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An Efficiency Improvement Program to the Automation Department's Working Practices

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What a journey! Spiced up with so many learning experiences! A year ago, who would have guessed that nowadays reading the Harvard Business Review is normal for me. Considering the work I have done and this achievement, the ultimate outcome of my hard work, the Master's Thesis, makes me think everything is possible if you truly want something to happen and you are ready to work for it. This goes definitely to Number 1 on my personal scale of achievements.

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This thesis focuses on proposing an efficiency improvement program concerning the Automation Department's working practices. The working practices of the Automation Department have a major impact on the oil refinery's total competitiveness. Accordingly, the working practices of the Automation Department needed to be developed as a part of a refinery-wide efficiency program.

This study was conducted in a several phases in order to identify the efficiency 'killers' in the Automation Department's current working practices and to propose improvements to fixing these identified pain points. The key concepts behind the work efficiency helped to create a tool, which was used in practice to identify the efficiency 'killers' from the current working practices. After the efficiency 'killers' were identified, the focus area of this thesis was chosen. Best available practices concerning cross-team collaboration were used to tackle the business challenge of this thesis and finally, the improvement proposal was co-created and validated by the relevant stakeholders involved in this study. The improvement proposal combines all the stages presented in this study into a compact and practical solution in order to improve the working practices in the Automation Department and to improve the overall competitiveness of the case company.

The efficiency 'killers' identified from the current working practices were strongly related to interfaces between the production line teams and the historical evolution of the current working practices. In order to control the evolution of working practices and to improve the overall work efficiency in the Automation department, an efficiency improvement program toward cross-team collaboration was produced as a final proposal of this thesis.

Keywords	Efficiency, Working Practices, Collaboration

Contents

Preface

Abstract

Table of Contents

List of Figures

1 Introduction 1

1.1 Case Company Background 1
1.2 Business Challenge, Objective and Outcome 2
1.3 Thesis Outline 2

2 Method and Material 4

2.1 Research Approach 4
2.2 Research Design 5
2.3 Data Collection and Analysis 7
2.4 Thesis Evaluation Plan 9

3 Existing Knowledge on Work Efficiency 12

3.1 Definition of Work Efficiency 12
3.2 Tools for Identifying Efficiency ‘Killers’ in Current Working Practices 13
3.2.1 Environment and Technology 13
3.2.2 People Management 14
3.2.3 Department / Group Context 15
3.2.4 Individual Context 15
3.3 Conceptual Framework A of This Thesis 16

4 Current State Analysis of Working Practices in the Automation Department 21

4.1 Overview of Current State Analysis Stage 21
4.2 Brief Description of the Case Company Automation Department 22
4.3 Description of Current Way of Working and Performance 23
4.4 Efficiency Strengths Identified 25
4.5 Efficiency 'Killers' Identified 29
4.5.1 Category 1 Efficiency 'Killers' 30
4.5.2 Category 2 Efficiency 'killers' 32
4.5.3 Category 3 Efficiency 'Killers' 34
4.5.4 Category 4 Efficiency 'Killers' 36
4.6 Selection and Detailed Description of Focus Area of This Thesis 38
4.7 Summary of Key Findings 41

5 Existing Knowledge on Improving Cross-Team Collaboration 44

5.1 Definition of Collaboration 44
5.2 Target Setting 45
5.3 Breaking Silos 46
5.4 Collaborative Working Practices 48
5.5 Conceptual Framework B of This Thesis 51

6 Building Proposal for Efficiency Improvement Program 53

6.1 Overview of Proposal Building 53
6.2 Collection of Ideas for Proposal Building 54
6.3 Findings of Data 2 Collection 56
6.4 Initial Proposal Draft 60

7 Validation of the Proposal 68

7.1 Overview of Validation Phase 68
7.2 Findings of Data Collection 3 68
7.3 Final Proposal 69
7.4 Recommendations and Managerial Implications 72

8 Discussion and Conclusions 73

8.1 Executive Summary 73
8.2 Thesis Evaluation 74
8.2.1 Objective vs. Outcome 75
8.2.2 Relevance 75
8.2.3 Validity and Reliability 75
8.3 Final Words 77

References 78

Appendices
Appendix 1. Tool for Identifying Efficiency Killers, Questions Q1 – Q18
Appendix 2. Data 1 Collection Table (confidential field notes from recordings)
Appendix 3. Data 2 Collection Table (field notes from recordings)

List of Figures

Figure 1. Action research cycle (Dick 2000:2).
Figure 2. Research design of this study.
Figure 3. Conceptual framework A on work efficiency.
Figure 4. Formulated questions based on Conceptual framework A = the actual tool for identifying efficiency 'killers'.
Figure 5. Construction of the Automation Department in Porvoo oil refinery (Neste company internal documents 2017).
Figure 6. Average work assignments carried out in a day by one mechanic during a week, from the beginning of 2017 (Neste company internal documents 2017).
Figure 7. Efficiency strengths identified from the current state analysis.
Figure 8. Efficiency 'killers' identified from the current state analysis.
Figure 9. Conceptual framework B of this Thesis.
Figure 10. A Collection of ideas for the proposal draft template.
Figure 11. Proposal draft template.
Figure 12. Co-creating initial proposal draft in Data 2 workshop.
Figure 13. Initial proposal draft = Efficiency improvement program toward cross-team collaboration.
Figure 14. Final Proposal - Efficiency improvement program toward cross-team collaboration.

1 Introduction

This study focuses on exploring efficiency improvements to the Automation Department's working practices in Neste Plc, Porvoo oil refinery. In the ever changing market environment, work efficiency is a vital factor when a company is trying to improve its overall performance and productivity in order to increase its competitiveness.

Companies are well aware of the importance of the efficiency of working practices when it comes to executing daily operations in connection with implementing the company strategy. This is true also for the Automation Department of Neste Porvoo oil refinery.

Identifying possible efficiency 'killers' in the current working practices of the Automation Department and improving inefficient working practices should help Neste exploit current resources to their full potential and increase their competitive edge.

1.1 Case Company Background

The case company of this study is Neste Plc, a major oil refinery in Finland. Neste offers products and renewable solutions in the global oil markets. The company operates in the domestic markets and also in the Baltic Sea area. It has a wide retail network with over 1000 gas stations in the Baltic Sea area. There are also two refineries outside of Finland in Rotterdam and Singapore.

In Finland, Neste has a flexible and adaptable refining system, including the Porvoo refinery and Naantali refinery. Together these two refineries form an agile and cost-effective entity. Thus, they provide valuable advantage in the global oil markets.

This study focuses on proposing efficiency improvement program for the Automation Department of Neste Porvoo oil refinery. The main tasks of the Automation Department are maintenance, installation and commissioning of the oil refinery's automation and instrumentation. The supervision of service providers concerning automation and instrumentation is also one important responsibility of the Automation Department.

1.2 Business Challenge, Objective and Outcome

The target of Neste's strategy is to be the most wanted partner to its potential customers in the global oil markets. Customers naturally want to do business with reliable and efficient companies. The case company has recognized the need for a refinery-wide efficiency program. Therefore, also the automation department working practices need to be developed as a part of the refinery-wide efficiency program in order to increase the oil refinery's total competitiveness.

The objective of this thesis is thus to propose an efficiency improvement program concerning the Automation Department's working practices, which have a potential of increasing its efficiency. In particular, this study strives to identify work efficiency 'killers' in the Automation Department daily working practices.

The outcome of this thesis is a proposal for an efficiency improvement program in order to improve the Automation Department's current working practices and increase its overall work efficiency.

1.3 Thesis Outline

The scope of this study is limited to explore the current working practices in the Automation Department which is located close to production interface in Porvoo oil refinery. This study include all groups inside the Automation Department except the distribution terminal. The distribution terminal group is a separate unit which is located outside of the production area and it is excluded from this study.

This study is carried out by gathering various data about current working practices in the case company Automation Department. As the aim is to determine efficiency 'killers' in the current working practices in the department, it will be done through conducting the current state analysis and creating a proposal to address the identified challenges. This study also includes two literature reviews, where existing knowledge is studied. The literature review is split into two parts, with the first review presented before the current state analysis. This review explores the idea of efficiency and tools for carrying out the current state analysis. The second review is presented after the current state analysis. The aim is to collect ideas and best practices for fixing the efficiency 'killers' found in the current state analysis.

An initial improvement proposal for the efficiency improvement program concerning the Automation Department's working practices is then created, based on the development areas identified. Finally, the validation of initial proposal is conducted by the Head of Automation Department and the final proposal is presented.

This thesis is divided into eight sections. Section 2 presents the research method, research approach, research design and the data collection for the analysis. Section 3 presents the first literature review of this thesis, focusing on the idea of efficiency. Section 4 covers the Current state analysis about the current working practices and provides the findings from the analysis, namely efficiency 'killers' in the Automation Department's current working practices. Section 5 presents the second literature review, aim to find out the best practices from the existing literature in order to fix the selected focus area of this thesis. Section 6 presents an initial improvement proposal for the efficiency improvement program concerning Automation Department's working practices. Section 7 provides validation and feedback for the initial proposal with the final proposal as the outcome. Finally, Section 8 is reserved for discussions and conclusions, including an executive summary and evaluation of this Master´s Thesis.

2 Method and Material

This section describes the logic and methods used to conduct this research. The first, research approach and research design for this study is presented. The second, the data collection for this research is presented. In the end of this section, important issues concerning the evaluation plan of this thesis are discussed.

2.1 Research Approach

The research approach for this thesis is action research. Action research was chosen to respond to the emerging need of the current situation, namely the lack of work efficiency in the Automation Department. Action research is a well suited method for real world problem solving. Action research enables the researcher to gain in-depth understanding about current state and realistic perspective between theories and practice (Blichfeldt and Andersen 2006:2-3). The flexibility that action research provides, makes it possible to adjust the research approach toward the demands of the current situation and to fulfil the practical need presented. (Dick 2000:2-4) Action research is especially suited for possible change processes in social contexts, which also might be the case in this study (Blichfeldt and Andersen 2006:1).

Action research is conducted in order to improve the existing practices or processes (Blichfeldt and Andersen 2006:4). Action research tends to be cyclic with critical reflection after each cycle. The action research cycle includes similar steps and similar sequences to ensure continuous improvement of practices. These steps are: plan, act, observe and reflect, as described in Figure 1.

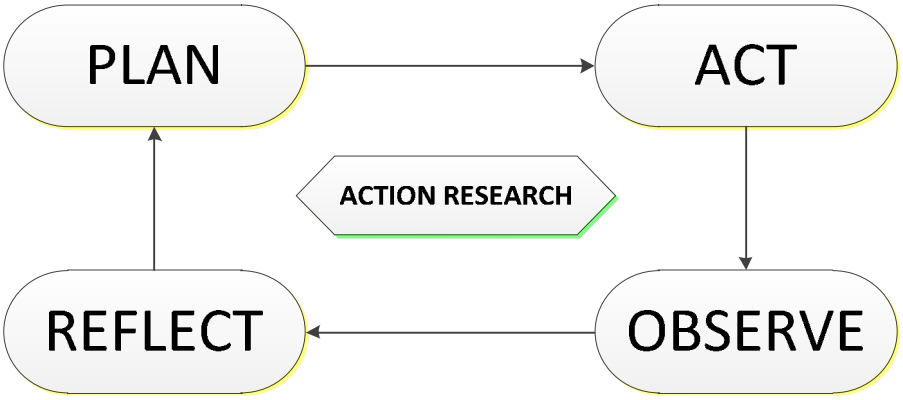

Figure 4. Action research cycle (Dick 2000:2).

In this thesis, only the first cycle of action research is conducted. The first cycle is an exploration of the current situation with ultimate outcome of improvement proposal for work efficiency and the initial attempt to improve practices. The use of critical reflection enables action improvement after each cycle and enhances mutual understanding about the process and practices (Melrose 2001:166). This model enables involving people from the host organization to this project and ultimately enhances learning experience and understanding of work efficiency in the Automation Department.

The collaborative and participative nature of action research enables time-efficient qualitative data collection for the researchers (Dick 2000:1-4). To improve working practices in the current case context, qualitative data is collected from the field for this thesis.

The qualitative data in action research is collected in a systematic way through interviews, workshops and observations. In order to provide practical perspective, useful tools and new knowledge of important topics are included to action research (Melrose 2001:168-169). In this study, data is collected from multiple sources from different levels to illuminate current working practices and to identify efficiency 'killers' in the Automation Department working practices. Also collected data collected from multiple sources and from different levels ensure the rigour of this study.

2.2 Research Design

The research design of this study is illustrated in Figure 2. This illustration visualizes the steps that are taken during this research. Steps, which include data 1-3 collection, and also the outcome of each step are presented.

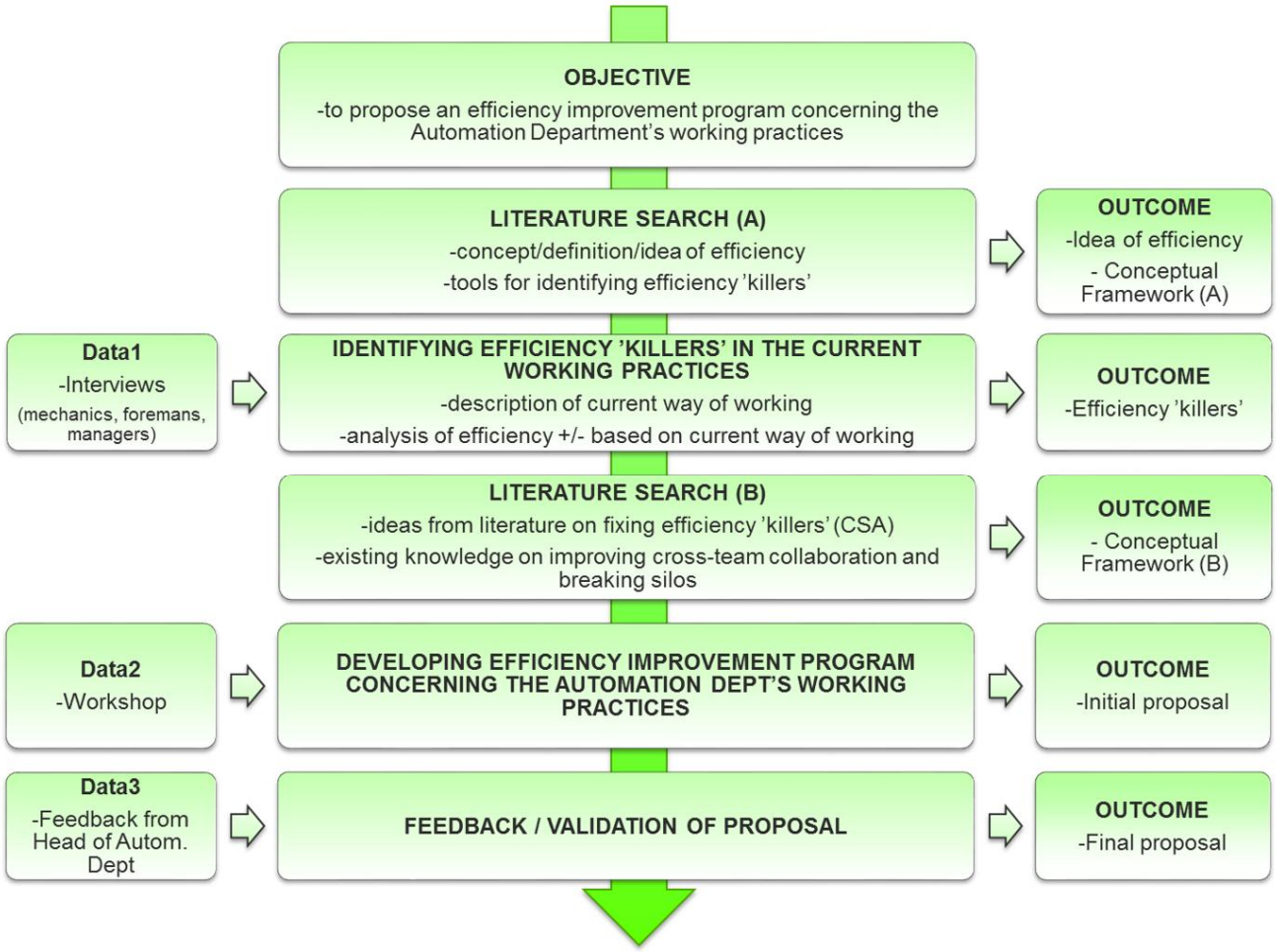

Figure 5. Research design of this study.

As seen in Figure 2, this study aims to propose an efficiency improvement program concerning the Automation Department working practices, which have the potential of increasing its efficiency. At first, existing literature about the concept of work efficiency is explored and a conceptual framework A of this thesis is constructed. This is done to explore the idea of efficiency in working practices and to find useful tools for identifying efficiency ‘killers’ in the current state analysis.

Next, the current state analysis is conducted after the first literature review, with the aim to explore efficiency 'killers' in the current working practices in the Automation Department. The current state analysis includes Data 1 collection, namely interviews with different stakeholders in the Automation Department. Existing literature is explored again after the current state analysis to find out how to fix the specific efficiency ‘killers’ revealed by the analysis and discuss how to set up efficiency improvement programs, with the outcome of conceptual framework B of this thesis.

Based on the findings from the existing literature and the current state analysis, the initial proposal for the efficiency improvement program concerning the Automation Department working practices is generated. This proposal building step includes Data 2 collection, i.e. workshop with managers to develop the initial improvement proposal. Finally, the feedback and validation of the initial proposal is conducted (data 3) with the Head of Automation Department. The ultimate outcome after validation is the final improvement proposal, namely an efficiency improvement program.

2.3 Data Collection and Analysis

In this study, data collection was conducted in three rounds. Data 1 was collected during the current state analysis, data 2 was collected in the proposal building phase and data 3 collected in the final step at the proposal validation. Details of data 1-3 collection are presented in Table 1.

Table 1. Details of data collection 1-3.

	Data source	Content of data collection	Outcome of data collection	Participants	Date & Duration
DATA 1, Current State Analysis					
1	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Analyzer mechanic	02.03.2017 37 min
2	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Maintenance engineer	03.03.2017 39 min
3	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation foreman PL3 & PLY	03.03.2017 44 min
4	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Group leader Automation	03.03.2017 40 min
5	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation foreman TF	06.03.2017 42 min
6	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation foreman PL2	06.03.2017 33 min
7	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic TF	06.03.2017 38 min
8	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic PLE	08.03.2017 37 min
9	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic PL2	08.03.2017 23 min
10	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation foreman PL1 & PL4	08.03.2017 33 min
11	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic PL3	14.03.2017 30 min
12	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic PL4	14.03.2017 33 min
13	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Automation mechanic PL1	15.03.2017 33 min
14	Personal interview	Current working practices	Current working practices, Strengths and weaknesses	Team Leader Automation	15.03.2017 30 min
DATA 2, Initial proposal building					
15	Workshop	Building improvements for autom.dept efficiency	Suggestions for initial proposal	Analyzer foreman, Group leader, Team leader, Head of Automation Dept	19.04.2017 1h
DATA 3, Feedback round					
16	Feedback	Evaluation of final proposal	Feedback of initial proposal	Head of Automation Dept	24.04.2017 25 min

As seen in Table 1, the data 1-3 collection includes several sources of data, mainly focused on the stakeholders working in the Automation Department. This enables deep insight into the current state of the Automation Department's working practices and to identify possible efficiency 'killers' in the current working practices.

