to use and supports its users. Fleischmann et al. (2012, 187, 204) states that for best functional implementation of systems, adequate tools should be provided for people who use them. For this, formal business systems for example SAP could be used rather than software programs that are often hard to blend together with the process itself.

2.3.9 Monitoring

Execution of process and its performance can be best evaluated over time. Over time monitoring or often called Process Performance Measurement (PPM) helps evaluation because changes external or internal changes may and more likely will occur at some point (Fleischmann et al. 2012, 208—209). Reasons changes to occur vary, these might be for example unexpected increases or decreases in sales. Internal changes and unbalanced allocation of recourse might cause variations in internal process performance and its execution.

Monitoring reflects quality, time and cost of a process and therefore helps analyzing and classify points of an improvement in these areas as well expose them to the stakeholders on time. According to Fleischmann et al. (2012, 208, 211), monitoring needs to be continuous in orders to identify deviations in a process and assess them in an appropriate manner. Because of this, improvements and modifications could be done fast enough without compromising quality, time, and cost of the process too much. However, evaluations could be done in different periods of times and intervals depending on the evaluated object.

3 AUTOMOTIVE INDUSTRY

This chapter focuses merely on the environment of the study. First, the past and the future of the car industry is introduced following industry's importance and impact on global economy. Lastly, importance of car dealers and the case company are introduced.

3.1 Automotive industry; the past and the future

It is argued whether the first invented automobile was steam-powered tricycle in 1769, which Nicolas-Joseph Cugnot built for towing artillery or gasoline-powered automobile in 1886, that Karl Friedrich Benz and Gottlieb Daimler invented (History 2019). Benz's vehicle was three-wheeled whereas Daimler's was the first four-wheeled vehicle introducing first high-speed petrol engine (Leisurelife 2019). The way of people is living or being able to access different kind of commodities despite one's domicile were changed. Leisure travel and relocating rose when individuals started to have first time ever a possibility to travel freely. Transportation of good and logistics developed in step with it making invention of the car revolutionary moment that changed people's lives forever.

The first cars were simply designed and did not have much an outlook of nowadays cars (History 2019). For example, Benz's vehicle had only the combustion engine integrated with the chassis together with driver's seat and did not have any safety features. The development of the cars and safety of them have been fast paced ever since the early days (Brooks 2012). Advance in technology and knowledge has let in huge innovations in automotive industry. The industrial revolution started in the beginning of 1900 when Henry Ford introduced assembly line in his production, which cut expenses in production and made cars affordable. New inventions such as electric starters, and automatic transmission, which is said to be one of the most important innovations in the history, came years after developing the industry even more.

According to Lin (1994), from 1970 one of the biggest car manufacturer Japan has been growing its production from 5 million units per year to over 13 million units per year in 1990. Statistics do not only show the advanced steps in production but in contrast demand for the

cars over the years. It is estimated that there are more than 1.4 billion vehicles operating on the road today and it is expected to grow up to 2.8 billion in 2036 (Chesterton 2018).

Nowadays cars are highly advanced with the latest features in technology as well as with safety systems. Different regulations, targets on emissions set by countries or unions together with competition has led to entirely new era of automobiles; electric vehicles (EV). For instance, the directive "Clean Air for Europe" (CAFE) set by European Union (EU) has established measures that aims for:

- 1. defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- 2. assessing the ambient air quality in Member States on the basis of common methods and criteria;
- 3. obtaining information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures;
- 4. ensuring that such information on ambient air quality is made available to the public;
- 5. maintaining air quality where it is good and improving it in other cases;
- 6. promoting increased cooperation between the Member States in reducing air pollution (European Union 2008).

PwC (2018) estimates in their paper that by 2030 over half of globally sold vehicles will be fully electrified. Same report states the future vehicles are coming more autonomous and the ownership of vehicles is changing shared rather than sole ownership.

3.2 The significance of automotive industry

According to some estimates the automotive industry as whole is worth \$800bn (Biller 2014). Overall turnover for the industry is 2.75 trillion and it amounts 3.65 % of world GPD (Saberi 2018). In addition, globally close to 8,5 million peoples were employed in manufacture alone by the automotive industry in 2016 and if indirect employments would be counted, both manufacturing and supply different components, the total number of people employed would be four times higher (Addley 2017). The majority of car manufacturers are owned by 14 different international companies, for which profits are divided. These can be roughly divided to 10 biggest producing countries. These countries are from the largest to smallest by production; China, U.S.A, Japan, Germany, India, South Korea, Mexico, Spain, Canada, Brazil (TopSpeed, [ref. 9 February 2021]; Addley, 2017).

According to Addley (2017), car industry employs as much as 8,5 million but due to the fact that production plants are divided by various competitors all over the globe, the employment is not lumped in a one particular continent or country. Furthermore, when counting indirect jobs in the automotive supply chain the employment is widespread creating jobs around the planet.

