Adaptivity in program management

Identification of success factors for adaptive cooperation in program management

Mara Linssen

Delft University of Technology

TU Delft

AT OSBORNE

Adaptivity in program management

Identification of success factors for adaptive cooperation in program management

by

Mara Linssen

to obtain degree of

Master of Science
in Complex System Engineering and Management

at Delft University of Technology
to be publicly defended on 20 June 2024

Chair:	Dr. J.A. (Jan Anne) Annema
First supervisor:	Dr. J.A. (Jan Anne) Annema
Second supervisor:	Dr. M. (Martijn) Leijten
External supervisors:	Ir. A. Bertels & Ir. T. Kremers
Project Duration	February - June 2024
Faculty:	Faculty of Technology, Policy & Management, Delft

An electronic version of this thesis is available at http://repository.tudelft.nl/.

Cover: ICNG op de HSL made by Rob Dammers (modified by author)
URL: https://www.spoorpro.nl/spoorbouw/2023/03/31/uitrol-ertms-gaat-sneller-in-belgie-maar-prorail-trekt-eigen-plan/?gdpr=deny

TU Delft

AT OSBORNE

Preface

Before you lies the master thesis ”Adaptivity in program management” and with this thesis I am finalizing my studies at Delft University of Technology by achieving the master diploma for the programme Complex System Engineering and Management. The end of my studies also marks the end of my student life in Delft. Student life in Delft has enabled me to grow academically and personally. It makes me the person I am today. I am grateful for the opportunities I have had contributing to the Delft student community. In the past months, I have again learned a lot about conducting a master thesis research and myself as a researcher and individual. This journey in my graduation process would not have been without the help of various people.

Starting, I would like to thank my supervision committee for their support throughout the complete research process. I felt welcome at any time to pose questions, discuss detailed challenges and ask for feedback on written pieces. They emphasised that the master thesis was part of education and that learning was still a big part of this process. A space was created where I felt safe to make mistakes and where I could learn from these mistakes through the guidance of my committee. My first supervisor, Jan Anne Annema, has given me great support and advise during the entire process. The door was always open and I felt comfortable knocking on your door for only a small question. My second supervisor, Martijn Leijten, gave constructive and specific feedback that made me reflect on the master thesis's processes. He provided a fresh view on my master thesis.

Within AT Osborne, I am grateful for the guidance and support provided by Anniek Bertels and Tom Kremers. Our bi-weekly meetings helped to keep me on track and discuss challenges. Both of you have been extremely supporting as you have read many of my written chapters and provided feedback. Additionally, you provided me with critical notes and helped me specify my thoughts. During my time at AT Osborne, I enjoyed the possibility to further get to know the company and the colleagues, and other interesting projects. I especially enjoyed participating in the Ronde Tafel where we further dived in adaptive cooperation with several field experts. This showed the interests in the subject and I enjoyed the meaningful conversations I had this day.

Also, I would like to thank the employees from the ERTMS program for their support and help in completing my thesis.

Finally, I would like to thank my parents, friends and boyfriend for their support in completing my master thesis. They provided a fresh view, questioned what I did not think of, and we had endless discussions on challenges I had to overcome. Given advice, provided feedback and lots of love and hugs guided me through this process.

I now successfully completed my master thesis and am proud of the final result. I have made unforgettable memories during my time as a student in Delft. But now I am ready for the next step, I am excited for what the future will bring after graduation.

Mara Linssen
Delft, June 2024

Executive summary

Increased passenger travel and transportation of freight requires a well-functioning transportation network. To accommodate this need, large infrastructure projects are developed and funded by governmental bodies. These large infrastructure projects tend to have cost overruns and delays. These cost overruns and delays are partially caused by the complexity that the infrastructure projects have to contend with. This complexity is fed by uncertainties, technological features, many actors involved and an institutional context with legislation and policies affecting the project environment. Research on project management therefore had focused on the development of different tools and approaches to deal with this complexity and to support in the reduction of cost overruns and delays.

Currently, programs are developed to work on large infrastructural challenges. These programs combine several different projects to achieve an ultimate goal that cannot be achieved if these projects would be executed in isolation. The main difference between a project and a program lies in their objectives. A project focuses on delivering specific results within a defined scope, while a program aims to achieve a broader goal. Similar to projects, cost overruns and delays occur in programs as well. An additional level of complexity for programs is the existence of dependencies between projects performed as part of the program. The duration of the program, dependencies due to various to be performed projects, and uncertainties, prohibit program managers from predetermining the program planning and exact path on how to achieve the program's broader goal. As the exact approach cannot be predetermined and new insights will be gained on what the best approach is to achieve the broader goal, the program should be managed in an adaptive manner. It should be possible to adjust for newly arisen insights and challenges. Adaptivity is thus a core characteristic of program management. The various project dependencies and uncertainties require extensive cooperation between the involved parties. The projects have to be integrated and together fulfill the program's broader goal. Therefore, cooperation strategies deployed in programs should include means to cooperate in an adaptive manner. An adaptive cooperation strategy can possibly support in the reduction of cost overruns and delays.

There is limited literature available that discusses how program management can be successfully deployed and how adaptivity can be achieved in these cooperation strategies in programs. The existing literature highlights the influence of governance and organisational structure, and thus cooperation, on successful program management. However, it does not explain how these aspects can be used in an adequate manner to facilitate effective cooperation in programs. In conclusion, there is lacking knowledge on cooperation strategies that support adaptive program management.