Data 1 were collected through personal interviews from different level of stakeholders during the current state analysis, namely mechanics, foremen and managers. The interviewees were chosen to cover all the product lines in Porvoo oil refinery. Questions for interviews were sent to the interviewees before the actual interview. The interviews were accomplished face-to-face in Finnish language and they were recorded with digital recorder and transcripted into field notes in an Excel spreadsheet. Data 1 were collected in order to explore the efficiency 'killers' in the Automation Department current working practices with different views and perspectives of stakeholders.

Data 2 were collected in order to build the initial proposal for efficiency improvement program concerning the Automation Department working practices. Data 2 were collected in a workshop which consisted of a group of managers from the Automation Department. At first, findings from the CSA were presented, analysed and discussed. Second, suggestions and ideas to improve efficiency and working practices in the Automation Department based on the CSA findings were gathered and recorded. The Data 2 workshop was recorded by using a digital recorder.

Data 3 included the validation of the final proposal from the Head of Automation Department. Based on the feedback from the Head of Automation Department, final adjustments for the initial proposal were made and the final proposal was created.

2.4 Thesis Evaluation Plan

When producing a qualitative research, it is essential to take into account the key criteria of creating high quality research and its outcomes, such as logic, validity and reliability of the research. To achieve quality, criteria such as logic, validity and reliability must be ensured and made visible throughout the research. Also, quality in action research can be ensured by reflecting on the choices the researcher is facing and making during the project. Ability to see the choices, understanding consequences of every choice and how the choices are grounded is essential for action research. (Reason 2006:190)

Validity in qualitative research means that the research is implemented following the clear and valid research process, by using valid tools and data collection methods (Reason 2006:187-203). Validity of the research answers the question, how well the study measures what it is meant to measure and whether the research results are in line with the outcome of the study. In order to achieve valid outcome, researcher need to take a notice of alternative explanations founded from the existing literature and existing knowledge collected from the involved stakeholders. This is done in order to avoid researcher bias in the study. (Näslund et al. 2010:338-341). Validity also means that theory from the existing knowledge is identified and applied to the relevant issue (Reason 2006:189).

In this study, to ensure *validity* in action research, it is important to involve several people from different levels of the organization, valid for the context of the study. In this study, this step aims to collect various valid insights and practical knowledge from the stakeholders about the current working practices.

Reliability in qualitative research expresses the trustworthiness and authenticity of a study and ensures that its results and sources are repeatable during the research and for other researchers the use later on (Golafshani 2003:598-604). Reliability in action research also means, that collected data from stakeholders is clearly documented and evidence based and that sources from the existing knowledge are traceable and available for other researchers to use. In order to guarantee reliability of stakeholders during the research, it is important to involve all stakeholders at the early stage of the research. This ensures authenticity and mutual learning process during the research and ultimately enhances common understanding and promotes possible changes in the future. (Näslund et al. 2010:331-348).

In this study, to ensure *reliability* of the research process and the findings, triangulation of data collection is used in order to reduce the bias of the researcher and build a reliable and trustworthy outcome of this thesis. Triangulation enables examination of multiple realities that people experience as working practices in the context of this thesis. In practice this means, that for this study, data is gathered with multiple methods (such as interviews, workshops and participant observations), and from multiple sources (mechanics, foremen, managers) to build an initial improvement proposal and correct it into the final proposal, based on the evaluation and feedback with the Head of Automation Department.

Logic means in general "the cause-and-effect explanation of an action, decision, event, phenomenon, or solution" (Business Dictionary 2017). In this study, logic is ensured by observing the overall logic of the thesis, starting from establishing its business challenge, objective and outcome that are carefully and logically planned and clearly defined. The research design (described in section 2.2) shows the logical plan for the researcher to follow and implement during this research, so that to logically arrive at the actual outcome of this thesis.

Relevance means that evidence and fact is logically connected to the issue at hand, aim to prove a material point of issue which is applicable for the current situation and might contribute solutions for the current situation (Business Dictionary 2017). In this study, relevance is ensured by selecting the existing literature from the relevant sources, gathering data from the relevant data sources, such as relevant stakeholders with different status in the context of the case company. This is done with the aim to build involvement and understanding about the project and its purpose for themselves and for the case company, thus using the relevant participative and collaborative methods.

Summing up this section, first the research approach and research design for this study were presented. Second, the data collection for this research was described, and finally in the end of this section, logic, relevance, validity and reliability issues were discussed. The next section continues discussion of the existing knowledge behind work efficiency in order to identify effective tools for carrying out the current state analysis in the case company.

3 Existing Knowledge on Work Efficiency

This section discusses the first round of existing knowledge on work efficiency, with key concepts behind work efficiency, and presents the first conceptual framework of this thesis, namely Conceptual framework A on work efficiency. Based on the Conceptual framework A, a questionnaire is formulated which will be used in practice as a tool later in Section 4, the current state analysis, to identify specific efficiency 'killers' at Neste Plc Automation Department current working practices.

3.1 Definition of Work Efficiency

Nowadays companies are increasingly concerned with keeping costs down and balancing overhead to maintain a competitive position in the emerging market environment. At the same time, companies aim to increase their work efficiency and overall performance of their work force, in order to improve the overall productivity and competitiveness (Vischer 1995:2).

Thus, work efficiency has become an important part of overall productivity. Productivity is the amount of value produced, divided by the amount of cost or time required to do so. Work efficiency can be defined as how many tasks or how much work can available resources perform, for example, by a single employee or department, during the given time period, compared to predetermined targets which are based on estimated full potential of current resources. When employees are able to perform their work faster and in a smarter way, more work is completed in a less or equal time scale, leading directly to increased work efficiency in their working practices (Fuller 2016:1-6).

High performance of employees increases the overall efficiency, and ultimately improves the overall productivity and competitiveness (Davenport et al. 2002:11). Companies' ability to improve their working practices and the ways how actual work is performed depends on their ability of defining and shaping their current daily habits of mind and practice (Power 2013:1). Ultimately this will lead to a clever application of standard working practices and allows companies to have continuous efficiency in their daily actions (Power 2013:2).

3.2 Tools for Identifying Efficiency 'Killers' in Current Working Practices

In order to improve the working practices and to avoid lack of efficiency, companies need to analyze their current working practices. This is done to identify potential efficiency 'killers' and to make their employees more effective (Vischer 1995:5). Low performance and lack of work efficiency might lead to societies which are continuously debating, unable to make decisions and prioritize their work. Ultimately, this will lead to missed deadlines and lack of overall competitiveness. (Fernández-Aráoz 2015:3)

Companies need to develop ways to increase employee effectiveness and help people achieve their maximum potential in their performance (Vischer 1995:6). As such, the next four sub-sections continue discussion about four important categories behind work efficiency, which are: 1) Environment and Technology, 2) People Management, 3) Department Context and 4) Individual Context.

3.2.1 Environment and Technology

The first category of the tool is environment and technology. To improve working practices, companies need to be aware about the current performance and circumstances in the working environment which are impacting the work efficiency (Davenport et al. 2002:3). Companies need to explore the current working environment in order to find factors which are decreasing the current performance (Davenport et al. 2002:8-9). It is also of utmost importance to examine how well the company is prepared for unexpected situations and inevitable hard times in the current working environment (Fernández-Aráoz 2015:3).

Understanding the existing working environment would enable a more efficient way of working (Fuller 2016:2). Strategic work environment planning which encourages teamwork and improves employees overall performance, might have massive impact on overall work efficiency. (Vischer 1995:1-2)

Next, technology provides possibilities and is an important factor when companies are improving their work efficiency. The new technology and tools it provides ultimately enable employees to perform more tasks in the same time scale than before (Davenport et al. 2002:2).

Business practice suggests that exploiting new technology might conceal massive productivity gains and it is of utmost importance for companies to identify these possibilities which have potential to improve the work efficiency and overall productivity of the company. (Vischer 1995:1) (Fuller 2016:1).

3.2.2 People Management

The second category of the tool is people management. Managing people is crucial in order to improve work efficiency and current working practices. Companies need to understand the effect how managing people is affecting their overall work efficiency. Ultimately, a wrong kind of management leads directly to the wrong kind of efficiency (Fuller 2016:2-3).

For example, this is known from business practice that highly motivated employees tend to be more effective in their work (Bailey and Madden 2016). Meaningful work is one of the most effective sources of motivation and high performance. On the other hand, meaningless work can lead to serious lack of work efficiency and overall performance. Management awareness about how and where people find their work to be meaningful or meaningless is crucial in order to manage and improve overall performance and work efficiency (Bailey and Madden 2016:1). People management in companies always include some level of internal bureaucracy which ultimately might feel like a 'killer' to meaningful work and decrease work efficiency. Thus, companies need to manage the amount of bureaucracy through solid and effective processes, with ultimate aim to limit the bureaucracy in terms of what is necessary and effective, and what is unnecessary and ineffective (Bailey and Madden 2016:10).

Next, collaboration with different stakeholders and the quality of collaboration is of utmost importance in order to improve work efficiency. Nowadays companies' management understand the value of collaboration and its meaning for overall performance. It is important to examine the quality of collaboration between internal and external stakeholders and encourage people to collaborate efficiently. (Fernández-Aráoz 2015:4)

Other critical elements of people management include providing a supportive work climate for employees to perform their work (Bailey and Madden 2016:10). Support enables workers to quickly solve upcoming difficulties and continue the actual effective way of working (Fuller 2016:4). Support also provides a signal to the employee that he is not left

alone with problems occurring and will ultimately lead to an enhanced learning process and improvement for long term work efficiency (Bailey and Madden 2016:10).

One valuable way to improve working practices are failures. Failures, which are ultimately occurring in every work environment, provide opportunity for shared learning and mutual improvement of working practices. The real challenge of management is then how failures are conducted in order to improve action and current working practices. (Birkinshaw and Haas 2016:2-8)

3.2.3 Department / Group Context

The third category of the tool is team work in group or department context. Team effectiveness has a major impact on a department's overall performance. A department's overall work efficiency depends on how well a team understands the overall need to optimize available resources and time and how it drives efficiently for results (Fernández-Aráoz 2015:2). If for some reason, pre-determined targets are missed and it seems that there is ineffectiveness occurring in a team, it is important for any company to sort out together with the employees the core issue for lack of effectiveness and when particularly it occurs (Power 2013:1).

Concerning overall team work, there are several issues that enable high performance of the team. For example, employees' commitment and alignment to the organization and its targets are essential for high performance and work efficiency. Diversity of skills and strengths in the group together with internal and external networks, enables effective working practices, effective problem solving and enhances a mutual learning process.

Summing up, effective team work is a crucial advantage for any company to succeed in emerging markets and it is worth analyzing how the company is performing in this sector and how it can be improved in the future. (Fernández-Aráoz 2015:3-4)

3.2.4 Individual Context

The fourth category of the tool is the individual context concerning work efficiency. Individuals are an important part of the overall performance since their individual performance, behavior and example affects other individuals in the work environment. This is

true, whether it is an efficient or inefficient matter in working practices (Bailey and Madden 2016:1-2). It is important for the employer to know and manage how individual employees are optimizing their time and resources (Fernández-Aráoz 2015:3) and what factors disable them to be efficient in their working practices (Vischer 1995:2). In the individual context, lack of training for example, might be a huge barrier for an efficient way of working and improving work efficiency (Hicks 2015:3).

Finally, to improve the company's work efficiency and their working practices, an individual employee who is close to the actual action, might have valuable views about what kind of work the company should concentrate on in order to improve efficiency and overall performance. The responsibility of the company is to collect and take account of these ideas when a company is seeking ways to develop its overall performance. (Fuller 2016:4)

3.3 Conceptual Framework A of This Thesis

As this thesis has two literature reviews, it also produces two conceptual frameworks. Conceptual framework A of this thesis serves as an initial tool built on existing knowledge discussed in this section on work efficiency for identifying general efficiency 'killers' and it includes four main categories. Conceptual framework A on work efficiency is illustrated in Figure 3 on the next page.

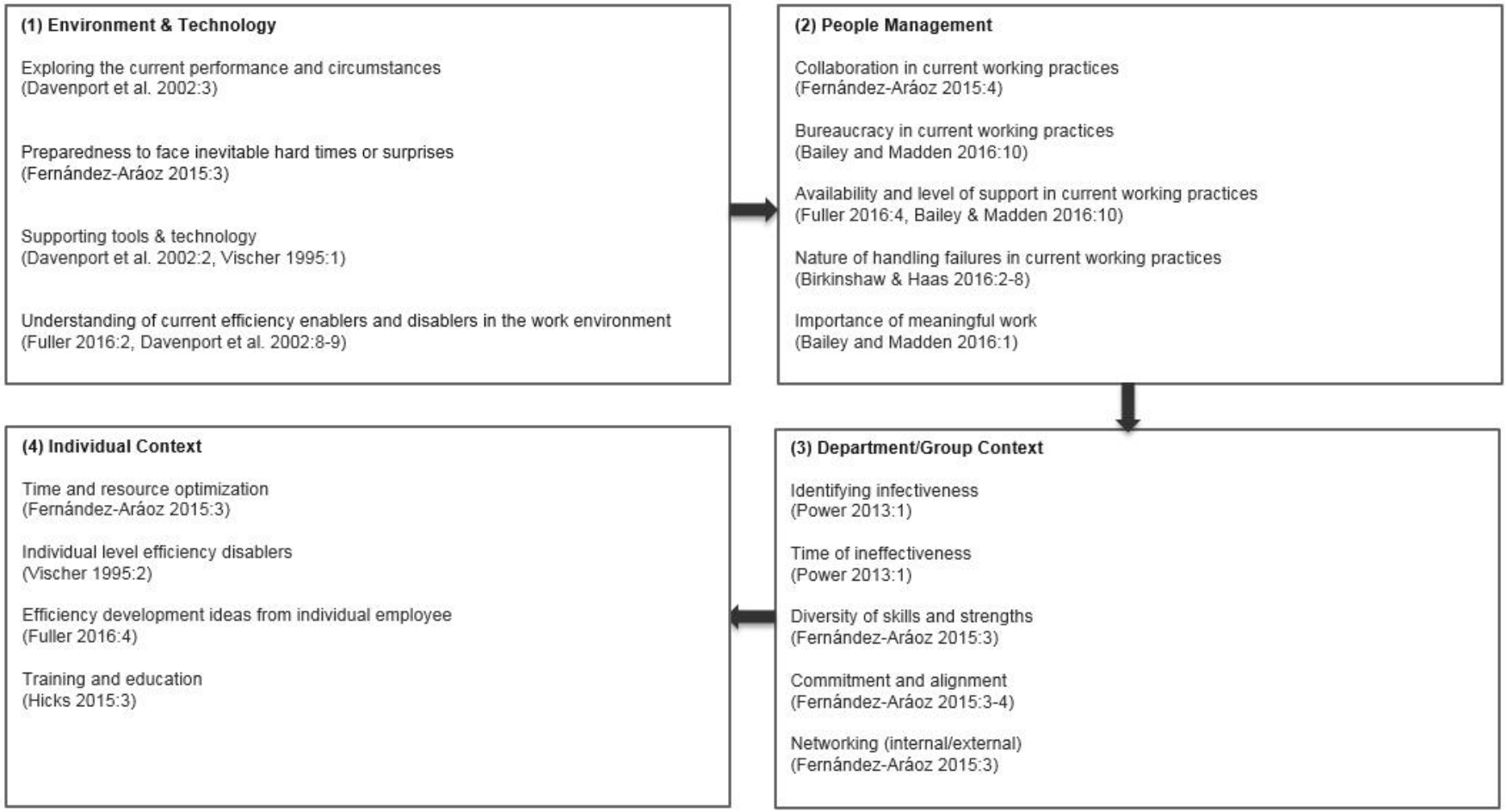

Figure 6. Conceptual framework A on work efficiency.

As seen in Figure 3, the four main categories in this Conceptual framework A are Environment and technology, People management, Group context and Individual context. The main categories include a further 18 important sub-topics concerning work efficiency which help to focus on issues that research has identified as possible areas for development. By formulating relevant questions for each sub-topic it is possible to investigate the lack of work efficiency in the current working practices at Neste Automation Department.

The formulated questions based on Conceptual framework A on work efficiency will serve as the actual tool in the interviews during the current state analysis. The formulated questions are illustrated in Figure 4 on the next page.

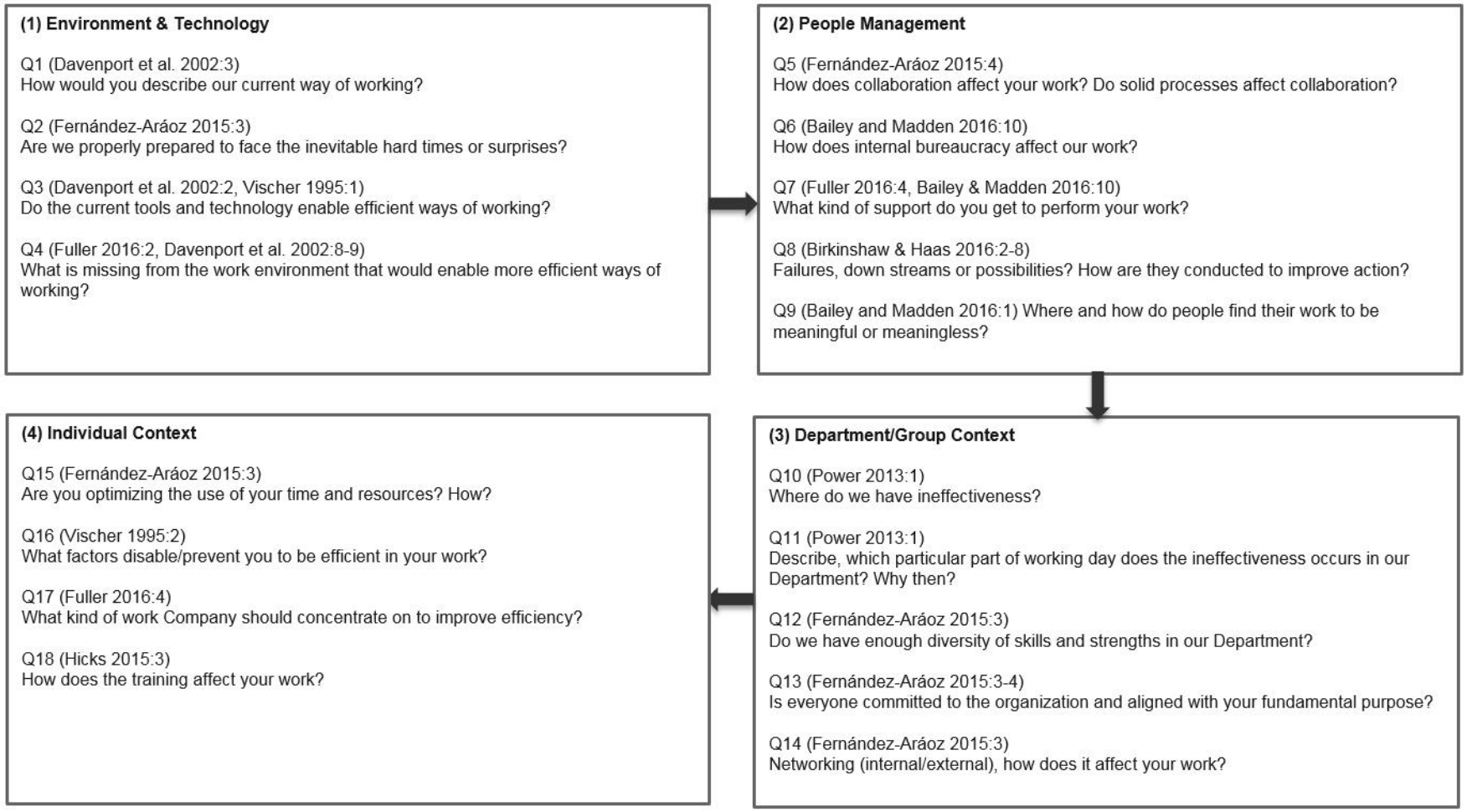

Figure 7. Formulated questions based on Conceptual framework A = the actual tool for identifying efficiency 'killers'.