Statistics show automotive industry is a massive contributor on investing in research and development (R&D) (Kearney 2021). Demand and regulations partially lead investments in R&D, therefore advanced technology as well as improved safety can be seen more often on the cars. As the industry is a pioneer in manufacturing technology, upheavals in production processes such as assembly invented by Henry Ford and Lean principles that roots from Toyota's production originates from it. These innovations have influenced other industries and are now universal everywhere. Furthermore, automakers have been a pathfinder for automation from which robots were initiated. Along with modifications in the supply chain as integration or outsourcing have extensively transformed industries of all kinds.

3.3 The importance of training the car dealers

As the world is changing continuously, so do the markets and people in it forcing companies to develop themselves by investing in their valuable resource; their employees to maintain competitiveness (Lessonly 2021). Training does not only develop individual skills and strengths but bring the whole team to the level of shared knowledge, skills, and goals. It is important to find people who understand the company, follow its processes and are correctly

trained (Libin 2020). Gastich (2018) crystallizes the importance of the training as "training is a competitive endeavor among manufacturers".

According to the Nguyen, Tran, and Ho's (2018, 5—6) study, training and development of employees contribute on positive influence on their confidence in their work making them performing better and more productive. Possibilities to develop oneself and learn creates stronger relationship between employees and the employer resulting in improved employee loyalty.

The benefit of training the car dealers not only directly help dealers and their salespeople to sell plenty of cars but have on affect whether the customer will return or not. In fact, study made by Bloemer and Lemmink (1992) show that positive experiences from both sales and aftersales at the dealership affects loyalty to dealer, which will in the end affect loyalty to the brand. Brakus, Schmitt and Zarantonello (2009) describes well what things affect experiences towards brand when speaking of people, whether customers employees or middleman:

Brand experience is conceptualized sensations, feelings, cognitions, and behavioral responses evoked by brand-related stimuli that are part of a brand's design and identity, packaging, communications, and environments.

Car manufacturers train their dealerships to better understand their products and different functionalities of them for sales and aftersales, form uniformity of company's practices, values and to gain devotion towards the company. Therefore, it is crucial for car brands to intrigue, engage and more importantly maintain the brand image. Amalia (2018) stages that successfully conducted sales do not solely stand for job well done. Study shows that quality of aftersales plays even a vital role in customer retention and again loyalty towards the brand.

When taking into account present and the future of the industry, the importance of competent people and coherent training become even more meaningful. There is no ambiguity that the automotive industry is in midst of a big wave of industrial restructuring and rapid technology evolution. Auto manufacturers need to improve and develop their processes management in their supply chain that lacks behind. It will eventually salvage the companies from making

further damage for their brand image or even save from further destruction. Furthermore, companies must keep evolving by driving innovation on their products and delivering excellence on services in order to meet the expectations of their customers around the world.

3.4 Company X

In the beginning of 20th century Asian automotive manufacturer was established (Induction Presentation 2020a). Early days the Company X only produced vehicles to its home market, especially during world shaken times of World War II, when it majorly focused its production to produce passenger trucks and military vehicles. After markable advance in the middle of 1950's for their engine engineering, the company reached to gain worldwide markets. The company has joined in an alliance with another car manufacturer to strengthen its positioning, creating savings in research and development costs, increasing share of technology for correlative benefit of development for the companies involved.

According to the Internal Release (2020b), the global production of the vehicles reached 3.5 million units in 2018. Product portfolio for the company consists of passenger cars, light commercial vehicles, and sports cars (Induction Presentation 2020a). Company's most sold type of vehicle is passenger cars regardless of the market country. However, other two product segments share a comprehensive support covering company's market shares for the customers to whom these products are typically aimed for.

The Company X is currently present in all the continents of the world making it a truly globally large-scaled enterprise (Internal Release 2020b). Due to this fact, distributed global markets creates in coherence regional business units all over the globe. Since automotive industry is highly competed, percentages of market shares vary across different continents and again in different markets. In previous year 2020, when combining all the markets the company was able to sell more than 4 million units.

4 DEVELOPING INFORMATION SYSTEM TO SUPPORT PROCESS MANAGEMENT

This chapter focuses on research and the Company X. The current situation of the company is introduced, following elevation of development points and research information is collected. After that this suggestions and recommendations are pointed out. Both primary data and secondary data is collected. Collection method for primary data is through semi-structured interviews with process stakeholders whereas secondary data is collected from reports or company's publications. The chosen mixed method collection provides more reliable result and supports the object of the thesis.

4.1 Company X's levels for information flow and approvals

As global company, which Company X is, it has spread-around operations and functions cross-country or even cross-continent scale. According to induction presentation (2020a), the company has headquarters from two different continents, from which the second level headquarter is in Europe. It is the last headquarter before the headquarter for Nordic markets. A pattern for guidelines and other relevant operational information originates from company's headquarter in Asia through headquarter in Europe, in which RBU responsible for Nordic market is a one.