As seen in Figure 4, the actual tool for identifying efficiency 'killers' includes 18 questions (Q1…Q18) which are built based on existing knowledge of work efficiency. The questions are divided into four main categories. These categories are Environment and technology, People management, Group context and Individual context. These categories have utmost importance in order to improve work efficiency. The current state analysis questionnaire which includes these questions is attached in Appendix 1.

Summing up, first a definition of work efficiency was introduced. Work efficiency can be defined as how much work can available resources perform during the given time period compared to predetermined targets and full potential of resources (Fuller 2016:1-6). Second, tools for identifying potential efficiency 'killers' in current working practices were discussed. Third, the construction of the tool was presented, namely Conceptual framework A. Conceptual framework A includes 18 important factors concerning work efficiency which were divided into four main categories. Based on this Conceptual framework A on work efficiency, the actual tool for current state analysis was formulated, which includes 18 questions concerning the sub-topics presented in Conceptual framework A.

The formulated questions based on Conceptual framework A on work efficiency for identifying potential efficiency 'killers' in the current working practices of the Automation Department is then used in practice in Section 4, Current state analysis. The next section explains the current state analysis carried out in the case company.

4 Current State Analysis of Working Practices in the Automation Department

This section discusses the results of the current state analysis about current working practices in the case company's Automation Department. The current state analysis is based on 14 interviews conducted with different stakeholders in the context of this study. First, the background of the case context of this study is presented, aiming to provide a brief description about the context and stakeholders included in this study and analysis. Second, a description of the current way of working and performance is presented to provide starting point for the possible improvement process. Third, Strengths identified in the current working practices are discussed. Fourth, efficiency 'killers' identified in the current working practices are presented and finally, the selection of the focus area and key findings from the current state analysis are presented and discussed in the end of this section.

4.1 Overview of Current State Analysis Stage

The current state analysis is conducted in four steps.

First, the order of the interviewees needs to be arranged so that foremen in the context of this analysis are mainly interviewed first before the mechanics. The aim is to enhance participation and common understanding about the topic of this study and to prepare foremen for possible questions coming from their mechanics concerning the topic before the actual interviews with the mechanics. During the foremen interviews, it is also agreed which resource, namely a mechanic, is currently available for the interview and with what schedule in order to avoid delays in the actual maintenance work.

Second, interviews are conducted using the questionnaire developed in Section 3 for identifying the efficiency 'killers' in the Automation Department's current working practices. The questions are based on the key concepts behind work efficiency which are used in the tool. These key topics are Environment and technology, People management, Group context and Individual context. These four key concepts were chosen based on the findings from the existing knowledge of work efficiency and because of their major impact on overall work efficiency.

Third, the description of current working practices and performance is based on internal documents and analysis results. The description of current working practices gives the overall sight of how the actual work is currently conducted and gives a baseline for possible future improvement. After the description of the current working practices, the gathered data from the interviews is analyzed and efficiency enablers and disablers are identified, namely strengths and efficiency 'killers' are discussed.

Fourth, the selection of the focus area and a description of the selected weakness is discussed in more detail and finally, a summary of the key findings is presented, pointing to the key areas for taking improvement steps.

4.2 Brief Description of the Case Company Automation Department

The Automation Department is part of the Maintenance Division, which includes several various professional departments. The Automation Department includes both Porvoo and Naantali oil refineries' Automation Departments. The context of this study is the Automation Department in Porvoo oil refinery which is located near to production interface. The Automation Department in Porvoo oil refinery is divided into smaller groups according to production lines and its site context. The construction of the Automation Department in Porvoo oil refinery is illustrated in Figure 5 below.

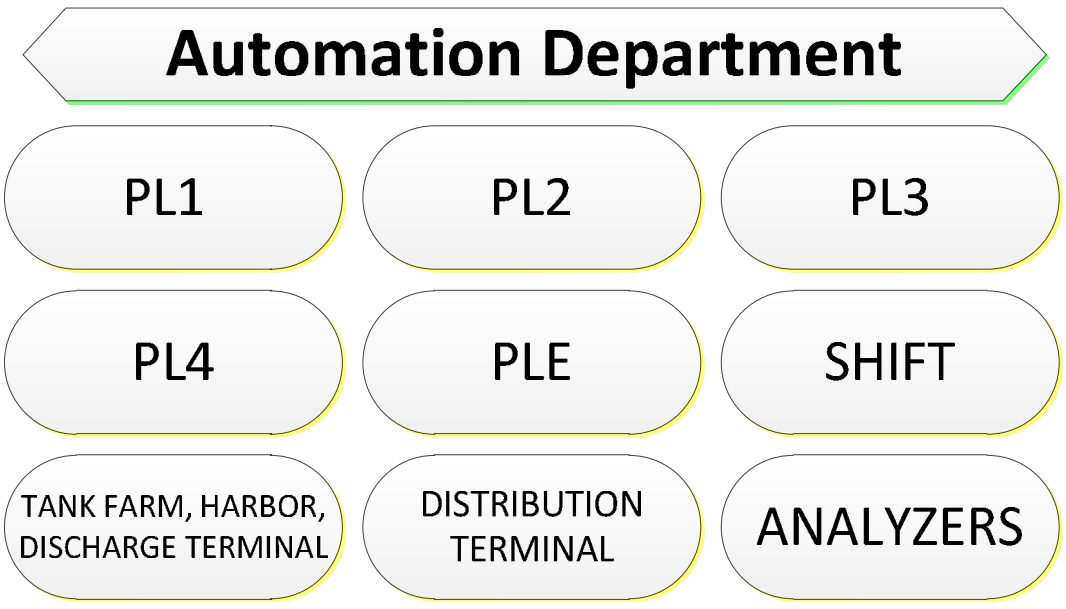

Figure 8. Construction of the Automation Department in Porvoo oil refinery (Neste company internal documents 2017).

As seen in Figure 5, the Automation Department in Porvoo oil refinery is divided into 9 groups which are responsible for maintenance in the pointed area or context. These 9 groups are production lines 1-4 (PL1-4), production line environment = wastewater treatment plant (PLE), shift mechanics 24/7 (SHIFT), tank farm + harbour + discharge terminal (TANK FARM, HARBOR, DISCHARGE TERMINAL), distribution terminal (DISTRIBUTION TERMINAL) and process analyzers (ANALYZERS).

The Automation Department includes 82 personnel altogether in Porvoo and Naantali oil refineries, but in this study, the context of current state analysis contains people working in the Porvoo oil refinery and especially the stakeholders who are located near the production interface. In practice, the estimated amount of personnel in the context of this study is 57 people, namely managers, maintenance engineers, foremen and mechanics. The distribution terminal is excluded from this study because it is an independent physical location. (Neste company internal documents 2017)

4.3 Description of Current Way of Working and Performance

This section contains a brief description about the current way of working and the current performance of the Automation Department. It seems that in the context of this study, the historical evolution has shaped the current working culture and work efficiency to what it is nowadays in the Automation Department instead of active planned process. This became clear also through the interviews established. Below are three examples of what 57% of all the interviewees stated:

> *"Current way of working has established over the years." Data 1: Informant O*

> *"Lots of things are done as they were always done before." Data 1: Informant X*

> *"Things are done differently between the groups inside the department." Data 1: Informant R*

It is also true that lack of efficiency occurs in the current working practices and it was also identified and discussed with every interviewee during the current state analysis. As one of the interviewees stated:

> *"I would say that we have inefficiency in every level of the department, from the mechanic level to the manager level and whatever is in between that, lots of attention is pointed to that mechanics are doing nothing more than just sitting on their seats, but in reality, it happens also in managerial level in our department". Data 1: Informant V*

The current performance of the Automation Department is followed on a weekly basis on every Monday morning meeting by managers and foremen. The average amount of work assignments carried out in one day by one mechanic during a week, from the beginning of 2017 is illustrated in Figure 6.

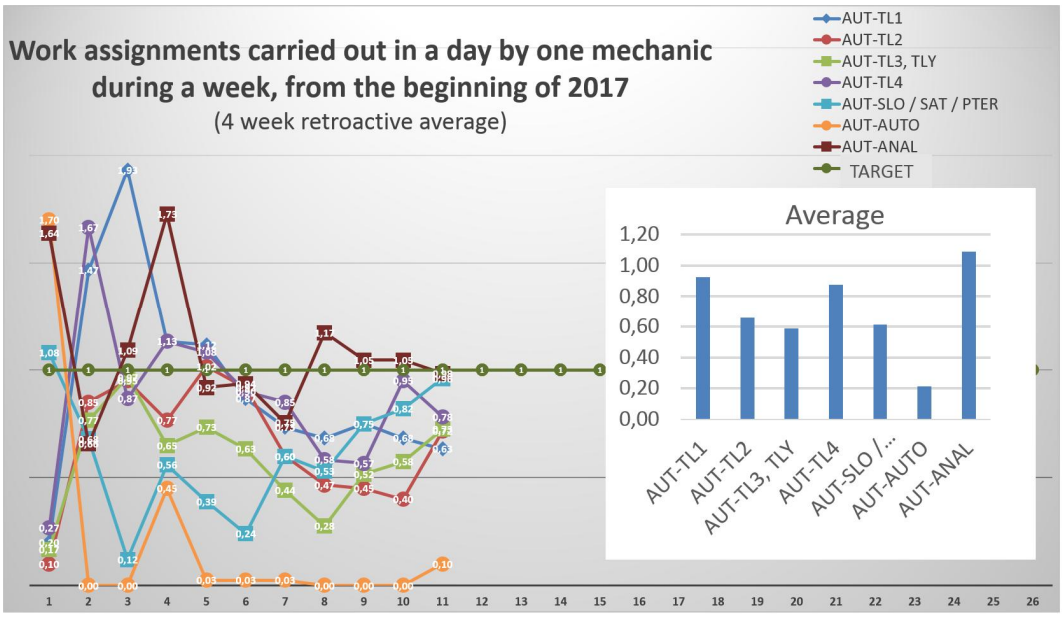

Figure 6. Average work assignments carried out in a day by one mechanic during a week, from the beginning of 2017 (Neste company internal documents 2017).

As seen in Figure 6, the average performance of a single mechanic is followed by the groups in which the Automation Department is divided. The natural resource loss (sick leaves, holidays etc.) has been taken into account in the calculations and the charts present the 4-week retroactive average performance of a single mechanic to minimize the deviation. The target average performance for a single mechanic is one finished work assignment per day. However, this metric does not define the exact content of the work assignment. Accordingly, one work assignment might include several maintenance tasks although the performed work is counted as one work assignment by the system. As can be seen in Figure 6, most of the groups are currently below the target and there is space

for improvement. This chart (Figure 6) is based on figures taken from the Case Company's enterprise resource planning system, "IFS M+".

Summing up, historical evolution seems to have led to inefficient working practices and lack of performance in the Automation Department. The next section continues discussion the strengths identified in the current working practices found in the current state analysis.

4.4 Efficiency Strengths Identified

This section discusses the strengths in the Automation Department current working practices, which were identified during the interviews in the current state analysis. Although there is lack of efficiency occurring, several efficient working practices were also found during the analysis which are used on a daily basis by the personnel to improve daily action and to get things done efficiently.

Training and education has significant importance to perform work efficiently. This is also true in the case company Automation Department. Education gives employee basic skills and knowledge to perform the given tasks. The availability of professional training courses provides a possibility to perform tasks more efficiently. Below are three examples of what 93% of all the interviewees stated on training:

> *"The most significant matter if you want to work efficiently." Data 1: Informant M*

> *"The foundation of all action, doesn't matter whether you are a mechanic or a manager." Data 1: Informant Y*

> *"Training and education is very important." Data 1: Informant T*

The meaning of training and education are seen as important factors in an efficient way of working. The availability of professional training courses are also highly appreciated among the mechanics and foremen.

There is comprehensive diversity of skills and talent in the Automation Department. This enables an efficient way of working and during the interviews it became clear that it covers the whole department. Here is one example of what 86% of all the interviewees stated:

> *"There is certainly a lot of talent and skills inside the department in order to handle any job given." Data 1: Informant Y*

Efficient working practices include collaboration between the Automation Department and several other stakeholders. These stakeholders are for example production people, electricians, designers, stand men, etc. Below are three examples of what 57% of all the interviewees stated:

> *"Collaboration is important and it enables more efficient way of working." Data 1: Informant X*

> *"Collaboration between departments inside the company is extremely valuable." Data 1: Informant T*

> *"There is collaboration between the Automation Department and stakeholders and it is working fine." Data 1: Informant Z*

Collaboration between the Automation Department and stakeholders seems to be working and it enables efficient working practices.

Correct and qualitative tools enable an efficient way of working and in most of the cases, guarantees the quality of performed work. Without decent tools, the outcome of performed work might be anything. This is also a question of work safety, without the correct tools the safety of employees might be compromised. As all of the interviewed persons stated: "Nowadays, the tools are okay." It is clear that the tools in the Automation Department enable efficient working practices.

Support is an important factor of work efficiency and it enables efficient working practices. Efficient working practices include all kinds of support, whether it's technical problem solving, personal support or moving help. Here is two examples of what 79% of all the interviewees stated:

"There is support available and it is encouraged to ask when needed." Data 1: Informant M

"You get any kind of support if you just dare to ask." Data 1: Informant S

It is clear that in the context of this study, namely the Automation Department, support is available and it enables efficient working practices.

The oil refinery as a working environment is very challenging and unexpected situations occur on the site from time to time. Production units or even production lines might come down when unexpected disturbances on the site occur. Flexibility and ability to react in these kind of situations is of utmost importance considering work efficiency and possible production losses. Here is two examples of what 71% of all the interviewees stated:

"When critical situation occurs on the site, reactions are very fast, flexible and efficient concerning the critical work at hand. Usually spares are also quite comprehensively available in these kind of situations." Data 1: Informant U

"We are used to unexpected situations on the site and we continuously observing the environment and circumstances, in such a case that something unexpected would occur." Data 1: Informant R

It is clear that all personnel in the Automation Department recognize the meaning and demand of flexibility when it comes to critical work in the unexpected situations. The personnel is very flexible and efficient in the unexpected situations and when urgent production requirements demand fast response. These situations are performed very efficiently in the Automation Department.

Contacts and networks enable efficient information sharing and efficient working practices. Below are three examples of what 93% of all the interviewees stated:

"Existing contacts has impact how work is performed, it speeds up the work and make things easier to handle." Data 1: Informant T

"Internal and external relationships are used actively to get things forward and it enables efficient way of working." Data 1: Informant Y

> *"Your own contacts are actively used in daily work, in order to move forward and to get things done on time." Data 1: Informant U*

It is clear that in the Automation Department, contacts are used actively to perform work efficiently with the ultimate aim of getting things done. These kinds of contacts are usually born beside the actual work during the career.

A final strength identified during the current state analysis was the awareness about the lack of efficiency in the current working practices. The whole personnel in the Automation Department are aware of the lack of work efficiency. Below are four examples of what 100% of all the interviewees stated:

> *"There is inefficiency occurring in our working practices." Data 1: Informant T*

> *"Inefficiency occurs every day in our department." Data 1: Informant W*

> *"There is no place where inefficiency does not occur, this is common problem in the whole department." Data 1: Informant N*

> *"We are forced to be inefficient, because we are working in the maintenance department." Data 1: Informant R*

These kinds of statements from the interviewees create a good foundation for the employer to build and improve current working practices when the personnel is already aware about the current situation and they are more adaptable toward a more efficient way of working.

Summing up this section, several strengths were identified from the current working practices during the current state analysis, which enable an efficient way of working. The summary of overall strengths in the current working practices in the Automation Department is illustrated in Figure 7 on the next page.

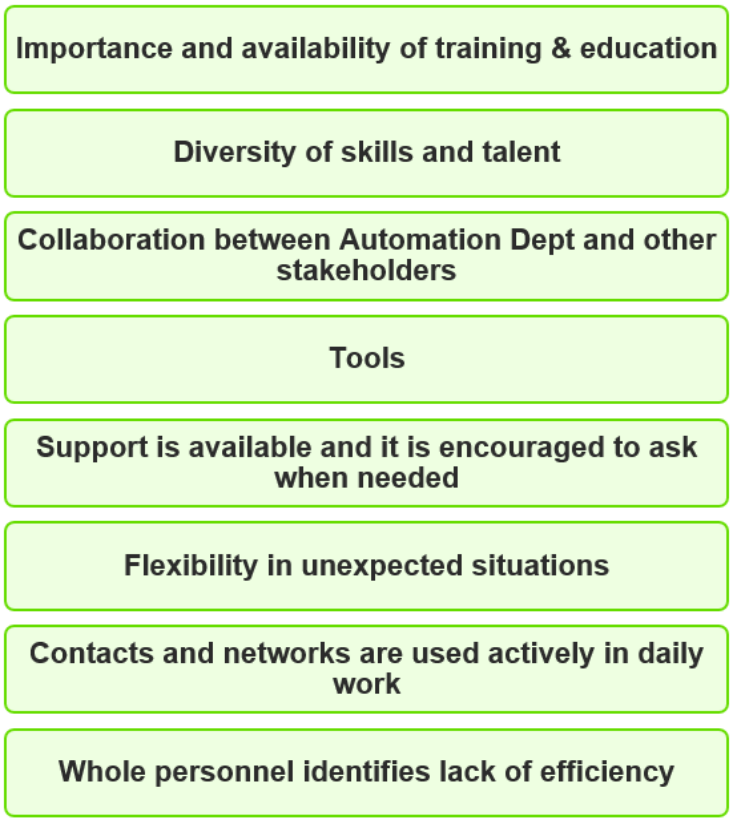

Figure 7. Efficiency strengths identified from the current state analysis.

As can be seen in Figure 7, there are several important strengths which are having a positive effect on the current working practices and increases the overall work efficiency of the Automation Department. The final strength (i.e. the whole personnel recognizes lack of efficiency) provides a good foundation for future improvements. The next section continues discussion about the core issues found in the current state analysis behind the lack of efficiency in the current working practices in the Automation Department.

4.5 Efficiency 'Killers' Identified

This section discusses the efficiency 'killers' in the Automation Department current working practices, which were identified during the interviews in the current state analysis. Efficiency 'killers' have a major impact on the overall working practices in the Automation Department and its overall work efficiency and work performance. It is of utmost importance to identify efficiency 'killers' in the current working practices in any company in

order to point and control possible improvement and development actions to correct targets. The identified efficiency 'killers' are divided to 4 categories considering their negative impact to the Automation Department's overall work efficiency.

4.5.1 Category 1 Efficiency 'Killers'

The Automation Department is divided to smaller working groups according to production lines and other site context. This clearly divided responsibility is efficient, but there is also a risk concerning work efficiency in the department context. Interfaces between the production line teams might become insurmountable and create borderlines which decrease the overall work efficiency. Below are three examples of what 71% of all the interviewees stated:

> *"Interfaces between production line teams disrupt working, all teams are in their own compartments and that significantly disrupt collaboration between the teams inside the department. All the time, invisible borderlines obstruct collaboration between production line teams." Data 1: Informant S*

> *"Everybody is in their own boxes." Data 1: Informant R*

> *"There are interfaces between the production line teams and sometimes it is very hard to get people working together or share the resources over the existing borderlines if there is need for help or some specific knowledge." Data 1: Informant W*

During the interviews, it became clear that there really are barriers between the production line teams which produce significant lack of work efficiency in the whole department context. These kind of interfaces between production line teams might also affect the total alignment and commitment of the personnel in the department. The lack of alignment and commitment to common goals will lead to ineffectiveness and ultimately lack of work efficiency in the Automation Department. Here is three examples of what 79% of all the interviewees stated:

> *"There is still room for improvement about personnel's commitment to common goals" Data 1: Informant Y*

> *"We haven't really seen the actual commitment to common goals yet. People are going forward separately. Nowadays, commitment is very fragile in*

> *our department and working culture in order to perform the work has changed over the times. Commitment to common goals has weakened and nowadays, there is no community in our department." Data 1: Informant P*

> *"Lack of commitment to common goals certainly decreases the work efficiency in our department." Data 1: Informant M*

It became clear that there is lack of commitment to common goals in the Automation Department and it decreases significantly the overall work efficiency and wellbeing at work. This might lead to a situation where work itself might become meaningless and out of purpose. This leads to a situation where the employee might lose the "big picture" about working in the Automation Department and raises questions as to why something needs to be done or what is important work and what is not, or is there any sense at all. If answers for these questions are not available and clearly visible, it might lead to a situation where the person decides himself whether he performs the given work or not because there is no sense of doing it from his point of view. This kind of situation is a serious pitfall concerning work efficiency. Below are five examples of what 71% of all the interviewees stated:

> *"Feedback from the production is very significant when you think about meaning of your work." Data 1: Informant T*

> *"Mechanics are thinking that we have lot of meaningless work and in practice, it appears as flaccidity, inefficiency and ultimately there is lack of interest to perform these kind of tasks which are seen as meaningless work." Data 1: Informant W*

> *"Mechanics don't realize the meaning of their work and it decreases the work efficiency." Data 1: Informant N*

> *"Important work for production are performed, tasks given by foremen are not seen so important if there is no production related interest behind the task" Data 1: Informant V*

> *"Production gives you a feedback and there you can find the meaning of your work and ultimately it gives a boost for your doings. Continuous working, like a machine, getting task after task without any praise, makes you feel like that nothing is enough and raises a question, are we seen as some kind of machines who are continuously keep on going without any breaks?" Data 1: Informant O*

It seems that immediate production related action dominates the perception of what is important and what is not. There seems to be lack of awareness about the importance of the work which is important concerning "the big picture" but not directly production related. This has a major decreasing effect on overall work efficiency.

Summing up, three efficiency 'killers' were identified in this section. These efficiency 'killers' were interfaces between production line teams, commitment to common goals and immediate production related action dominating perception of what is important. The next sub-section continues the current state analysis of identifying efficiency 'killers' in the current working practices.

4.5.2 Category 2 Efficiency 'killers'

Atmosphere and tensions in the working environment are important factors affecting work efficiency. A negative atmosphere and tensions in the department might ultimately turn to intentional or unintentional misunderstandings between the stakeholders, namely foremen and employees and in the worst case can lead to serious lack of effectiveness in working practices. This is true in any work community and also in the Automation Department. Below are four examples of what 64% of all the interviewees stated:

> *"Stick and carrot ratio should be changed to something else than just applying limits for the current working practices. The way of working must be meaningful. This will lead to better working practices and provides improvement for work efficiency. It is unclear, how much the screw of our personnel still needs to be tightened. It seems that in our department, it is always turned one extra round tighter than normally would be appropriate." Data 1: Informant U*

> *"Pre-promised overtime work for upcoming weekend are repeatedly cancelled, although it is clear for everyone that we have more work load than we can perform in a week during the normal working hours." Data 1: Informant M*

> *"Atmosphere and collaboration is working, at least between foremen and managers. It seems that mechanics don't even want to see the whole picture what we are doing here and why. For example, sometimes there might occur situations, usually this happens on Fridays, where mechanics are informed by foremen that there is no need to come for overtime work in upcoming weekend, because we have performed very well during the current week and we have managed to get all the necessary things done in*

> *time, and that is good for us. They don't seem to understand the main point that we did well our work." Data 1: Informant V*

> *"Current atmosphere between employer and employees is causing inefficiency. Especially when there is no chemistry between both parties involved. Well, at least chemistry works between mechanics in our department" Data 1: Informant O*

It is clear that there are tensions occurring between the employer and employee level. This affects negatively work efficiency and the current way of working. Especially after misunderstandings and even worse, after continuous misunderstandings whether intentional or unintentional. This can lead to serious situations where employee's spontaneity and common sense vanishes totally and he starts to follow the ideology: "I'm just working here, I just do what I'm told". Below are three examples of what 57% of all the interviewees stated:

> *"The same task is performed over and over again if the current task is performed by a person, who doesn't care about the end result or quality of his own work." Data 1: Informant Q*

> *"There are too many people 'just working here', there is no inner will to find out things and solve issues. It is only done what is necessary and that seems to be enough. In practice this means that the same task is performed over and over again, until the work is finished by a person who has a professional attitude for his own work." Data 1: Informant Y*

> *"There are also 'free riders', who are 'just working here'." Data 1: Informant N*

It is clear that there are some 'free riders' in the Automation Department who are 'just working here' and they provide significant lack of work quality, lack of work efficiency and ultimately affect negatively the overall working culture in the whole department. Ineffective working culture means in practice that there are ineffective time periods occurring during the working day. It is vitally important for the employer to identify these ineffective time periods for possible future actions, in order to reach the ultimate aim of improving work efficiency. During the interviews when asked about which part of the working day ineffectiveness occurs, below are three examples of what 86% of all the interviewees stated:

> *"Morning hours, after the lunch, after 15pm we are not so efficient anymore because you start to think about going home from work. This kind of habit has developed over the times." Data 1: Informant N*

> *"Starting work is difficult during the morning hours and working is finished well advanced in the afternoon. Sometimes it is hard to start working straight after the lunch." Data 1: Informant Q*

> *"There is lack of efficiency when it comes to time management. When we are willing and when we are working, we really know how to do our work and we are efficient. Getting started with a job or a task, takes time. Historical evolution into current working culture has taken us to this kind of situation and the working practices have been established over the times in our department." Data 1: Informant W*

These kind of statements were collected from almost every interviewee and it is safe to say that there are several ineffective time periods during a normal working day in the Automation Department's current working practices resulting in major lack of efficiency.

Summing up, three efficiency 'killers' were identified in this section. These efficiency 'killers' were: Employer vs employee tensions, "I'm just working here, I just do what I'm being told" - attitude, Ineffective working times (morning hours, after the breaks, last hour). The next sub-section continues the current state analysis of identifying efficiency 'killers' in the current working practices.

4.5.3 Category 3 Efficiency 'Killers'

Every organization has a certain amount of bureaucracy which tends to guide people to do certain things in a certain way. The larger the company is, the bigger the amount of bureaucracy. Nowadays when the company and its employees need to report all the performed tasks and financial proceedings, the amount of bureaucracy might cover a significant part of a normal working day. Handling internal bureaucracy whether it comes from organization or department level, might also affect overall work efficiency. It is important for companies to know, in what level and in what circumstances the internal bureaucracy affects actual work. When asked about internal bureaucracy and how it affects work efficiency, the three examples below show what 100% of all the interviewees stated:

> *"There is lots of bureaucracy, it slows down the actual work and makes simple things more complicated" Data 1: Informant T*

> *"Bureaucracy affect negatively, it is very stiff and complicated system. Everything takes unbelievable long time, even the small issues. This has been increased over the times in oil refinery." Data 1: Informant S*

> *"Very stiff system, own ideas or development suggestions are drowning to everlasting bureaucracy, it is frustrating and heavy to handle." Data 1: Informant M*

It seems that internal bureaucracy slows down all performed action in the Automation Department, slows down the decision making and covers significant part of normal working time every day. Thus, provides lack of work efficiency. Interviewees were unanimous concerning bureaucracy and its major impact to overall work efficiency. At its best, bureaucracy might bring stability to the ever changing working environment, as the oil refinery typically is by its nature. When asked about what other elements than bureaucracy disables them to be effective in their work, below are four examples of what 64% of all the interviewees stated:

> *"Interruptions, especially on during the tasks which demand concentration" Data 1: Informant P*

> *"Lots of interruptions occur during a working day." Data 1: Informant W*

> *"Daily interruptions disrupt the actual work and many times, tasks are left incomplete." Data 1: Informant Y*

> *"Interruptions are disrupting the normal work and causes hurry for us." Data 1: informant T*

It is clear that daily interruptions which are partially the consequence of the current working environment, namely the oil refinery, and cannot be avoided, do cause lack of efficiency in the Automation Department current working practices. It is very hard to work in an efficient way if there are inputs coming from the various directions, then decide the input to follow and finally, to be able to start the actual work there is internal bureaucracy first which needs to be handled.

Summing up, two efficiency 'killers' were identified in this section. These efficiency 'killers' were un-necessary bureaucracy and interruptions. The next sub-section continues the

current state analysis of identifying efficiency 'killers' for category 4 in the current working practices.

4.5.4 Category 4 Efficiency 'Killers'

Work efficiency can be developed through learning from mistakes. Sharing the knowledge about the mistakes made is important so that other people don't repeat the same mistakes again in their working practices. This is a possibility to increase potential work efficiency and improve action in the current working practices. Companies should be aware of how they are exploiting the occurred mistakes to improve work practices. Mistakes can be taken as threats or possibilities. Here is two examples of what 64% of all the interviewees stated: about mistakes in the Automation Department during the analysis:

> *"Mistakes are not brought up, even to own supervisor and they are not used to improve action well enough. Here is still place for improvement." Data 1: Informant X*

> *"Mistakes are discussed and there is strive to share experiences at least inside the own team, but the information about the occurred mistakes are kept inside the own group. As a result of this limited knowledge sharing, the same mistake might be done couple times after." Data 1: Informant R*

It is clear that mistakes are not currently used to improve action and to improve work efficiency. The same mistakes are made many times, after which mistakes are discussed inside one's own team but the lessons learnt are not shared to other groups in the department. There is no systematic learning process from mistakes.

Ability of a company to manage unexpected situations in unexpected circumstances is a major factor concerning work efficiency and overall productivity. Awareness and preparedness of the company in these kind of situations, provides a good foundation to solve these situations efficiently. Here is three examples of what 79% of all the interviewees stated:

> *"There is no systematic preparation for unexpected situations, for example there is lack of spares concerning these kind of issues." Data 1: Informant O*

> *"We haven't prepared anyway at all, concerning unexpected situations in refinery." Data 1: Informant U*

> *"There is no plan for these kind of situations and in practice, we are relying on experience-based knowledge." Data 1: Informant T*

It is clear that there is no systematic preparation for unexpected situations. The preparation for unexpected situations is dependent on automation mechanic and the actions of those who are currently working their shift when the situation occurs, otherwise preparation is relying on experience-based knowledge. Lack of material certainly doesn't make things easier and all these together do not support an efficient way of working when unexpected situations occur.

Products are continuously developing globally and new technology is available in the markets. It is a challenge for every company to keep the pace concerning new technology which ultimately enables smarter and more efficient ways of working. When asked how the new technology is used in current working practices, below are four examples of what 79% of all the interviewees stated:

> *"There is new technology in use but it is not used efficiently." Data 1: Informant W*

> *"We have the new technology in use, but there could be more." Data 1: Informant Z*

> *"New technology is used, but the full potential it provides is still not used efficiently." Data 1: Informant X*

> *"We are using new technology at some level, but we don't take out all the possibilities it provides to us." Data 1: Informant N*

The case company has invested to new technology in the field which enables smarter and more efficient ways of working but it is not used in the best possible way. The whole potential it provides is not exploited to improve overall work efficiency and overall productivity in the Automation Department.

Summing up, three efficiency 'killers' were identified in this section. These efficiency 'killers' were no systematic learning from mistakes, no systematic preparation for unexpected situations and lack of using a new technology invested in by the case company. The next sub-section continues with the selection of the focus area and description of the selected weakness in more detail.

4.6 Selection and Detailed Description of Focus Area of This Thesis

This section contains the selection of the focus area of this thesis and provides a description of the selected Efficiency 'Killer' in a more detailed level. Although there were in total 11 efficiency 'killers' identified from the current state analysis, which all seem to have a negative impact on overall work efficiency in the current working practices in the Automation Department, some of the efficiency 'killers' have even more impact on overall work efficiency than others. It is clear that the selection of the focus area should target the Efficiency 'Killer' which has most potential of increasing the Automation Department overall work efficiency compared to others, if developed.

During the current state analysis, it became clear that identified Category 1 Efficiency 'killers' have the most negative effect on the overall work efficiency and ultimately most potential of increasing the Automation Department's overall work efficiency. These efficiency 'killers' were interfaces between production line teams, commitment to common goals and immediate production related action dominating perception of what is important.

It is clear that the selection of the focus area is targeted to one of these three options from Category 1 Efficiency 'killers'. During the current state analysis interviews, one of these three efficiency 'killers' occurred almost in every context of interviews. It started to become clear that focusing on and improving this particular Efficiency 'Killer' would also affect positively most of the identified efficiency 'killers' in this study and ultimately the overall work efficiency in the Automation Department. This particular Efficiency 'Killer' is 'Interfaces between production line teams'.

Improving 'Interfaces between production line teams' would ultimately improve the following other efficiency 'killers': commitment to common goals, immediate production related action dominating perception of what is important, "I'm just working here, I just do what I'm told" - attitude, ineffective working times (morning hours, after the breaks, last

hour), systematic learning from mistakes, systematic preparation for unexpected situations and lack of using new technology.

After the current state analysis was performed and the results were clear, the summarized findings were presented to the Head of Automation Department. The aim was to consult him about the possible focus area of this study. During the consultancy, it became clear that focusing on either one of the following two particular efficiency 'killers' would have the most potential of increasing the Automation Department overall work efficiency. These efficiency 'killers' were interfaces between production line teams and immediate production related action dominating perception of what is important.

Concerning these two efficiency 'killers' presented, it is also clear that existing literature about 'interfaces between production line teams' is more available compared to 'immediate production related action dominating perception of what is important'. In order to find relevant best practices from the existing literature with the aim to tackle the identified Efficiency 'Killer' and to improve current working practices in the Automation Department, the rational and natural choice for the focus area of this thesis would be 'interfaces between production line teams'.

Based on findings from the current state analysis, consultancy of Head of Automation Department and existing literature available, the focus area of this thesis is 'interfaces between production line teams'. Discussion continues in more detail about the selected focus area.

During the interviews, it became clear that there are visible and invisible barriers between interfaces of the production line teams which cause significant lack of work efficiency in the whole department context. These barriers are seriously disturbing collaboration and current working practices inside the Automation Department.

> *"Interfaces between production line teams disrupts working, all teams are in their own compartments and that significantly disrupts collaboration between the teams inside the department. Invisible borderlines obstruct collaboration between production line teams all the time." Data 1: Informant S*

This causes difficulties to transfer resources temporarily or permanently over the production line interfaces, especially when there is lack of resources in some production line team which needs to perform current work peak at hand.

> *"There is interfaces between the production line teams and sometimes it is very hard to get people working together or move the resources over the existing borderlines where help or specific knowledge is needed." Data 1: Informant W*

> *"Production line interfaces are defining and restricting available resources which is possible to use at any given time" Data 1: Informant Q*

There are also differences in attitudes and the current working practices between the production line teams inside the Automation department.

> *"Things are done differently between the production line teams." Data 1: Informant R*

> *"The common idea, how the work is performed inside the department is missing." Data 1: Informant Q*

Barriers between the production line team interfaces restricts the existing knowhow in the department, disrupts the information sharing and disables systematic learning from mistakes in the whole Department context.

> *"There are barriers between the production line teams and they are high, but eventually they can be climbed over, after there is no options left. Mental and physical barriers should be dismounted so that we enable better availability for existing knowhow inside our department. Currently, mistakes are also handled inside the individual employee's own group, not among the department context and over the barriers between production line teams." Data 1: Informant Y*

> *"Currently, the work is performed by production line teams which are divided according to the structure of oil refinery. Specialists, who are profiled to some special profession, are currently performing they work mainly in their own production line area and not in the context of whole refinery, although they have unique know-how and they are particular specialists of some unique profession area." Data 1: Informant V*

Barriers also causes lack of commitment to common goals, when work is performed in separate groups and not as a united team. This ultimately affects the meaning of work.

> *"Especially borderlines between production line teams are effecting commitment to common goals. We don't involve another team's area or doings and actually, there is no interest to intervene others business." Data 1: Informant S*

> *"There is also 'free riders', who are 'just working here'." Data 1: Informant N*

This enables free riders inefficient working practices and leads to ineffective working times to occur in the Automation Department. Thus, it affects significantly the current working practices in the Automation Department. The next sub-section provides a summary of the key findings from the current state analysis.

4.7 Summary of Key Findings

This section provides a summary of the key findings identified in the current state analysis. The first target for the current state analysis was to identify strengths and efficiency 'killers' in the Automation Department's current working practices, aiming to provide clear insight to which working practices are efficient and which are inefficient. The second target for the current state analysis was to present a clear picture about the context of this study and to provide a description of the current working practices and current performance in the Automation Department. The aim was to establish a clear starting point for the future improvement proposal which is then used to develop current working practices in the Automation Department. The third target of the current state analysis was to provide a selection of focus areas for this thesis and to provide more detailed insight to the selected 'Efficiency Killer' in the current working practices.

It is clear that historical evolution has shaped the current working culture and working practices to the form that they currently are in the Automation Department instead of it being an active, planned process. It is also clear that there is lack of efficiency occurring in the current working practices.