International operations demand clear process structures throughout its operations. Processes need to have designed and created in a way that they are functional because often in a large-scale company these processes are somewhat bureaucratic and sometimes way too long. According to Training Manager (2020), bureaucracy in a company often plays against the benefit of processes rather than in favor of them. Despite the level of bureaucracy international operations create their own level of complexity and challenges. It is more prone to domino effects if individual activity within the process is challenged or abolished.

According to company's latest directory (2021c), order request process for technical training take place before the actual order of the car happen. The reason for this is to get all the valid

permissions and verifications for the order. After these the requests are fully approved the car is eventually produced and shipped.

4.2 Conceptualizing the process structure and the issue

The researcher suggested the Company X to conduct interviews with the process' stakeholder to better understand a structure of the process, each stakeholder point of views of the process and responsibilities breakdown. The interviewees were selected by the directory and information provided by Technical Training Manager and Training Manger (Interview on the 30th of 2020). Then they were contacted with the help of company's employees and the team the researcher was working in. The structure of interviews and following steps were conducted with the respect of a process modeling structure: analysis, modeling, validation, simulation and optimization, information technology implementation and monitoring. Therefore, stakeholders in a process who are not straight in scope of the research were left out.

Semi-structured interviews were selected as it gives possibility to adjust the research interview-specific and therefore gain quality data from them (Gillham 2005, 70). Before the interviews, an email invitation including information about the research and interview setting. A commissioned for the study Training team was interviewed first to get better understanding of their perspective for the process. This way the following interviews with other process' stakeholders could be structured and formulated right. The first interviews with Technical Training Manager and Training Manager were done on the 30th of December in 2020, followed by interview with Distribution Coordinator on the 18th of January in 2021 and General Affairs Officer on the 4th of February in 2021.

Need for acquisition

In the Company X, technical training is triggered whenever the new car model is introduced, an old model is updated, or the skills of technicians are needed to be maintained. According to the interviews (2021), the company has order process for technical training cars which is described later in Figure 3.

Model shows the pattern of how process proceeds within from start to the end together. There are around seven stages where the information changes from every stage to another when the process proceeds.

Delivery and cession

Delivery and cession process is a part where the former process, order request for acquiring the training car has been approved and it is ready for order. It starts from when the employee within the company orders the car and ends when the car has been written-out from the company's bookkeeping.

4.3 Forming the base – Analysis

Targets were set with thesis topic in mind from Training team's perspective together with the Technical Training Manager, Training Manager from the Training team. The target was to receive all the necessary information from other process stakeholders throughout the order process and communication structure.

Before the interview, the researcher set the target that should be obtained during the interview, which subsequently will be base for following interviews with other process stakeholders. The target was to get better outlining on Technical training team's activity on technical trainings, their perspective on responsibilities division, information and communication structure and possible channel for them, the issue, and its adverse effect on Technical Training Managers work. Since Technical Training Manager is involved and responsible for tasks that relate on the information about the ordered car and their usage in the training, was the emphasize on the question on these topics.

According to Technical Training Manager (2020), his duties consist of scheduling and managing the technical trainings, and other activities related to them. Trainings are being held to train or uphold technicians' skills with the existing cross-carline products or with upcoming models. By training technicians are more skilled and their quality of work increases, which results in customer satisfaction.

According to Technical Training Manager (2021), altogether 3200 people are trained yearly in the Nordic countries and from this total sum each country trains 800 people per year. The quantity is calculated from the capacity of the trainings, in which 9 people can fit in one training session. He says trainings are usually two days long and they vary depending on the level and content that are being trained in the training. Technical trainings are face-toface classroom trainings and participation to these is a necessary to participants complete it. This is because technical topics and mechanics cannot be taught if not in practice. Hence, it is important to have cars that are going to be trained available in the trainings.

According to Technical Training Manager (2021), demand for acquiring a new car for the trainings arise periodically or when a car's kilometrage reaches 15.000 kilometers, when new model is introduced or if there are any updates on the car models. He says in order to get the car for the training, order request form needs to be filled up and approved. When it is approved the process proceed to next steps and to other stakeholders in the process to handle until it is delivered to the wanted destination.

Key activities Technical Training Manager does in order to hold the trainings are to settle the training date with country office and the trainer, schedule the training days, invite the participants and other administrative subtasks (Interview on the 13th of January in 2021). Subtasks were left out as they were not relevant for the study.



Figure 4. Technical Training Manager's Key Activities to implement the trainings (Original idea Fleischmann et al. 2012, 81).

According to Technical Training Manager (2021), information flow and communication in the delivery process are the points where obstacles occur that reflect to training teams work whether it is about work before or after the trainings. He says after the approved order, the next time he gets any information about the car and its delivery is almost always when it is delivered or if at all. This makes it difficult or even impossible to schedule the trainings days or secure cancellations for the trainings if for some reason the car will not be delivered on time. In addition, he needs separately to ask different stakeholders this information and to deal who is responsible for different steps in the process as there is no communication or information channel to acquire this information. Information from the delivery process is crucial as it forms the next steps for his work, trainings, and their implementation.

According to Technical Training Manager (2021), the relevant information is he needs to know are a date of delivery for specific car model, whether delivery is to the destination or if the car must be picked up and by whom, completion of registration for the car, Pre-Delivery Inspection (PDI) and Underbody protection for the car. He pointed out that the information effect on KPI's the Training team monitors and measures. Before the training they monitor

how many participants have registered to the training and after how many have completed the training (Interview on the 13th of February in 2021). Desired information for Technical Training Manager is to have a process status of each step in the process for the ordered car.

4.3.1 Selection for the structure

Results from the first interview was gathered and structure for following interviews were done. The researcher sent the invitation to other process' stakeholders that are next in the process when the order request is approved and the order proceeds. General Affairs Officer and Distribution Coordinator were interviewed since they are mainly involved in the process before and until the car is delivered.

The interview with Distribution Coordinator was conducted on the 18th of January in 2021. and with General Affairs Officer was conducted on the 4th of February in 2021. As General Affairs Officer would be chronologically next in the process as they are the usual point of contact for the Training team. For scheduled reasons interview did not meet this order. However, it did not hamper the research as the formulation of the process modeling was done after all the interviews were conducted.

Selection for the interview order was based on key activities for Technical Training Manager as described in Figure 3. Structure of the interview was formed by the previous interview and its target was to find the necessary information for modeling a structure for the order and delivery process, responsibility breakdown and channels used to support Technical Training Manager with his key activities to secure the implementation of the trainings.

4.3.2 Filing the gaps – Modeling

Distribution Coordinator was interviewed on the 18th of January in 2021. The Distribution Coordinator is part of sales department and his job in the process is to get the approval and find the wanted car for the training. After the right car with the right features is found, it is ordered.

According to Distribution Coordinator (2021), his task in the process starts when he gets confirmation to order the car. He says that according to the information in in the order form the order is then placed. Usually, the car will be ordered straight from the company's plants, either from the Europe or Asia, depending on the wanted car and model. Distribution Coordinator (2021) pointed out that delivery times differ whether the car will be ordered from the plant in Europe or the plant in Asia. For Asian production, the delivery time is set to seven months whereas in European production the delivery time is five months. He also pointed out that sometimes the cars could be found and delivered straight from the company's warehouses, from which the delivery time is significantly faster. However, the good reminder is to form the steps for tasks according to the longer delivery times.

After the order, the information Distribution Coordinator receives concerns car's delivery time and the destination which is delivered country's port. According to Distribution (2021), his responsibility ends after the car is deliver to the port. Subcontractor unloads the car from the vessel and registers it if needed. After this responsibility changes to General Affairs Officer or company's country officer, depending on which country the car is delivered to.

According to Distribution Coordinator (2021), he communicates and changes information mainly with General Affairs Officer. The communication is done through emails and some information is changed through assigned softwares depending on the information. He says at least three to four different platforms or softwares are being from the approval to the point when it is delivered. Some of these platforms are manually filled which means stakeholders who is responsible for given task is responsible for fill them systematically.

4.3.3 Interview with General Affairs Officer

Interview with General Affairs Officer was conducted on the 4th of February in 2021. General Affairs Officer is a part of Human Resources and General Affairs department. Inside the company forms and requests that are related to internal matters go through General Affairs Officer (Interview on the 4th of February in 2021).

According to General Affairs Officer (2021), the position requires being involved in validation in different projects and processes inside the company. When the researcher asked about

his perspective of process structure and responsibilities breakdown the answer was more comprehensive than with Technical Training Manager and Distribution Coordinator. General Affairs Officer (2021) said that the last step where he is involved is the step where he gives an authorization for Used Car Team to sell the training car to the dealer and write it off from company's bookkeeping. Although, the steps in the process where he is more involved concerns validations of different kind. Outlining of process' structure was made with the interviewee using BPMN diagram.

Technical Training Manager	Fills and sends an order request
General Affairs Officer	Authorize the port to the training center
Distribution Coordinator	Make the order
Subcontractor	Unloads the car at the port and does the registration
Country Office	→ Handles delivery from the port to the training center
Country's Training Center	Use the car for the trainings
Used Car Team	Deflect of the car

Figure 5. Swimlane Process Model for technical training car lifecycle (Harmon 2014, 219).