Although the main focus was to identify potential efficiency 'killers' in the current state analysis, there were also several strengths identified in the current working practices in section 4.4. In total, 8 strengths were identified during the current state analysis. Concerning strengths, the key finding was the final strength identified, namely 'the whole personnel acknowledges lack of efficiency'. This strength provides a good foundation for

future improvement to the current working practices in the Automation Department, as the whole personnel is already aware of lack of performance.

During the current state analysis, there were several efficiency 'killers' identified in the current working practices in the Automation Department discussed in section 4.5. In total 11 efficiency 'killers' were identified. A summary of these key findings is illustrated in Figure 8.

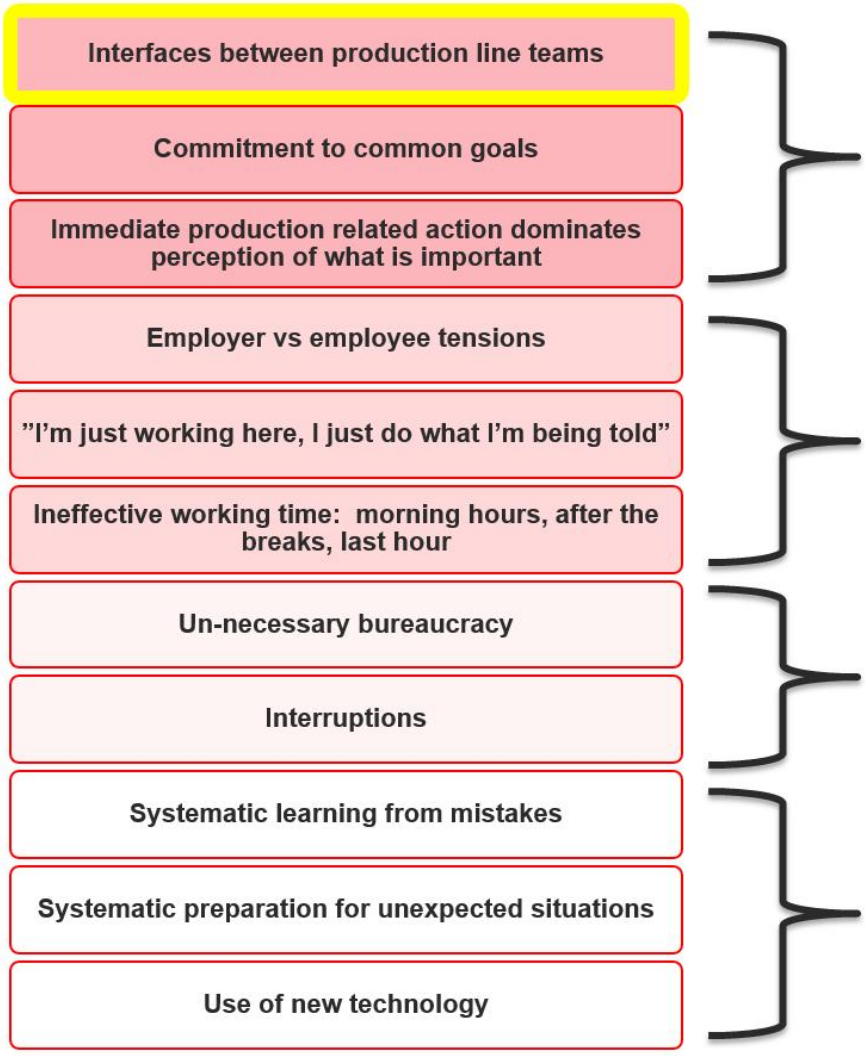

Figure 8. Efficiency 'killers' identified from the current state analysis.

As can be seen in Figure 8, there are several efficiency 'killers' which are decreasing overall work efficiency in the current working practices in the Automation Department. Efficiency 'killers' are grouped into four categories according to their impact and relation to inefficient working practices. The red color indicates the amount of negative impact

and relation to inefficient working practices. The focus area of this thesis is highlighted in yellow.

Based on the findings from the current state analysis, consultancy of Head of Automation Department and existing literature available, hereafter, the focus area of this thesis will be 'interfaces between production line teams'. This selection informs the choice of literature in Section 5 and is guiding the improvement proposal building in Section 6. In the following section, discussion continues with existing knowledge and ideas about best practices to tackle the selected efficiency 'killer' from the current working practices in the Automation Department

5 Existing Knowledge on Improving Cross-Team Collaboration

This section discusses the second round of existing knowledge and best practices in order to tackle the selected focus area of this study, namely 'interfaces between the production line teams'. This section presents the definition of collaboration and discusses key concepts behind cross-team collaboration, such as target setting, breaking silos and collaborative working practices. At the end of this section, a Conceptual framework B for improving cross-team collaboration is constructed in order to combine best practices found from the existing knowledge and which are crucial for building the initial improvement proposal later in Section 6.

5.1 Definition of Collaboration

Collaboration can be defined as an "evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal" (Bedwell et al. 2011:130). Or, according to Patel et al. (2011:1) "Collaboration involves two or more people engaged in interaction with each other, within a single episode or series of episodes, working towards common goals". Moreover, collaboration is a process where people, groups or departments are working together in order to achieve desired outcome. The process itself can involve several different levels of employees, for example mechanics, foremen and managers, which are all working towards a common target. Collaboration is an active process which includes interactions and social activities that might change over time. Ultimately, over the times when the process is changing, it might be improved or worse, stop developing. (Bedwell et al. 2011:130)

It is of utmost importance for organizations to manage collaboration and to be fully aware about the potential barriers and disadvantages for collaboration in the current working environment. Successful collaboration is a critical factor for any organization in order to improve the overall performance and competitiveness in the emerging markets. There are several potential benefits for any company to achieve, as a result of successful collaboration. For example cost reduction, increased profit, innovation and improved decision making. (Patel et al. 2011:1)

In this study, the selected focus area from the identified efficiency 'killers' was 'interfaces between production line teams'. As such, the next three sub-sections continue discussion about three important topics identified from the existing literature behind improving cross-team collaboration. These topics are: target setting, breaking silos and collaborative working practices.

5.2 Target Setting

Target setting is a critical part of successful collaboration and managing people. The nature of target setting must be common for all collaborators. Mutually agreed common goals are the most important driving force to improve overall collaboration in the organization. Without common goals, there is no reason why people, groups or departments should interact and work together, in order to achieve predetermined targets. Common goals are critical to achieve collaborative working practices. (Bedwell et al. 2011:134)

Common goals must be clearly defined and well-articulated to all parties which are meant to collaborate with each other. Understanding the common goals and putting effort to achieve those goals will facilitate collaborators behavior, increase mutual trust and interaction between all collaborating parties and ultimately improves the overall collaboration and performance of the organization. Also attainability of common goals increases collaborators' focus to achieve desired results. (Katzenbach and Smith 1993:113-114)

Collaboration between groups inside the department is critical for any company in order to use its resources successfully. It is clear that the nature of common goals must be cooperative inside the department. Cooperative goals will integrate groups into a department and bound the groups together with shared values, interactions and commitment. Groups need to believe that cooperation is positively related to reaching their common targets. In other words, success for one ultimately means success for all. The cooperative nature of common goals leads the collaborators into the same direction, which enhances supportive attitudes and ultimately combines ideas, efforts and shared visions into more productive performance of available resources. (Tjosvold 1988:42-52) Achieving cooperative performance goals, provides commitment as a team, enhances motivation of the team and energizes people (Katzenbach and Smith 1993:114).

A department usually includes several smaller groups. To create a united collaborative team from several smaller groups, it is necessary to keep all groups accountable for the

overall performance of the whole team. Thus, groups will never become a collaborative team, if they are not accountable of performed results as a team. "Being in this boat together" - clearly describes the approach, where number of people with various skills are committed to a common purpose and hold themselves mutually accountable for team's overall performance. (Katzenbach and Smith 1993:116).

Rewarding successful collaboration is essential to reinforce common cooperative goals and to improve collaboration. All groups need to share promotions, rewards, praise and bonuses after successful collaboration and completing common tasks. Sharing rewards makes it concrete for the collaborators that all stakeholders have a positive impact to common goals when they are achieved. In order to guarantee possibility for groups to influence department overall rewarding and to reinforce collaboration, providing feedback about their progress toward common goals is essential. Thus, information about other groups' situations, namely needs and resources, must be available for enabling collaborative resource allocation inside the department. (Tjosvold 1988:48)

An effective way to encourage collaborative behavior is to tie rewards into the result evaluation of achieved common goals. Team rewarding is the most efficient predictor to improve collaborative working practices in any organization (Bedwell et al. 2011:141).

5.3 Breaking Silos

Silos in any organization are usually the result of a working culture which has evolved over the years. This kind of working culture includes complicated hierarchical, siloed and fragmented processes and even several various cultures may occur inside the organization. (Ashkenas 2015:2-3) Silos usually holds important knowledge and nature of siloed culture makes availability of that knowledge hard to get. The larger the company is, the more disruptive the silos are. Silos create an environment where collaboration and sharing are extremely difficult to implement, unless it is in the interest of the one current silo which drives its own goals. Silos are meant to be broken and it is of utmost importance for any company to identify this problem and break down the silos. This is essential for any company, in order to improve overall performance and competitiveness in the emerging markets. (Govindarajan 2011:1-3)

Strategic work environment planning is critical for breaking silos. Strategic work environment planning provides an opportunity to eliminate physical and mental barriers for collaboration between working groups. It also enables opportunity to change thinking about physical work space and use strategic work environment planning as a tool which provides such a common work space that actively supports employee performance, knowledge sharing, facilitates working practices and common behavior, encourages teamwork and ultimately increases organization's overall effectiveness. (Vischer 1995:1-3) The new structure of physical common work space enables supporting a sense of community among employees and overall work performance improvement. These kind of spaces tend to have an open layout combined to transparency which is easy to perceive by any stakeholder with a single look. (Gratton and Erickson 2007:8) Having groups close together in a common space, combined to norms of openness, increases direct and un-direct communication between the people and enables organizational learning (Tjosvold 1988:49).

Physical barriers in a common work space reduce communication and participation between the employees. The physical barriers create silos for the work environment and tend to slow down the actual work. This enables unethical behavior and drive employees to have longer breaks. These phenomena can be avoided with strategic work environment planning. The aim is to derive maximum advantage of the potential performance available and to avoid a lack of performance in the work environment. (Vischer 1995:6)

Creating interactions between the collaborative parties is crucial for breaking the silos. It is not an easy task to stop working in silos and to start collaborate through interactions when the people have done so for ages. Companies need to provide situations where the people start working together across the boundaries, in order to remove existing barriers from the work environment (Gardner 2017:1-3). Interactions are very important to create by any organization in order to improve the overall performance and organizational learning. Interactions can be created through a natural group occasions, mutual training or with common tasks. Moreover, the main idea is to get people working together, into a same room, at the same time. Successful interactions provide efficient problem solving, innovation and it enhances the current and the future collaboration inside the whole organization. (Ashkenas 2015:3-4)

Collaborators with common goals, which are engaged to interact with each other, ultimately share the understanding about what they are doing and what it means for their

lives and work community (Ardichvili 2008:542). Promoting conditions between the collaborators for open discussion, and exchange of the ideas, by providing the time and space for this kind of interaction, is crucial in order to remove the barriers, break down the silos and to improve the mutual working practices (Ardichvili 2008:550).

Breaking down the silos inside the organization demands the cultural shift toward collaboration. This is possible only when the leaders of a company recognize the need for cultural shift and embrace the change toward collaboration. Organizations don't change because they want to, they change because they are forced to, by competition, by advances of the science and the technology or by emerging work environment. The cultural shift toward collaboration demands the leadership and a common understanding from the whole organization, about why a cultural shift is needed and why the new collaborative working practices must be implemented in order to successfully achieve the common goals. (Govindarajan 2011:1-3)

A primary task of management is to get the people working together in a systematic way. The aim is to gather and guide the existing talents toward collaboration and common goals in a systematic way which is controlled by the management. This is not an easy task to accomplish, especially when the existing culture has been evolved over the years inside a company. It is more than likely that resistance for a cultural shift occurs during the implementation. Thus, amount of resistance is likely to increase among the size and age of the company. It is clear that managing a cultural shift toward collaboration, needs a carefully planned, long-term implementation strategy with carefully selected management tools in order to be successful. (Christensen et al. 2006:1-8)

Cross-team collaboration is not just nice to have, it is a strategic choice. A successful shift to a collaborative culture empowers the people, provides interactions between the people, lowers the barriers and manages cynicism. It also enable benefits, such as resource sharing, knowledge sharing, participation and the open communication, with an ultimate aim to increase the long-term performance and the competitiveness of the whole organization. (Gardner 2017:10-13)

5.4 Collaborative Working Practices

The collaborative working practices are essential for any organization who are striving toward a collaborative culture and improved performance (Patel et al. 2011:1). Although

there are several working practices included to the collaboration, the aim of this section is to introduce the collaborative working practices identified from the existing literature which are essential in order to improve the focus area of this study, namely 'interfaces between the production line teams'.

The first collaborative working practice for optimizing the overall performance is sharing resources. The ability to share resources over the function areas or units in any company is an important performance enabler. (Patel et al. 2011:7) Larger teams exhibit greater skill sets for a company to use and it provides a possibility to handle greater workloads with available resources (Patel et al. 2011:12). This is especially true when there is a need to pool the talent or transfer the skills across the boundaries, with the aim to solve the problems more efficiently. Or, when the amount of work has increased in some other function area, sharing the resources over the function areas provide flexible use and targeting of available resources to where more performance is currently needed. This is a valuable effort for any company to use. Skillfully managed resource sharing provides an organizational learning, improved relationships inside the organization and it increases the overall sense of community inside the organization. (Gratton and Erickson 2007:16-17)

The second important collaborative working practice is sharing knowledge. It is a valuable resource for any organization, when all the collaborative parties are sharing their knowledge and all the stakeholders are having the access to the shared knowledge which is required in order to accomplish the work and to improve the overall performance toward common goals. (Patel et al. 2011:7)

The collaborative working culture supports and encourages individuals and groups to share their knowledge for a common good and to achieve a common purpose inside the organization (Patel et al. 2011:7). The importance of knowledge sharing and what the expectations and benefits are for all needs to be clearly defined and well understood by all the stakeholders. It is not self-evident that the knowledge sharing is successful, as there might be the barriers which need to be solved first until the knowledge sharing becomes a standard working practice. Ultimately, the knowledge sharing is a question of trust. It is a challenge for any company to build the trust between the collaborative parties and to provide a collaborative work environment which embraces the knowledge sharing. The successful knowledge sharing requires the trust and that can be achieved

by clear communication, by support, by encouragement and by the example of behavior of leaders inside the organization. (Ardichvili 2008:544-548)

The third collaborative working practice is to involve and engage people for the collaborative tasks, projects and collective decision making. It is a valuable resource for any organization to collect all the available insight and recommendations around the organization. Gathering the different prospects about the current issues, where a solution need to be developed, is a valuable asset for any organization to use. Engaging people at the early stage of a solution building fosters the collaboration and facilitates the possible implementation stage in the future. Such an involvement can take a various forms but more important is to exploit the collaborative approach toward common goals, in order to provide the mutual engagement among the people. (Katzenbach and Smith 1993:116-117) It is also clear that careful consideration must be taken into account, how to structure the collaborative effort, where people are supposed to be involved. The aim is to collect practical and insightful ideas on how to provide a successful outcome of the collaboration through a structured pre-planning about the upcoming collaboration. (Bedwell et al. 2011:139)

The fourth collaborative working practice is training and communication. Without proper training and clear communication, people don't know what the expectations for the collaborative behavior are, and how to collaborate effectively with the each other. There might be people who are encouraged to collaborate, and they even want to collaborate, but they aren't skillful enough or simply don't know how to do it. (Gratton and Erickson 2007:12)

Training is a critical tool for the overall development of collaboration. The training involves people and groups, it create interactions and facilitates the collaborative behavior. This kind of approach creates understanding for all the stakeholders, how critical it is to implement and act, according to the collaborative working practices and it provides them a concrete example of how to achieve the common goals together through effective collaboration. (Bedwell et al. 2011:140)

A number of skills are necessary for successful collaboration. Appreciating others, active participation and engaging, productive conflict solving, openness, knowledge sharing

and so forth. By training people concerning these areas, creates itself a sense of community and ultimately improves the overall performance of the whole organization. (Gratton and Erickson 2007:12)

Clear communication through collaborative working practices mentioned in this section is essential for successful collaboration. Well considered articulation about the collaborative working practices and what the kind of behavior which is truly valued inside the organization, is essential for implementing the collaborative working practices (Gardner 2017:15). Communication underlines the collaborative work. Thus, people understand each other and shared awareness about the common ground is created, where people can rely on during their work. Especially when the culture is shifting toward the collaborative working practices. The organization needs to enable information sharing through the open channels, and embrace and support a communication between the all collaborative stakeholders, during the evolving collaboration process. (Patel et al. 2011:9)

5.5 Conceptual Framework B of This Thesis

The construction of the Conceptual framework B is based on the findings from the existing knowledge about improving cross-team collaboration. Existing knowledge, which is relevant for this study, is summarized in to the second conceptual framework of this thesis, Conceptual framework B. The Conceptual framework B is illustrated in Figure 9.

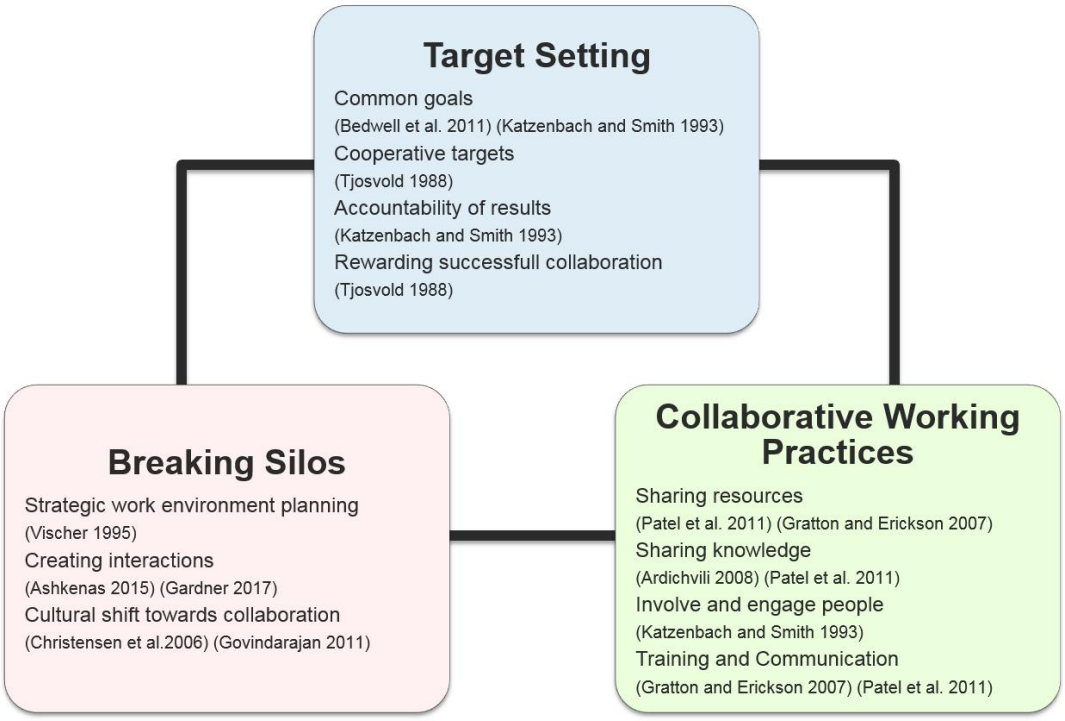

Figure 9. Conceptual framework B of this thesis for improving cross-team collaboration.