According to General Affairs Officer (2021), he receives a confirmation from order request from Finance. Ordered cars are counted in for each years' budget, therefore approval from Finance is needed. The confirmation is then forwarded to Distribution Coordinator. Delivery and order information on the other hand, he receives from Distribution Coordinator. Information about ordered cars could be seen from different platforms and databases. These databases are mostly Excel spreadsheets as only orders are done through assigned software. The information that they contain are VIN number (production number of the car), delivery estimate, registration, and the rotation date to replace the car.

According to General Affairs Officer (2021), communication and information between Distribution Coordinator is changed until the car is delivered to the port. Underbody protection in Norway and registration are usually done by subcontractor at the port unless there is a rush to get the car to the destination. General Affairs Officer is responsible of taking care for the delivery to the final destination in Finland from the port whereas in other countries company's country offices are responsible of for the delivery from the port.

4.3.4 Connecting perspectives

After the interviews, the data from each interview was compared and analyzed to understand dissenting perspectives, assumptions, and information exchanged between stakeholders. These could be then leveraged for the benefit of Training team for their work. Technical Training Manger and Training Manager were told about the findings and both were involved in planning of the next steps.

The following steps were to outline the identified structure of the process together with the identified obstacles in the information and communication flow to the Technical Training Manager. Subsequently, the structured process with information and communication deficiencies was indicated to the process' other stakeholders, General Affairs Officer and Distribution Coordinator.

Combining the BPMN diagram (see figure 4.) and key activities of Technical Training Manager (see figure 3.). information and communication structure could be visualized as in Figure 8. Technical Training Manager transfer sends order request information to General Affairs about technical training car order. As the order process proceeds different information is exchanged between different stakeholders within the process.



Figure 6. Communication structure according to BPMN diagram and Key Activities (Original idea Fleischmann et al. 2012, 184).

In Figure 6 communication and information exchange that happens after the order has been approved is visualized. The communication in the figure is marked as dotted lines. It can be seen the communication being two-way between different stakeholders as process proceed. Only exception to this is the communication between Technical Training Manager and General Affairs Officer and Distribution Coordinator that affects also Technical Training Manager's key activities.



Figure 7. Affected Key Activities for Technical Training Manager from communication shortages (Original idea Fleischmann et al. 2012, 81).

In Figure 6 visualizes affected Key Activities for Technical Training Manger when communication is lacking in order and delivery process. According to Technical Training Manager (2021), assumptions for the possible trainings days needs to be done because otherwise there is no information provided about it. According to contracts (2021), scheduling for the trainings should be done early enough for participants to have enough time to arrange themselves time for the training. The same applies for cancellations as there is two weeks notification time for participants to cancel without any fee (Cancellation Policy 2021b). According to Technical Training Manager (2021), it is almost even impossible to know if the trainings should be hold or not if there is no information nor anyone is communicating respectively to him about the details of the delivery.

Other relevant key activities the insufficient communication and information have on impact is whether the car could be driven or not. According to EU directive unregistered cars cannot be driven in the traffic (D. 2014/46/EU). An additional tax fee for driving unregistered car is 1.000 euros including other fees and sanctions if the car is crashed and third parties are involved (Traficom 2021). According to Technical Training Manager and Training Manger (2021), cars are mainly being used and examined in the trainings where they are not driven. However, test drives and check should be done in order to confirm the cars' functionality.

According to Autotuojat ja -teollisuus' (2021) document, if produced cars has not been registered at least three months before new regulations take place cars cannot be registered for traffic use. These regulations can be concerning for example cars' emissions restrictions set by EU or countries. According to Technical Training Manager and Training Manager (2021), unregistered cars that have exceeded the time period for registration also affect cession of the cars because they cannot be sold. This in the end affects a budget for new technical training cars that are needed in the future (Interview on the 24th of February in 2021). Old training cars are sold to dealers by Used Car Team, and they are then again counted in for next year's budget for the cars that are ordered and being used in the trainings.

4.3.5 (Re-)modeling the structure

After conceptualizing and structuring the model of the current process and identified problem point in the communication, the process was re-modelled keeping in mind process modeling questions "which activities are performed by whom to yield a result of value" (Fleischmann et al. 2012, 66).

First, the information General Affairs Officer and Distribution Coordinator exchange during the process were put in a table for clarifications. According to interview with General Affairs Officer (2021), Distribution Coordinator (2021), and documents (2019; 2021a) the information could be gathered. This was then again reflected to the information Technical Training Manger needs in his job to be able to execute his key activities. Crucial information was marked as green and irrelevant info was left white and was left out from the modeling as Fleischmann et al. (2012, 169) suggested.

Table 2. Useful information that is exchanged between Distribution Coordinator and General Affairs Officer.

Stakeholder	Exchanged information		
	Order number		
	VIN number		
Distribution Coordinator	Car model		
	Estimated delivery time		
	Estimated delivery place (port)		
	Registration		
	Underbody protection		
General Affairs Officer	Department		
General Analis Officer	Contract date		
	EIC		
	User/Responsible		

Based on Table 1 the communication structure could be formed in order to achieve communication and information flow to Training team from Distribution Coordinator and General Affairs Officer. The information Technical Training Manager could utilize that General Affairs Officer and Distribution Coordinator exchange are car model, estimated delivery time and delivery place, information about registration and underbody protection.



Figure 8. Communication structure with Training team involved (Original idea Fleischmann et al. 2012, 184).

In Figure 8 re-modelled communication enables information pattern to travel through Training team. The modeling utilizes optimization so that any further efforts in from anyone in the process could be avoided. Communication and information exchange between General Affairs Officer and Distribution Coordinator would be the same as previously. However, as described in Table 1 not all information is relevant for Technical Training Manager. Therefore, by selecting or delimiting essential information could information overflow be avoided.

4.3.6 Seeking improvements – Validation, simulation, and optimization

After the modeling, a simulation and optimization were done. All the stakeholders who were interviewed were invited to comment and validate the re-modelled communication structure. This helped to point out any shortages in quantity or quality flow as well as whether the re-modelled structure would affect process' execution performance.

Simulation was done as fast-paced as a test without an actual order. Communication and information exchange was in the center of observation. The exchange of these happened through emails, which in the end happened to be the point of optimization. It was noticed that sending, receiving, and finding information from emails are not easy nor efficient way to

collect and find information. Already used softwares could not be utilized as company has limitations for the accounts and these accounts are already counted in for the budget.

4.3.7 Preparing for variables – Organizational Implementation

The researcher suggests creating a form for process stakeholders for "what-if" scenarios, just in case. With this company could maintain a process management for a process in question. These scenarios could be there is an unexpected variable in the process that affects the flow of the process as well as the communication of it. According to Training Manager (2021), staff turnover could create chaos if it is not properly maintained. Same applies for substitutes covering sick leaves or a change of subcontractor.

According to interviews (2021), responsibility breakdown was clear to some stakeholders and to some parts of the process as it is somewhat known what the next step in the process is. However, responsibilities in these steps have not been standardized nor monitored by anyone. Therefore, the form could be used as process log to describe clearly next steps. Crucial information for the process as it could display responsibilities, steps to follow as process procedures in different markets could vary.

Stakeholder in responsibility	If-clause in context	Result
Distribution Coordinator	If destination appointed to Norway, then responsibility changes to person X	Person X is responsible from X onwards

Table 3. If-clauses in different scenarios

4.3.8 Planning an information medium for the company – Technology implementation

Interviews showed that order process require different tools and systems. Unlike in seamless process where core and subprocesses could be harmonized with same or similar systems for minimized effort from all the stakeholders. Current situation is not optimal as they are hard to blend together with the processes. As the researcher found out when interviewing the commissioner, the Training team, should the suggested method be created as optimally without any further increases in budget. Therefore, Enterprise Resource Planning (ERP) software were left out for their expensive subscription and other alternatives for these were thought and suggested.

Technology implementation was discussed in the interview with the Training team and suggestion about a platform from which everyone could see the essential information regarding the order and delivery set the basis for technology implementation. According to company's resources and suggestions from the interview, an Excel file was selected to be the best medium where the order and delivery information could be best seen and transferred among process stakeholders.

4.3.9 Continuous optimization – Monitoring

The researcher suggested monitoring integration for the technology design. Monitoring should be done for the process from communication and information's perspective. This helps the company to evaluate their efficiency and performance. As the cars should be ordered at least every nine-months unless new models are introduced, should the monitoring be done continuously and overtime.

Continuous monitoring helps to identify improvements and tackle them without compromising process flow, which reflects quality, time, and cost of the process (Fleischmann et al. 2012, 208). According to Technical Training Manager (2021), he has been the only one who has identified deficiencies in communication and information flow in the process. To achieve business goals agile as a team quickens the optimization time if the deficiencies are noticed during monitoring. Therefore, effort and contribution belong to every stakeholder in the process (Fleischmann et al. 2012, 187).

4.4 Approach for Company X

Based on the process modeling steps, interviews, models and suggestions that were constructed during this research, was the following approach suggested for the Company X. The interviews brought up essential information that could be utilized to improve information flow in the particular process that affects positively on process management in the Company X. Approach is based on optimization for information conveying and interpretation, and its storage. It takes into consideration the aim of the study as well as resources provided for it from the Company X. Therefore, the actual creation and implementation of the of the suggestion was left for the company. However, this approach is thought to create benefits for process management and overall understanding and importance of communication and information exchange inside the process.

Suggestion – Designed information medium

Planning was done according to the identified points at stage of optimization. To be as clear as possible data and its interpretation was done according to suggestions of status information (Fleischmann et al. 2012, 86). Moreover, the medium design needed also follow automation integration to minimize errors and improve workflow.