As seen in Figure 9, Conceptual framework B includes the three key concepts on improving cross-team collaboration. These key concepts are: Target setting, Breaking Silos and Collaborative working practices. All these three key concepts are linked to the each other, in order to improve the cross-team collaboration in the context of this study. These three key concepts include several important sub-topics with reliable sources, concerning effective collaboration practices inside the organization. Importantly, the selection of the key concepts and the sub-topics for improving collaboration and working practices were chosen to respond to the needs of the case organization of this thesis.

Summing up this section, first a definition of collaboration was introduced. Second, the existing knowledge around improving cross-team collaboration was discussed. Finally, the second conceptual framework of this thesis was constructed and introduced, namely Conceptual framework B. In this thesis, Conceptual framework B will be used to build an initial improvement proposal for the Automation Department working practices later in Section 6. The next section continues the discussion for initial proposal building considering the future improvement proposal for the working practices of the Automation Department.

6 Building Proposal for Efficiency Improvement Program

This section provides an initial proposal draft for an efficiency improvement program concerning the working practices in the Automation Department. In order to build the initial proposal draft, this section combines the results of the current state analysis 'Interfaces between the production line teams', existing knowledge from conceptual framework B for improving cross-team collaboration and the collective insight of proposal building from Data 2 workshop. This section also describes all the proposal building phases, until the initial proposal draft for an efficiency improvement program is finally constructed. The constructed initial proposal draft for an efficiency improvement program is then validated in Section 7.

6.1 Overview of Proposal Building

This sub-section provides an overview of the initial proposal building and briefly describes the upcoming phases in this section. The first phase of the proposal building includes a collection of the ideas captured from the Conceptual framework B, in order to improve the focus area of this study which is 'interfaces between production line teams' identified from the current state analysis. Those ideas are then formulated into a proposal draft template which is used as a platform for the discussion and feedback in the Data 2 workshop.

The second phase of proposal building, provides a collective insight from the Data 2 workshop, where all the relevant stakeholders are involved in order to collectively co-create and develop the initial proposal draft. The template formulated in phase 1 is used as a platform to build the initial proposal draft.

The third phase of proposal building introduces the summary of the initial proposal and provides the final construct of the initial proposal draft which combines all the elements studied in this thesis and the collected development ideas from the Data 2 workshop.

6.2 Collection of Ideas for Proposal Building

The first phase of proposal building includes a collection of the captured ideas, based on the Conceptual framework B for improving cross-team collaboration. These ideas are then formulated into a proposal building template, which is used in phase 2 as a platform for the discussion and for the Data 2 collection. A collection of ideas for the proposal draft template is illustrated in Figure 10.

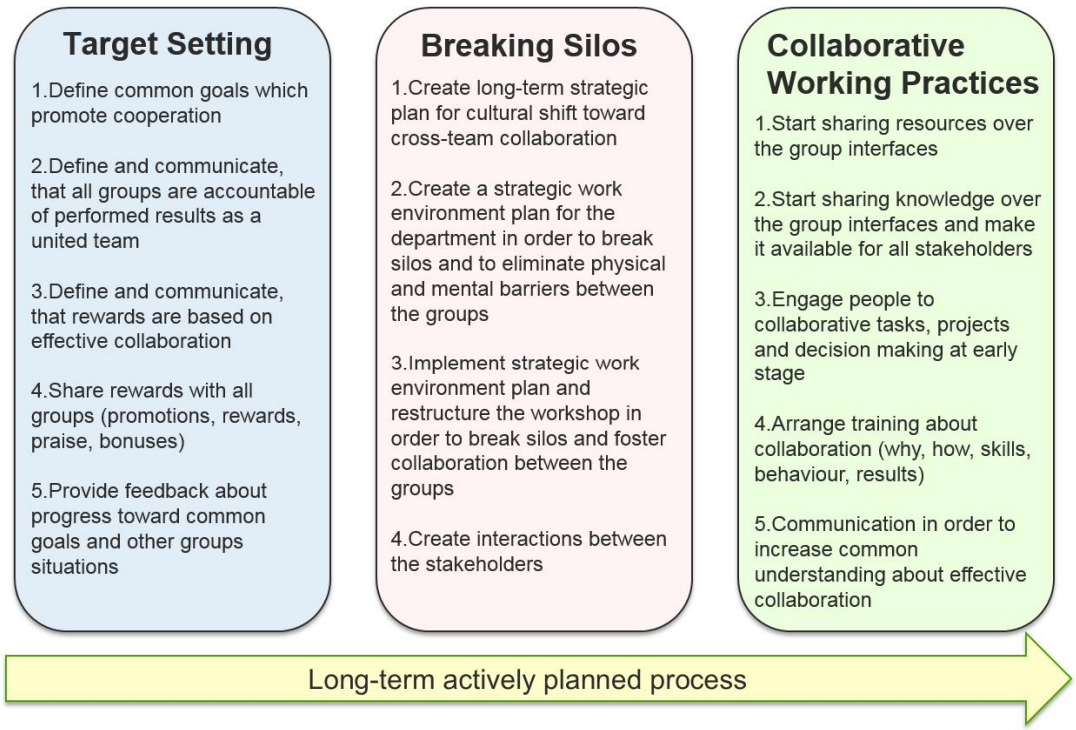

Figure 10. A Collection of ideas for the proposal draft template.

As seen in Figure 10, a collection of ideas is based on three key concepts on improving cross-team collaboration identified in the Conceptual framework B. These key concepts were: Target setting, Breaking Silos and Collaborative working practices. The same color coding is used in Figure 10 in order to illustrate the connection between the Conceptual framework B and the practical ideas concerning the key concepts on improving cross-team collaboration. Practical ideas are then listed under the topic of the key concept. These practical ideas are then formulated into a proposal draft template. A proposal draft template is illustrated in Figure 11.

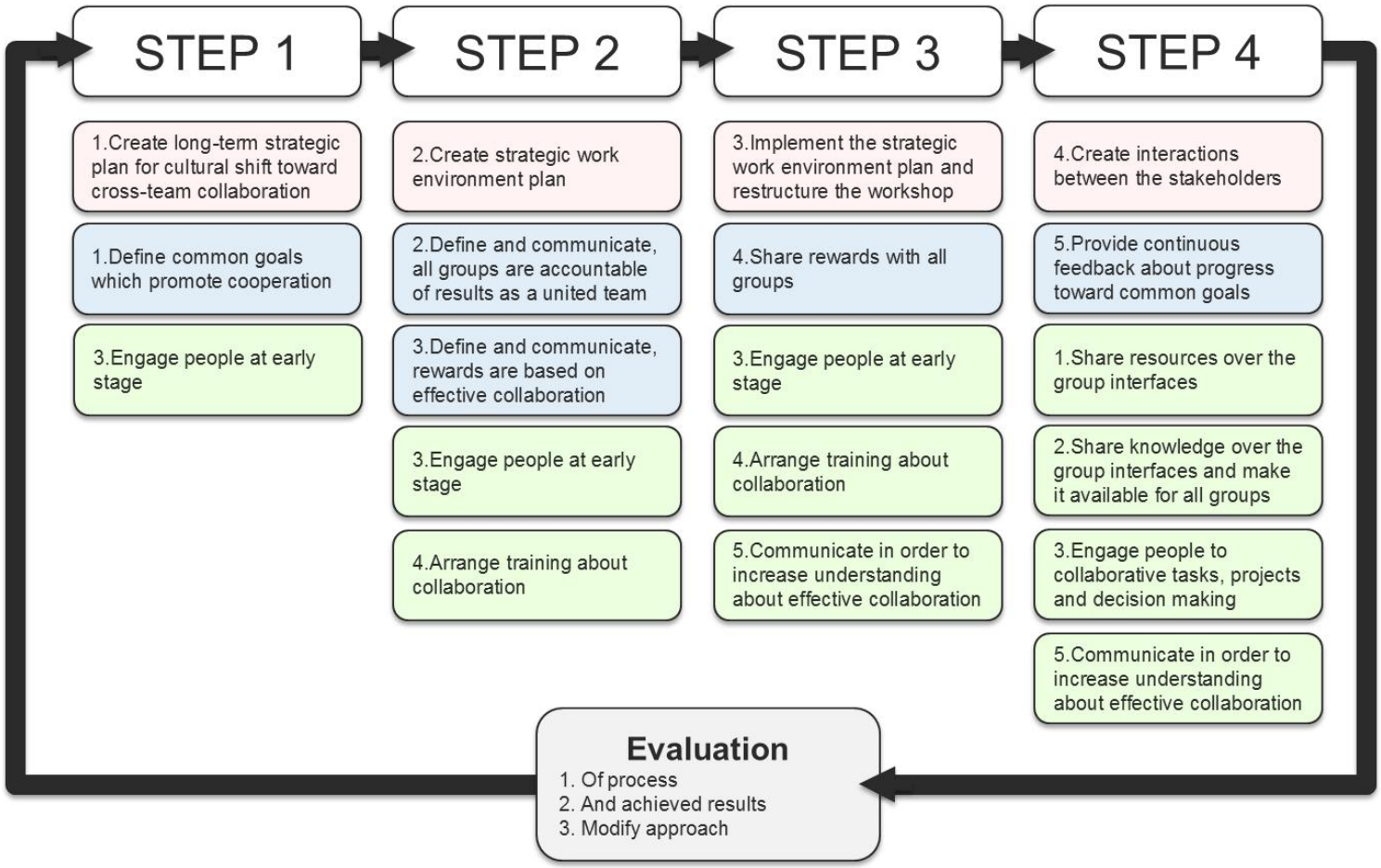

Figure 11. Proposal draft template.

As seen in Figure 11, all the collected ideas based on the Conceptual framework B are pre-organized into the proposal draft template in such a way that they formulate an actively planned improvement process which include the several steps toward cross-team collaboration in the Automation Department. This proposal draft template creates a good foundation for the Data 2 collection and it enables collective insight and development idea gathering from the Data 2 workshop. This formulated proposal draft template is then used as a platform for co-creating the initial proposal draft in the Data 2 workshop. The next section continues the discussion with findings from the Data 2 collection.

6.3 Findings of Data 2 Collection

The second phase of the proposal building, provides collective insight from the Data 2 workshop where all the relevant stakeholders were involved in order to collectively co-create and develop the initial proposal draft. The proposal draft template formulated in phase 1, was used as a platform for the co-creation of the initial proposal draft in the Data 2 workshop.

Discussion started with the overall construction of the process description, based on the used template. As one of the three participants stated:

> *"The color coding and the numbering in the proposal draft template is unclear. The explanations for the color coding would be nice to see in the proposal." Data 2: Informant 1*

Based on this statement, the color coding and the phase numbering under the steps are made more visible to the initial proposal draft. Discussion continued with the actively planned process itself and what necessary modifications need to be done for the overall structure of the actively planned process, concerning the continuous evaluation of the process and the process follow up. As two of the three participants stated:

> *"The evaluation of a process after the each step is important. In order to figure out, if this process is going forward as planned. On my sight, the evaluation need to be continuous and in practice, after every step. It provides a possibility to modify the actual approach after each step, if the chosen approach didn't work as planned. It is wise to evaluate how the project is going on during the process and not just after the final finish line, and then wonder the actual outcome of the process. Also, the process needs to proceed logically forward. The next step cannot start, until the previous step is finished." Data 2: Informant 1*

> *"Should there be included some mid-term reviews during the process? There should be more evaluation than only one in the end during the process. It would be nice to have more evaluation during the process or between the steps. Of course, there needs to be the final evaluation for the whole process cycle among the mid-term reviews." Data 2: Informant 2*

Based on these statements, continuous evaluation for the actively planned process is added to the initial proposal draft in order to include evaluation after each step, with the aim to ensure that the process is moving to right direction and supports the overall progress of the process. This kind of solution provides a possibility to modify the approach before the upcoming step if necessary. Discussion continued with the initial steps 1-4 inside the process.

Concerning step 1, there was interesting discussion about the first phase of step 1, namely creating a long-term strategic plan for a cultural shift toward cross-team collaboration and the importance of the current phase concerning the successful outcome of the whole actively planned process. As one of the participants stated:

> *"I would like, that in Step1, phase 1.1 is opened more like a project plan for example. I mean that it is described as a project plan including the following elements: create time schedule, create objectives, create responsibilities, and book the necessary resources. Finally, all these need to be written out as a concrete project plan. This provides a possibility to evaluate the process between the steps and to actively follow the progress of this particular project. Too many projects in our company are failing and are not finished because there is no written plan on how to execute the project itself. If the plan is not clearly opened and defined in the beginning of the project, including scheduling and responding the tasks (for the next upcoming months or rest of the year), it is stupidity to look back at the end of the year and ask: "Did anything actually happen, did we manage to achieve any improvements or the desired results during this time?". Data 2: Informant 1*

Based on this statement, the first phase of step 1 is modified to include the nature of the clearly defined project plan which contains the discussed elements, such as creating time schedule, create objectives, create responsibilities, book the resources and create a written plan. Discussion continued with the target setting and rewarding concerning the step 1 and step 2 and the following phases, 1.2 Define common goals which promote cooperation, 2.2 Define and communicate, all groups are accountable for results as a united team, and 2.3 Define and communicate, rewards are based on effective collaboration. Below is what two of the participants stated:

> *"Common targets should be mutual for all in our department and in our case, it means modifying the 'sti-target setting' and they (sti = short term incentive) need to be defined according to desired results that we want to achieve". Data 2: Informant 2*

> *"Achieving common targets would provide rewards to maximum if the silos are broken during the pre-defined 'sti-interval' timeline." Data 2: Informant 1*

It is clear that the phases concerning the target setting and rewarding are essential in order to achieve a successful outcome of the process. Also, the first phases of the step 2 and step 3 created conversation of how to successfully perform these implementation phases. In particular, conversation centered on 2.1 Create strategic work environment plan and 3.1 Implement the strategic work environment plan and restructure the work-shop. When discussing these issues, one of the participants stated:

> *"The implementing phase is important. These kind of issues need to be communicated personally and not through the public channels. The implementing plan is important and it is a big part of this project. Nowadays, several ideas are coming from the stakeholders inside the company, which are just sent through an email, without a clearly defined plan, how to implement the idea. It is unrealistic to expect things to happen, without a valid implementation plan. Most of the projects fail because of the inadequate implementation plan or there might be not an implementation plan at all." Data 2: Informant 1*

Considering this statement, an important element of the initial proposal draft was missing concerning the whole process. The missing element was the actual implementation plan, i.e. how to execute the strategic work environment plan. It became clear that it needs to be added to the initial proposal draft.

Finally, the discussion continued with the important issue which needed to be involved into every step during the process. It became clear that clear communication during every step is crucial in order to achieve a successful outcome of this process. Below is what one of the participants stated:

> *"Communication, communication, communication, during the whole project. It is of utmost importance to keep up continuous communication with the involved stakeholders. The ultimate aim is to show the importance of this project and to keep it on the frame during the whole project. People*

don't commit themselves without effective communication. Communication needs to be included into every step in this project." Data 2: Informant 1

"Also the correct channel to communicate for the people needs to be defined at an early stage of this process. Considering communication, the new approaches in the company maybe aren't the best ones in order to reach people in the context of this project." Data 2: Informant 1

It is clear that communication needs to be added into every step included to the initial proposal draft. During the Data 2 workshop, many development ideas were co-created in order to create the initial proposal for this thesis. As one of the participants stated during the co-creation:

"This is the kind of framework how this is done. This is a generic model that can work in many different organizations". Data 2: Informant 2

The Data 2 workshop was recorded with a digital recorder and transcripted to the Data 2 collection table. The key findings from the Data 2 collection can be found in Appendix 3. Figure 12 illustrates how the development ideas were collected during the Data 2 workshop.

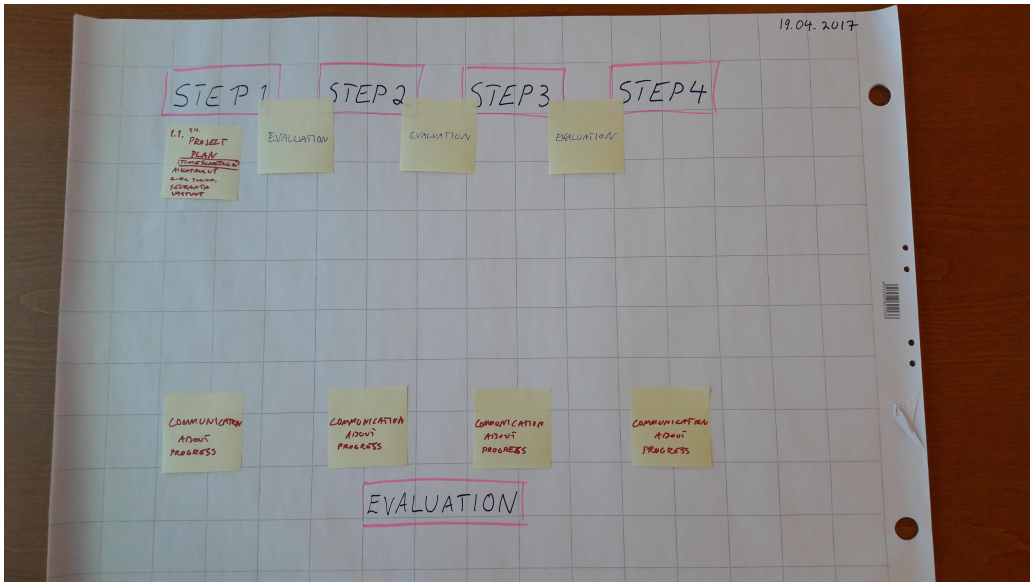

Figure 12. Co-creating initial proposal draft in Data 2 workshop.

As seen in Figure12, the co-created ideas were collected and included to the frame which illustrates the same process that was described in the proposal draft template used in Data 2 workshop.

Summing up the Data 2 workshop, many development ideas were collected and co-created during the workshop in order to construct the initial proposal draft for the efficiency improvement program. Based on the development ideas to the initial proposal draft color coding and numbering are improved, several phases under the steps are added and the contents of some phases are modified as well as mid-term reviews, namely step evaluations, are added to the overall process cycle.