The designed medium was a tracker (see table 4), where every stakeholder in the process would have access to it for comprehensive understanding about the process and responsibility breakdown. It would help to answer questions "how, what, when" (Eriksson & Koistinen 2014, 5). To ease interpretation of the tracker and to minimize errors on information input, also an entry form for technical training car's information was designed (see figure 9).

Technical Training Car Entry Form				
VIN number	209123095750392			
Car model	Car model X			
Version	Version X			
Quantity	1			
Country	Finland			
Additional information	Norway Sweden Denmark			
	SAVE MODIFY DELETE			

Figure 9. Technical Training Car Entry Form

The entry form was designed based on the interviews (2021) to only show relevant information for the order delivery and delivery process. Its main purpose is to serve effortless input for the technical training car information which is essential for the tracker of the ordered car (see table 4). To minimize errors only fields "VIN number" and "additional information" fields are open-end fields, meaning information to those fields is needed to be manually written. Fields "car model", "version", "quantity" and "country" are set by company's existing fixed information that is not going to change. Therefore, in those fields options from drop-down menu can be selected as seen in the field "country". The form will be on the first Excel spreadsheet and when it is saved the information on the form will be changed for the second spreadsheet which is exclusively meant for the tracker.

Table 4. Technical Training Car Tracker for Order, Delivery and Defleet (Original idea Fleischmann et al. 2012, 87).

DATE	STAGE	STATUS	RESPONSIBLE	COMMENTS			
12.2.2021	Order of the car	READY	Distribution Coordinator				
12.7.2021	Delivery	IN PROGRESS	Distribution Coordinator				
	Registration	NOT STARTED	Subcontractor X				
	Underbody protection	NOT STARTED	General Affairs Officer				
	Pre Delivery Inscretion	NOT STARTED	General Affairs Officer				
	Defleet	NOT STARTED	Used Car Team				

TECHNICAL TRAINING CAR TRACKER

Tracker was designed to help monitoring the order and delivery process of the car, where it tells all the essential information. These are a date of the entry when the car has passed a particular stage in the process, whether the stage is waiting to be started, in progress or ready, responsibility person for the stage and comments if needed. However, automation for the tracker needed to be limited so the entries to "status" column could be marked manually as information cannot be generated elsewhere without ERP software. However, to minimize errors, entries to "status" field are needed to be selected from drop-down menu and the status for following stages cannot be changed unless previous one is marked as "ready". For open-end columns, "comments" field serves the purpose if additional information is needed to support the respected stage where the comment is left.

Centralized file

The file would work as process log where the essential information for process' standardized responsibilities and if-clauses would be easily accessible (Fleischmann et al. 2012,184). The entry form and the tracker would be used inside the same file, but different spreadsheets as previously mentioned (see picture 10). The benefit of having the status tracker and process log in the same place is to save time as there are less files that are needed to be handled.

Form Tracker Log

Picture 1. Picture of spreadsheets on Excel for Form, Tracker and Log.

Every stakeholder who is responsible of at least one task inside the order, delivery and cession process would have an access for the file. Other stakeholders who are not straight in scope of executing a particular stage as described in Table 4 would be granted read-only access (Fleischmann et al. 2012, 68—68). This decrease the possible errors as employees with modifying rights will be limited. Moreover, everyone would still have the right to see all the essential information about the progress of the process because people are entitled to have it to successfully execute their job (Adhikary, [ref. 24th January 2021]).

5 CONCLUSION

In this chapter we are going through main elements of the results and recommendations for the company. Study's reliability and validity is introduced, following with the authors insights of the research and suggestions for future research.

5.1 Main results and recommendations

As a result, structure of information and communication were structured and essential information for Training team's work was found. The information was used so that it could be best used in favor of process' stakeholders. Therefore, a medium was designed to help inserting, tracking, and interpreting the information for achieving successful implementation of technical trainings, secure test-drives and effortless progress of the car's process until it is deflected. As the research proceeded, the author suggested Company X approaches that were used eventually in designing the medium.

Constant and two-way communication and information flow are essential for the processes to work well in the first place. They are crucial for stakeholders within the process to execute their tasks, especially if their tasks are depended on the previous process' stages and information received from them. The suggestion seemed to have a demand for the company as it turned out during research that various processes would need optimization and streamlining in the Company X, which only clear and transparent communication could improve. However, these processes are still needed to be re-modelled and optimized for overall process development. Communication and information flow are not always the reasons behind the need for an optimization, but as discovered, they are present in all processes and therefore optimization of processes cannot be done fully unless communication and information are taken into account.

It is important to understand that the deficiencies on communication and information flow inside the company can have an influence further than just on internal company's short-term results or KPI's. These issues can be far-reaching and have an effect on brand image, customer loyalty and on customer retention as well. In the end, long-term results matter more than the short-term goals. Consequently, everyone in the process or the company should think outside of the box once in a while and understand how their work or actions are affecting others' work. After all, it is a mutual benefit everyone if everyone can successfully execute their tasks.