Based on the results of the current state analysis and the focus area of this study, 'Interfaces between production line teams', ideas from the Conceptual framework B for improving cross-team collaboration and the co-creation in Data 2 workshop, the initial proposal draft for efficiency improvement program is crafted. The next sub-section presents the initial proposal draft for efficiency improvement program and continues the discussion with the content of the initial proposal draft for efficiency improvement program.

6.4 Initial Proposal Draft

The goal of this section is to provide the initial proposal draft for efficiency improvement program toward cross-team collaboration in the Automation Department. The initial proposal draft for efficiency improvement program toward cross-team collaboration combines the results of the current state analysis 'Interfaces between the production line teams', existing knowledge from Conceptual framework B for improving cross-team collaboration and the collected insight from Data 2 workshop. In this sub-section, the initial proposal draft for efficiency improvement program is presented and also the content of the proposal steps are described. The initial proposal draft for efficiency improvement program toward cross-team collaboration is presented on the next page in Figure 13.

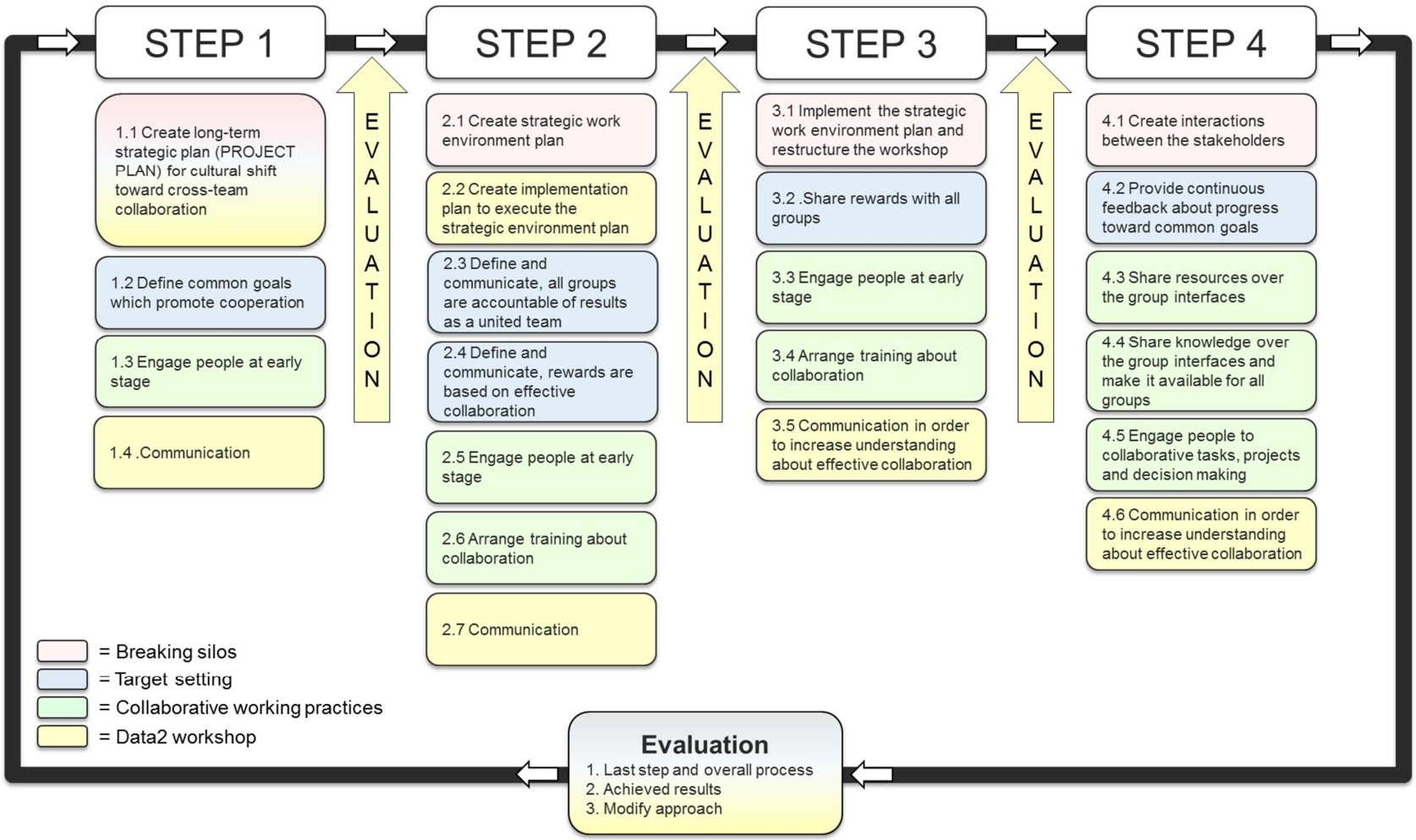

Figure 13. Initial proposal draft = Efficiency improvement program toward cross-team collaboration.

As seen in Figure 13, the initial proposal is an efficiency improvement program including four steps and several evaluations during the process. The aim is to improve cross-team collaboration in the Automation Department and to change the course historical evolution has followed. The four steps include several phases which are color coded according to the key concepts behind the conceptual framework B for improving cross-team collaboration and the Data 2 collection for this thesis. The numbering is done according to the step where the current phase is placed and it also expresses the suggested order how the phases can be executed during the step. The color coding also expresses the reference for the ideas behind the current phase. Red refers to chapter 5.3 Breaking silos, blue refers to chapter 5.2 Target setting, green refers to chapter 5.4 Collaborative working practices and yellow refers to 6.3 Findings of Data 2 collection. Next, discussion continues with briefly describing the content of steps 1-4.

STEP 1 includes four phases, 1.1 Create long-term strategic plan (PROJECT PLAN) for cultural shift toward cross-team collaboration, 1.2 Define common goals which promote cooperation, 1.3 Engage people at early stage and 1.4 .Communication.

Phase 1.1 is the starting point of this process. This phase includes the commitment and decision making from the leaders to execute the efficiency improvement program in order to start the cultural shift toward cross-team collaboration and to break down the existing silos in the Automation Department. In this phase, a project plan is created for executing this whole process successfully with the following important elements: create time schedule, create objectives, create responsibilities, and book the necessary resources. Finally, create a written plan for all previous elements mentioned and deliver it to all the stakeholders involved at this point of the process.

Phase 1.2 is necessary in order to get people working together. Without defining common goals which promote cooperation, there is no reason why people should cooperate and work together.

Phase 1.3 includes engaging people at an early stage. At this point, especially all the executive managers and foremen should be involved to plan, define and comment the objectives of this efficiency improvement program toward cross-team collaboration.

Phase 1.4 communication early in the process includes the vision sharing of cross-team collaboration and its benefits for the community. This phase consists of sharing the reasons behind the up-coming efficiency improvement program. This is done in order to provide answers for the stakeholders involved and to enhance the overall understanding why this needs to be done and how to execute this process successfully together. Also defining the communication tools used during the efficiency improvement program is important in this part of the overall process.

STEP 2 includes the following seven phases: 2.1 Create strategic work environment plan, 2.2 Create implementation plan to execute the strategic environment plan, 2.3 Define and communicate, all groups are accountable of results as a united team, 2.4 Define and communicate, rewards are based on effective collaboration, 2.5 Engage people at early stage, 2.6 Arrange training about collaboration and 2.7 Communication.

Phase 2.1 includes creating the strategic work environment plan in order to break down the physical and mental barriers from the work environment. This includes restructuring the workshop in such a way that the work environment enables efficient and collaborative cross-team working practices in the Automation Department. These kind of spaces tend to be with open layout and with such a design that creates interactions between the groups and people, encourages knowledge sharing and facilitates common behavior and working practices in the department.

Phase 2.2 provides the actual implementation plan, with responsibilities and preplanning, how to successfully execute the strategic work environment plan considering the current circumstances and in order to restructure the workshop in a smart and effective way, together with the stakeholders.

Phase 2.3 includes defining and communicating for all groups that they are mutually accountable as a united team for the achieved results toward common goals which were defined in phase 1.2. The aim is to get people and groups working with each other and to create a collaborative responsibility and the purpose for every group in the Automation Department in order to achieve the pre-determined common goals.

Also the rewarding needs to guide, support and encourage people and the groups to effective cross-team collaboration and to achieve the common goals. The key concept

behind rewarding, namely effective collaboration, is defined and communicated to all stakeholders in phase 2.4.

Phase 2.5 includes using valuable resources inside the department by engaging the people during the previous planning phases in step 2. This is done in order to collect all available insight and recommendations available from the department. Engaging people at an early stage of solution building fosters collaboration and facilitates the implementation stage in the future. It is very important to start involving the mechanics at this point of the process, concerning the up-coming implementation phase in step 3.

Phases 2.6 and 2.7 include the training and communication during step 2. Without proper training and clear communication, people don't know what the expectations for collaborative behavior are, and how to collaborate effectively with each other.

STEP 3 includes the following five phases: 3.1 Implement the strategic work environment plan and restructure the workshop, 3.2 Share rewards with all groups, 3.3 Engage people at early stage, 3.4 Arrange training about collaboration and 3.5 Communication in order to increase understanding about effective collaboration.

Implementing the strategic work environment plan is done in phase 3.1. and the new structure of the physical common work space is created in order to support cross-team collaboration. This is done to create interactions between the people and groups, to create a sense of community among the employees and to improve the overall work performance in the whole department.

Phase 3.2 consists of reward sharing with all the groups whether its promotions, rewards, praise or bonuses. All the groups should be mutually rewarded when successful results of cross-team collaboration occurs between the groups and the overall work efficiency is improved. Promoting cross-team collaboration behind the achieved results is of utmost importance during the rewarding.

Phase 3.3. Includes engaging people. At this point of process it is of utmost importance to engage all the mechanics in the department in order to implement the strategic work environment plan successfully and to enhance the overall understanding of cross-team collaboration and its benefits for the whole community.

Phase 3.4 includes arranging training about cross-team collaboration for the mechanics. Training is a critical tool for overall development of collaboration. There might be people who are encouraged to collaborate, and they even want to collaborate, but they aren't skillful enough to do it or just don't know how to collaborate with the other stakeholders.

In phase 3.5 communication is very critical in order to support the implementation of the strategic environment plan and to promote benefits of the cross-team collaboration for all the stakeholders involved in this process.

STEP 4 includes the following six phases: 4.1 Create interactions between the stakeholders, 4.2 Provide continuous feedback about progress toward common goals, 4.3 Share resources over the group interfaces, 4.4 Share knowledge over group interfaces and make it available for all groups, 4.5 Engage people to collaborative tasks, projects and decision making and 4.6 Communication in order to increase understanding about effective collaboration.

In phase 4.1, the company needs to create interactions for the groups and mechanics, in other words, situations where people start working together across the boundaries, in order to remove the existing barriers from the work environment. Interactions can be created through natural group occasions, mutual training or common tasks in order to get people into the same room, at the same time and working together.

Phase 4.2 includes providing continuous feedback about the progress toward common goals, during the efficiency improvement program. This also means that information of the other groups' situation needs to be provided for all the groups in order to provide a possibility to share the resources between the groups and to create a chance to achieve the defined common goals.

Phase 4.3 includes an important and valuable collaborative working practice for any company, i.e resource sharing. The ability to share resources over the function areas or units is an important performance enabler. Larger teams exhibit a greater skill set for the company to use and it provides a possibility to handle greater workloads by sharing the available resources over the function areas when the amount of work has increased temporarily in some other function area. Resource sharing provides a flexible use of the

available resources in order to move resources to where more performance is currently needed.

Phase 4.4 includes another important collaborative working practice, i.e. knowledge sharing. It is a valuable resource for the company, when all the collaborative parties are sharing their knowledge and all the stakeholders have access to the shared knowledge which is required to accomplish the work for example in another function area, which might not be so familiar for the employee. Sharing knowledge enables efficient cross-team collaboration and improved overall performance.

In phase 4.5, engaging people to collaborative tasks, projects and decision making is crucial. Such an involvement can take various forms, but the more important is to exploit the collaborative approach toward common goals, in order to provide mutual engagement among people and to facilitate collaborative working practices inside the department.

Phase 4.6 includes clear communication through the all phases and collaborative working practices mentioned in this section and this is essential for successful cross-team collaboration. Well considered articulation about collaborative working practices and the kind of behavior which is truly valued inside the organization, is essential for implementing the efficiency improvement program toward cross-team collaboration in the Automation department.

As seen in Figure 13, there is continuous evaluation after each step and the final evaluation of the whole efficiency improvement program is executed after step 4. The step evaluation consists of a review whether the process is going forward as planned or does the approach need to be modified if the chosen approach didn't work during the step as it was planned. The final evaluation includes the last step and the overall evaluation of the efficiency improvement program toward cross-team collaboration. The aim is to review if the desired results were achieved and it provides a possibility to modify the efficiency improvement program in order to be valid and ready to execute for the next cycle of efficiency improvement program.

Summing up this section, the proposal building included three phases. The first phase included the collection of the captured ideas from the Conceptual framework B for improving cross-team collaboration and a formulated proposal draft template which was used as a platform for the Data 2 workshop. The second phase of proposal building was Data 2 workshop, where all the relevant stakeholders were involved in order to collectively co-create and develop the initial proposal draft for an efficiency improvement program toward cross-team collaboration. The third phase of the proposal building introduced the final construct of the initial proposal draft in order to propose an efficiency improvement program toward cross-team collaboration in the Automation Department. The next section focuses on the validation of the initial proposal draft.

7 Validation of the Proposal

This section validates the initial proposal for an efficiency improvement program toward cross-team collaboration which was developed in Section 6. Validation refers to the collected feedback from the Head of Automation Department. The goal of this section is to present the final proposal of this thesis, i.e. an efficiency improvement program toward cross-team collaboration.

7.1 Overview of Validation Phase

This sub-section provides an overview of how the validation for the initial proposal was conducted and it briefly describes the upcoming phases of this section. The current validation method used, namely feedback from the Head of Automation Department was chosen in order to meet the tight schedule of this study. It is also clear, considering the given time schedule for this thesis that because the outcome of this thesis is a long-term efficiency improvement program, piloting the final proposal in practice during this timeline is impossible.

The validation of the initial proposal includes three phases. The first phase of the validation is the Data 3 collection. The Data 3 collection includes feedback from the Head of Automation Department concerning the initial proposal draft which was co-created and constructed based on the Data 2 workshop in Section 6. Based on the Data 3 collection, the initial proposal is then developed to a final proposal of this thesis. Second phase of the validation presents the final proposal of this thesis. Finally, third phase of the validation presents the recommendations for the case company and the next steps considering the future implementation of the final proposal in the case company.

7.2 Findings of Data Collection 3

The Data 3 collection includes the feedback from the Head of Automation Department regarding the initial proposal for efficiency improvement program toward cross-team collaboration which was co-created and constructed based on Data 2 workshop in Section 6. The feedback and validation of the initial proposal was collected through a personal

interview with the Head of Automation Department and the feedback session was recorded with a digital recorder. The summary of Data 3 collection is presented in Table 2.

Table 2. Summary of Data 3 collection.

Key Findings from Data 3 Collection	
Participants	Comments
Informant 1 Head of Automation Department	"The phase 2.2 in Step 2, create implementation plan to execute the strategic environment plan was a great addition to this process." "The biggest issues are now okay concerning the successful execution of the whole actively planned process." "This is how it is done, just print it out and that's it."

As seen in Table 2, additions to the initial proposal for efficiency improvement program toward cross-team collaboration were not presented during the Data 3 collection and the feedback concerning the initial proposal was very positive. Based on the Data 3 collection, positive feedback and the validation of the initial proposal, it is rather clear that with this kind of approach, it is possible to successfully execute and implement the co-created efficiency improvement program toward cross-team collaboration in practice. The ultimate aim is to improve the focus area of this study which was 'Interfaces between production line teams' identified from the current state analysis. Accordingly, the initial proposal for efficiency improvement program toward cross-team collaboration is the actual final proposal of this thesis.

7.3 Final Proposal

This sub-section provides the actual outcome of this thesis. The final proposal of improvements to the Automation Departments working practices is an efficiency improvement program toward cross-team collaboration. The final proposal is based on the selected key weakness identified in the current state analysis, i.e. 'interfaces between the production line teams' and existing knowledge from the Conceptual framework B for improving cross-team collaboration. In addition, it is based on the co-created initial proposal

for efficiency improvement program toward cross-team collaboration constructed in Section 6 and the feedback and the validation of the initial proposal by the Head of Automation Department in Section 7. The final proposal for efficiency improvement program toward cross-team collaboration is illustrated in Figure 14.

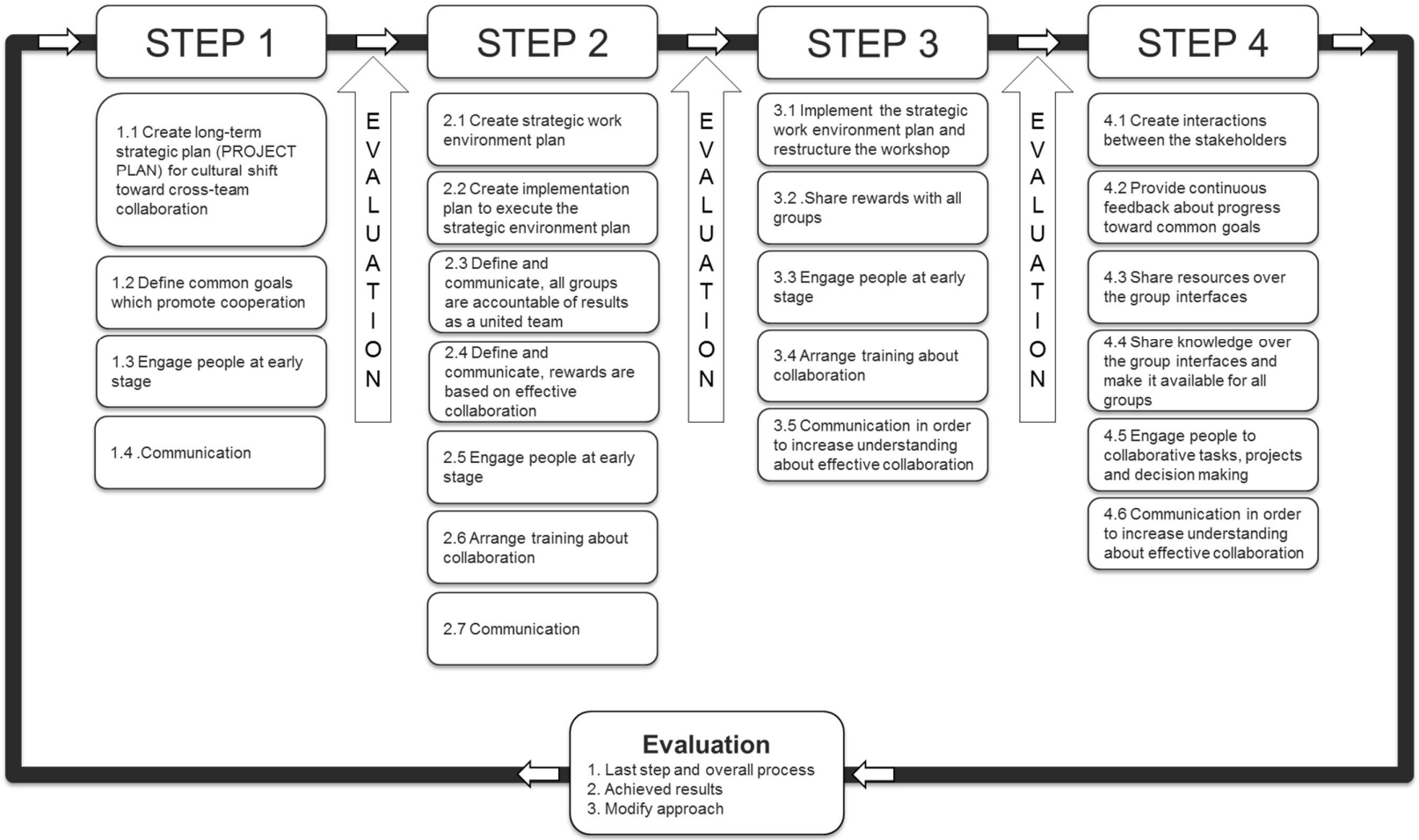

Figure 14. Final Proposal - Efficiency improvement program toward cross-team collaboration.

7.4 Recommendations and Managerial Implications

This sub-section provides the recommendations and managerial implications for the case company. Successful execution of the final proposal - efficiency improvement program toward cross-team collaboration in the Automation Department - ultimately provides many benefits for the case company, such as: broken silos, improved cross-team collaboration, improved collaborative working practices, increased work efficiency, better productivity and overall positive impact to oil refinery's total competitiveness. Finally, it also provides a model, which can be used for improving working practices in the other departments inside the Neste company.

Considering the benefits mentioned above, the developed final proposal for efficiency improvement program toward cross-team collaboration does not define or propose the timelines for executing the proposed efficiency improvement program cycle, or the timelines for the steps and phases included in the process in order to provide information, when these benefits are achieved. As such, it is recommendable for the case company to define these timelines for the efficiency improvement program cycle, including the steps, phases and evaluations proposed in this study. Considering the benefits mentioned, it is recommendable to start making preparations for executing the final proposal for efficiency improvement program toward cross-team collaboration provided in this study, at the latest from the beginning of next year when the new targets and goals are defined for the employees and management. As such, this study recommends the following future steps to be taken by management.

First, engage the executive managers and present the efficiency improvement program. Second, provide a decision to execute the efficiency improvement program. Third, nominate a workgroup to execute the efficiency improvement program. Fourth, define timelines for the efficiency improvement program and start executing the efficiency improvement program. Fifth, define a long-term approach and execute several cycles of efficiency improvement program with modified approaches.

Summing up this section, an overview of the validation phase and Data 3 collection was introduced. After the validation and feedback by the Head of Automation Department, the outcome of this thesis, namely the final proposal - efficiency improvement program toward cross-team collaboration - was presented. Finally, the recommendations and managerial implications for the case company were described. The final section continues with discussion and conclusions of this thesis.

8 Discussion and Conclusions

This section provides an executive summary of this thesis in order to briefly describe the executed research and the grounded overview of the constructed solution. Also, an evaluation of this thesis is presented in this section focusing on the research process, used methods and the ultimate outcome of this thesis. At the end of this section, the final words for this thesis are presented.

8.1 Executive Summary

This thesis focused on proposing an efficiency improvement program for the Automation Department. The working practices of the Automation Department have a major impact on the oil refinery's total competitiveness in the emerging markets. Accordingly, the working practices of the Automation Department needed to be developed as part of a refinery-wide efficiency program.

This study was conducted in several phases in order to identify the efficiency 'killers' in the Automation Department's current working practices and to propose improvements for these identified pain points. First, the key concepts behind work efficiency were searched from existing literature and the first conceptual framework of this thesis was constructed, namely the Conceptual framework A focusing on work efficiency. The key concepts identified behind work efficiency were Environment and Technology, People management, Department/Group context and Individual context. Based on the Conceptual framework A, a questionnaire was created and it was used as a tool in practice during the interviews in order to identify the efficiency 'killers' from the current working practices during the current state analysis stage.

In the current state analysis stage, efficiency 'killers' were identified and the focus area of this thesis was chosen, namely 'Interfaces between the production line teams'. Next, a second round of existing literature was searched in order to find best practices for improving the selected focus area of this thesis and then the second conceptual framework of this thesis was constructed, i.e. the Conceptual framework B for improving cross-team collaboration. The key concepts identified behind cross-team collaboration were Target setting, Breaking silos and Collaborative working practices.

Finally, the initial improvement proposal for the efficiency improvement program was created. This was done based on the results of the current state analysis 'Interfaces between the production line teams', findings from the Conceptual framework B for improving cross-team collaboration and most importantly, the contribution of all the relevant stakeholders in the Data 2 workshop. The constructed initial proposal for efficiency improvement program toward cross-team collaboration was then validated by the Head of Automation Department and the final proposal for efficiency improvement program toward cross-team collaboration was constructed.

The efficiency 'killers' identified from the current working practices were strongly related to the interfaces between the production line teams and the historical unintended evolution of the current working practices. There was also other efficiency 'killers' identified from the current working practices in the Automation Department and all the findings can be found in Section 4, Current state analysis. In order to improve the selected focus area of this thesis and to control the evolution of working practices, an efficiency improvement program toward a cross-team collaboration was produced as a final proposal of this thesis. The final proposal for efficiency improvement program included four steps with several phases and continuous evaluation during the process. The description of the efficiency improvement program and its steps and phases can be found in Section 6.

For the case company and the Automation Department, successful execution of the final proposal provides improved cross-team collaboration, improved collaborative working practices, increased work efficiency, better productivity and most importantly, an overall positive impact on the oil refinery's total competitiveness in the emerging markets. The final proposal for efficiency improvement program toward cross-team collaboration is also applicable to other departments to use in order to develop the overall work efficiency and productivity inside the company.

8.2 Thesis Evaluation

This sub-section evaluates this thesis according to the evaluation plan provided in section 2.4. This sub-section discusses important issues such as how the outcome meets the objective of this thesis, relevance of the constructed proposal for the case company and how the logic, reliability and validity were realized in this thesis.

8.2.1 Objective vs. Outcome

The objective of this thesis was to propose an efficiency improvement program concerning the working practices of the Automation Department, as described in section 1.2. The outcome of this thesis was an efficiency improvement program toward cross-team collaboration in the Automation Department which ultimately improves the overall work efficiency of the whole Automation department as declared in section 7.3. When comparing the outcome of this thesis to the objective, it can be seen that they are in line and therefore, this thesis meets its targets and even more.

8.2.2 Relevance

Relevance means that evidence and fact is logically connected to the issue at hand, aim to prove a material point of issue which is applicable for the current situation and might contribute a solution for the current situation. It is clear that with a successful implementation of the constructed and validated final proposal an efficiency improvement program toward cross-team collaboration, which was built based on three different and relevant data (described in detail in Section 2), ultimately helps to improve the working practices and the work efficiency in the Automation Department and offers a solution to fix the selected focus area of this study, which was 'Interfaces between the production line teams'.

Considering relevance for the case company and for the Automation Department, successful execution of the final proposal provides improved cross-team collaboration, improved collaborative working practices, increased work efficiency, better productivity and most importantly, a positive impact on the oil refinery's total competitiveness. The final proposal is applicable for other departments to use in order to develop overall cross-team collaboration and work efficiency in the case company.

8.2.3 Validity and Reliability

When creating this thesis, the following key criteria such as logic, validity and reliability were taken into account and made visible throughout this thesis in order to provide a quality research and valid outcome.

Validity of the research answers the question how well the study measures what it is meant to measure and whether the results of the research are in line with the outcome of the study. Validity in qualitative research also means that the research is implemented following a clear and valid research process, by using valid tools and data collection methods. The chosen methods, interviewing and workshop with relevant stakeholders using a digital recorder enabled efficient data collection during this research. There were multiple sources from different groups and with different status needed to be interviewed during this research. This was done in order to collect the practical insight from the stakeholders and to prove that this research truly covers the whole context of this thesis, namely the Automation Department. The results of data 1-3 collections are transparent and reported clearly in this thesis. Although the results of Data 1 are confidential, direct quotes are used in this thesis in order to prove the validity and reliability of this research.

Reliability in qualitative action research expresses the trustworthiness and authenticity of a study and ensures that its results and sources are repeatable during the research and for other researchers the use later on. In this study, multiple data sources are used from existing literature in order to explore alternative explanations for the topics that are discussed in this thesis. Triangulation was used for the data collection during this thesis in order to examine multiple realities that people experience as working practices in the context of this study and to co-create the initial proposal in Section 6. Finally, the final proposal was validated by the Head of Automation Department in Section 7. All this was done in order to avoid researcher bias during the research and to prove the reliability of this thesis. The sources were made clearly visible and traceable throughout this thesis for other researchers to use except for the internal documents from the case company and the confidential Data 1 collection table.

Logic means in general the cause-and-effect explanation of an action, decision, event, phenomenon, or solution. During this study, logic was ensured by observing the overall logic of this thesis, starting from establishing its business challenge, objective and outcome that were carefully and logically planned and clearly defined. After that, the researcher followed uncompromisingly the research design described in section 2.2 which shows the logical structure how this thesis was implemented during the research and how this research logically arrived to the actual outcome of this thesis. The last subsection finishes this thesis with some final words.

8.3 Final Words

This study acknowledges the importance of developing overall work efficiency to improve overall productivity and competitiveness of the case company. Even though the data and the methods used for creating the solution for the case company seems to have produced an effective solution, it is most probable that some elements affecting overall work efficiency and solutions from existing knowledge still remain unidentified in this research and thus would require further investigation and research work to be done by other researchers in the future.

This is possible by further exploring best practices from existing knowledge to tackle the many improvement areas, for example 'systematic learning from mistakes' and 'immediate production related action dominating perception of what is important', identified in this research and by modifying the proposed efficiency improvement program for the upcoming cycles for those improvement areas.

Finally, considering this research, and the final outcome and the ultimate learning experience, applying and promoting efficient working practices in the daily operations of any company is a valuable asset in order to achieve success in the emerging market environment.

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Tool for Identifying Efficiency 'Killers'

Questions Q1 – Q18

Q1 (Davenport et al. 2002:3)
How would you describe our current way of working?

Q2 (Fernández-Aráoz 2015:3)
Are we properly prepared to face the inevitable hard times or surprises?

Q3 (Davenport et al. 2002:2) / (Vischer 1995:1)
Do the current tools and technology enable efficient ways of working?

Q4 (Fuller 2016:2) / (Davenport et al. 2002:8-9)
What is missing from the work environment that would enable more efficient ways of working?

Q5 (Fernández-Aráoz 2015:4)
How does collaboration affect your work? Do solid processes affect collaboration?

Q6 (Bailey and Madden 2016:10)
How does internal bureaucracy affect our work?

Q7 (Fuller 2016:4) / (Bailey and Madden 2016:10)
What kind of support do you get to perform your work?

Q8 (Birkinshaw and Haas 2016:2-8)
Failures, down streams or possibilities? How are they conducted to improve action?

Q9 (Bailey and Madden 2016:1)
Where and how do people find their work to be meaningful or meaningless?

Q10 (Power 2013:1)
Where do we have ineffectiveness?

Q11 (Power 2013:1)
Describe, which particular part of working day does the ineffectiveness occurs in our Department? Why then?

Q12 (Fernández-Aráoz 2015:3)
Do we have enough diversity of skills and strengths in our Department?

Q13 (Fernández-Aráoz 2015:3-4)
Is everyone committed to the organization and aligned with your fundamental purpose?

Q14 (Fernández-Aráoz 2015:3)
Networking (internal/external), how does it affect your work?

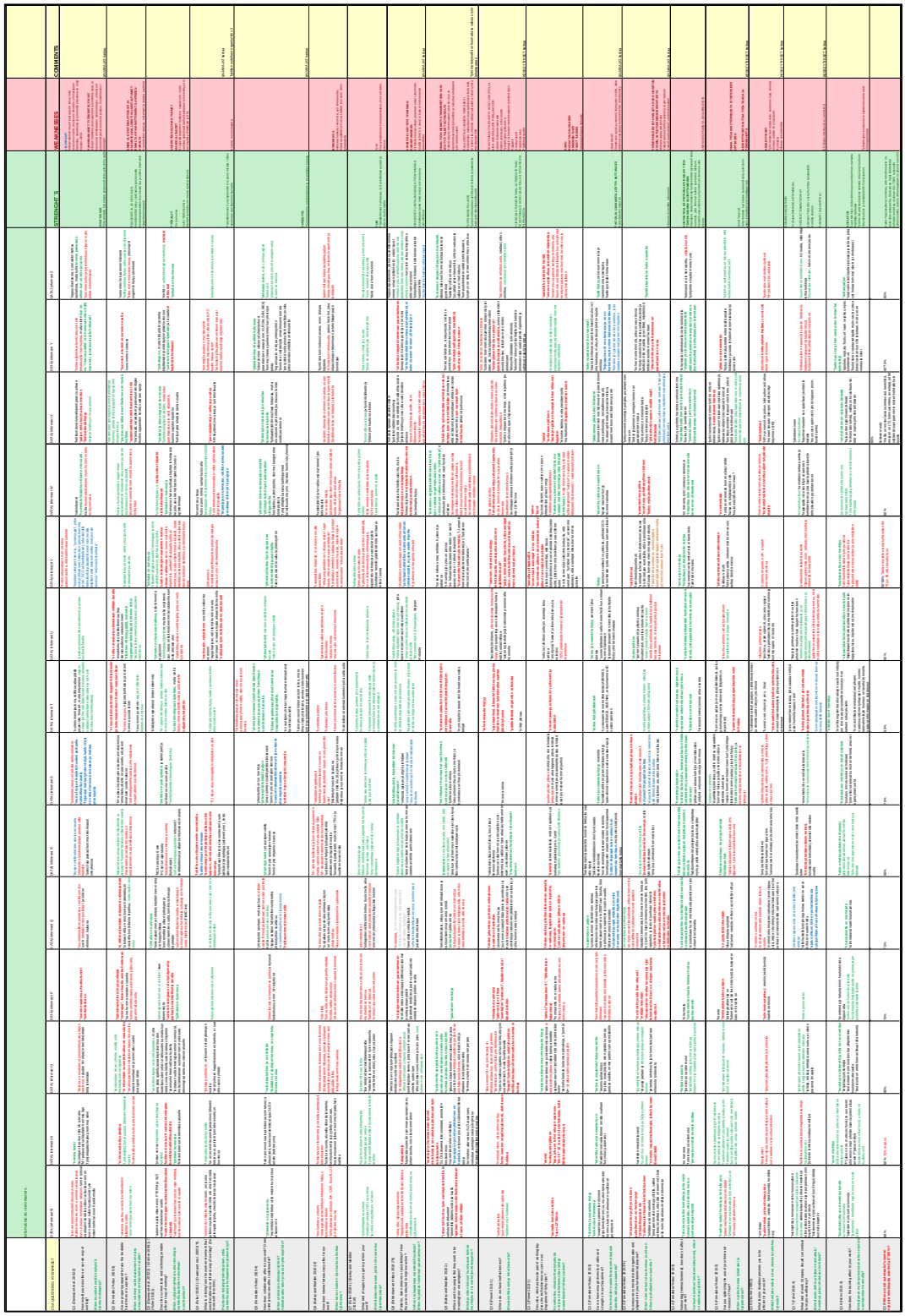
Q15 (Fernández-Aráoz 2015:3)
Are you optimizing the use of your time and resources? How?

Q16 (Vischer 1995:2)
What factors disable/prevent you to be efficient in your work?

Q17 (Fuller 2016:4)
What kind of work Company should concentrate on to improve efficiency?

Q18 (Hicks 2015:3)
How does the training affect your work?

Data 1 Collection Table (confidential field notes from recordings)



Data 2 Collection Table (field notes from recordings)

Key Findings from Data2 Collection	
Participants	Comments
Informant1 Head of Automation Department	"The color coding and the numbering in the proposal draft template is unclear. The explanations for the color coding would be nice to see in the proposal." "The evaluation of a process after the each step is important. In order to figure out, if this process is going forward as planned. On my sight, the evaluation need to be continuous and in practice, after every step. It provides a possibility to modify the actual approach after each step, if the chosen approach didn't work as planned. It is wise to evaluate how the project is going on during the process and not just after the final finish line, and then wonder the actual outcome of the process. Also, the process needs to proceed logically forward. The next step cannot start, until the previous step is finished." "I would like, that in Step1, phase 1.1 is opened more like a project plan for example. I mean that it is described as a project plan including the following elements: create time schedule, create objectives, create responsibilities, and book the necessary resources. Finally, all these need to be written out as a concrete project plan. This provides a possibility to evaluate the process between the steps and to actively follow the progress of this particular project. Too many projects in our company are failing and are not finished because there is no written plan on how to execute the project itself. If the plan is not clearly opened and defined in the beginning of the project, including scheduling and responding the tasks (for the next up-coming months or rest of the year), it is stupidity to look back at the end of the year and ask: "Did anything actually happen, did we manage to achieve any improvements or the desired results during this time?" " "Communication, communication, communication, during the whole project. It is of utmost importance to keep up continuous communication with the involved stakeholders. The ultimate aim is to show the importance of this project and to keep it on the frame during the whole project. People don't commit themselves without effective communication. Communication needs to be included into every step in this project." "Achieving common targets would provide rewards to maximum if the silos are broken during the pre-defined 'sti-interval' timeline." "Also the correct channel to communicate for the people needs to be defined at an early stage of this process. Considering communication, the new approaches in the company maybe aren't the best ones in order to reach people in the context of this project." "Project plan needs to be realistic with certainly enough time reserved for the project and each step. Great example from the other project: the time is resource and the project reserves before hand the necessary time needed from the involved stakeholders. If the project performs well, and faster than was planned, it starts to cancel those reserved resources and makes them available for other as soon as it is possible from the project point of view. This kind of approach will prevent lot of difficulties during the long-term projects." "The implementing phase is important. These kind of issues need to be communicated personally and not through the public channels. The implementing plan is important and it is a big part of this project. Nowadays, several ideas are coming from the stakeholders inside the company, which are just sent through an email, without a clearly defined plan, how to implement the idea. It is unrealistic to expect things to happen, without a valid implementation plan. Most of the projects fail because of the inadequate implementation plan or there might be not an implementation plan at all."
Informant2 Team Leader	"This is the kind of framework how this is done. This is a generic model that can work in many different organizations". "Hard to get a clear picture, how much each step will take time. Project plan should include some response times also" "Should there be included some mid-term reviews during the process? There should be more evaluation than only one in the end during the process. It would be nice to have more evaluation during the process or between the steps. Of course, there needs to be the final evaluation for the whole process cycle among the mid-term reviews." "Common targets should be mutual for all in our department and in our case, it means modifying the 'sti-target setting' and they need to be defined according to desired results that we want to achieve".
Informant3 Group Leader	"This doesn't concern directly to this thesis, but openness and common practices came up in the other development program which was performed this spring. These previous practices I mentioned, were wished and appreciated by our mechanics."