Therefore, without understanding even little nuances in the organization that make it succeed or fail, it is troublesome or nearly unfeasible in practice to do necessary set of actions. That is why it is essential to understand processes, responsibilities, and goals of various value chains inside the organization and how they are dependent on one another.

5.2 Usefulness of the analysis

Suggestions are relevant for the Company X to approach as they were constructed and designed according to data collected and different models together with company's resources. Streamlining processes is essential for efficient and profitable business. Particularly, in the case of global operations where processes are divided across the globe with the responsibility division for different departments or subcontractors. Therefore, it is important to continuously optimize processes as savings in expenses are hence multiplied in global value chains.

5.3 Research reliability and validity

For the study, a case study method was used, and its result was used according to Company X's needs. The primary data and secondary data were collected during the research, therefore the study used interviews, documents, publications, and observations.

The work for the study was started late in the year 2020 and lasted until spring in 2021. For the narrow scope of interviewees, people who did not fill the interview criteria were left out from the research. Based on the aim of and scope of the thesis, interviewees consisted only four employees, from which three of the were from different departments, Training, Sales and Human Resources. However, to get more reliable result for direct and indirect effects from the problem that the research tried to find the answer, result audience for the interviewees should have consisted larger spectrum of samples. Interviews were not supposed to give the right answers but to provide an overview of the research problem for the company and therefore suggest best possible option for it.

The focus for this research was to enhance consciousness of importance of communication and information exchange for better process management and execution. It is more important to achieve process' business objective if it is not at the expense of individual's business objectives in that particular process. Especially, if the business objectives are depended on one another.

5.4 Lesson

The researched topic seemed to be too wide at the beginning, since communication, information as well as optimization as topics would have been too wide to discover. Hence, it became clearer through interviews to select a topic that would actually come into use and be beneficial for the Company X. Business process management and its optimization need extensively wider understanding of company's practices and management than limitations of the study and employment of the researcher allowed to discover. Communication and information were the aspects that were focused during this study. Those are the points of development and acknowledging in everyday life that would not necessarily need any wider profound understanding of a particular business.

The research gave an opportunity to explore cause-effect situations and to understand reasons behind them. The opportunity made possible to bring in sight the findings and to provide solutions that could be used in practice. Companies that operate globally and have long roots in the history, have built operational chains across different markets. Although, it is not clear that sometimes these chains might not be working in the most efficient way as possible. However, it is a good start to acknowledge the issue and the need to fix it, but it is wiser to have an action for it.

In terms of process management regardless of the field of business, exchange of information and communication with every stakeholder is essential. Thus, improved process management was achieved through improved information flow with the designed medium. However, aspects on communication and information flow should be inspected on other fields of business operations for improvement. As communication and information change take part on all the interactions happening in the world it could be that the companies that are poor with their communication might leave behind, or at least lose dominance.

5.5 Future research

The topic business process management is rather old but its widespread studies on different topics give an extensive possibility on future research on the fields of communication and information. Communication is fairly new in a way that its importance has been recently noticed and started to research. Therefore, more comprehensive research can be done in the areas of:

- 1. The implementation and monitoring process were left for the company; therefore, they should evaluate its effectiveness and performance over time.
- 2. Company should take in consideration how well the process effects dealerships' satisfaction of the trainings.
- 3. The approach in this study used modeling steps practice, the company should use the practice for upcoming opportunities for optimizations in communication and information in different processes.

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APPENDICES

APPENDIX 1. Data of Interviews

APPENDIX 2. Frame for interview with Technical Training Manager and Training Manager

APPENDIX 3. Frame for interview with Distribution Coordinator

APPENDIX. 4. Frame for interview with General Affairs Officer

APPENDIX 1. Data of Interviews

30.12.2020 Technical Training Manager and Training Manager from Company X

- 13.01.2021 Technical Training Manager and Training Manager from Company X
- 18.01.2021 Distribution Coordinator from Company X
- 04.02.2021 General Affairs Officer from Company X
- 24.02.2021 Technical Training Manager and Training Manager from Company X
- 30.03.2021 Technical Training Manager and Training Manager from Company X

APPENDIX 2. Frame for interview with Technical Training Manager and Training Manager

Theme: Technical trainings

Theme: Information and communication

Theme: Responsibility

Theme: Issues

Theme: Additional information

APPENDIX 3. Frame for interview with Distribution Coordinator

Theme: Distribution Coordinator's work in the process

Theme: Order and delivery process

Theme: Communication and information

Theme: Channels

Theme: Responsibility

APPENDIX. 4. Frame for interview with General Affairs Officer

Theme: General Affairs Officer's work in the process

Theme: Order and delivery process

Theme: Communication and information

Theme: Channels

Theme: Responsibility