In the Netherlands, programs are being executed, showing cost overruns and delays. An example of such a program is the European Railway Traffic Management System (ERTMS) program, that is focused on the implementation of a new digital track safety system for the railway network in the Netherlands. The program is highly influenced by uncertainties, regarding technological developments and European collaboration, many involved actors and an institutional context, with legislation concerning the railway system and its involved parties. To successfully complete this program and integrate the various projects, cooperation is crucial. Additionally, recent evaluation argued for a revision of the program approach. The evaluation called for a more adaptive approach that allows for better handling of new insights and facilitation of interim adjustments.

The societal relevance and academic knowledge gap demonstrate the need for studying success factors for adaptive cooperation in programs. This master thesis focuses on answering the following main research question:

What success factors could be included in a strategy for adaptive cooperation to support successful program management?

An exploratory research approach is chosen that combines an extensive literature study with a single case study. The exploratory research is focused on making a contribution to theory development. For the single case study, the ERTMS program has been selected, due to its complex environment and need for an adaptive cooperation approach. This single case study is focused on identification of

system elements that influence the ability to be adaptive, through a holistic approach considering the system in which the case is operating. By performing the extensive literature study and the single case study, success factors have been identified that influence the ability of a team to work and cooperate in an adaptive manner. By reflecting on the differences and similarities discovered between the theory and the case study, it was possible to answer to the main research question.

Due to the knowledge gap on adaptive cooperation strategies in programs, a theoretical lens is developed. This lens studied different academic research areas to discover factors that could influence adaptivity and adaptive collaboration in programs. The theoretical lens considers different success factors that could influence the adaptivity of a team in a program:

- Feedback loops.
- Sum of system elements, no individual considerations.
- Not all elements must be predefined, leave room for definitions and changes.
- Consider the stakeholders and how they influence the system.
- Actors have collective interests.
- Roles, responsibilities and information are shared.
- High level of trust between the actors.
- Facilitation of effective interactions and information exchange between the involved actors.

These factors that were found in the literature were compared to success factors that have been identified by the performed single case study. The single case study involved conducting 11 semi-structured interviews that focused on the cooperation of a specific team in the ERTMS program. After analysis of the interview data, different system elements of the collaboration were identified to see which elements influence the team's adaptivity.

The analysis of the interview data revealed three important system elements that influence this adaptivity within the team: Information, Culture and Organisational structure. When detailing the elements, different interconnections became clear. This resulted in the identification of perceived success factors for adaptive cooperation in the studied team.

For an adaptive cooperation strategy, an open and transparent team culture is aimed for. Listening to each other, understanding the team dynamics and valuing the diverse interests can help to achieving this culture. Additionally, it is argued that there should be a continuous building and sustaining of trust. Measures to assist are transparent communication and understanding of coordinated goals and interests within the team. These goals should be formulated based on collective interests to ensure all team members put in effort to achieve the goal. In addition to these factors, adequate information is required and can be achieved through selecting the right roles and responsibilities in the team.

Finally, it is observed that mandate and a formal structure, together specifying the operational framework, contribute to the adaptivity of the team. This factor was not expected to be one of the influential factors on adaptivity. The existing literature on adaptivity set the expectation that social processes and acts primarily influence the ability of a team to be adaptive. The identification of this factor thus highlights that achieving adaptivity in cooperation requires more than social processes alone, according to the interview data.

The success factors identified in the case study and those in theory were compared to discover similarities and differences. The interpretation of the results from this comparative analysis yielded several insights.

Many similarities between the case study success factors and theoretical factors resulted in a combined formulation of the factors. The merging of factors resulted in four success factors that specify the aspect to be achieved by the factor. In addition, measures that can provide guidance in establishing these success factors, were included in the factor formulation.

The theoretical factor, feedback loops, did not become evident in the case study data. However, as different theoretical sources argued the influence of this factor on adaptivity and the case study has

suggested the importance of frequent progress updates, therefore showing its need for feedback loops, the factor is still considered a factor to be included to achieve an adaptive cooperation in programs.

The case study success factor, mandate and formal structure for the operational framework of the team, was not mentioned in the literature search. However, the repeated mentioning of this factor by the interviewees, convincingly argued for its influence on adaptivity and thus that it could be used as a factor to achieve adaptivity if included in a cooperation strategy for programs. As this factor was not expected to be of influence on the adaptive cooperation, based on the existing literature on adaptivity, this insight is considered to be of academic value and can possibly make a contribution to theory development.

The various insights obtained throughout the research, lead to the final conclusion of this research and answering of the main research question.

The key insight from this research is the identification of a new success factor for achieving adaptive cooperation: *Mandate and a clear formal structure for the operational framework of a team*. The existing literature argued that adaptivity shows a clear link with social processes and acts. The identification of this factor shows that the first step towards adaptive cooperation is to set the rules for cooperation. The mandate and formal structure and thus the operational framework of a team first have to be designed before the social processes can be considered. Achieving adaptivity thus requires more than only social processes. This insight constitutes the academic contribution of this research and provides a specific measure for program managers on how they can achieve adaptive cooperation.

The other success factors formulated, focused on social processes, can as well positively influence the team's ability to be adaptive and could thus also be included in a cooperation strategy.

The main research question is answered as follows: to achieve an adaptive cooperation strategy it is important to set a mandate and formal structure, that determine the team's operational framework. This determined operational framework is necessary for the team to act in an adaptive manner. If done correctly, fitting the team's goals and tasks, other theoretical success factors, focused on social processes, could be included in the adaptive cooperation strategy to support this program management approach.

There was no information available on how adaptivity could be included in program management and on how cooperation could be organised to successfully complete programs. The success factors identified in this research therefore contribute to the theory development on adaptivity in program management and provide a start for additional research and theory development in this academic research field.

It is important to notice that these factors are a result of a single case study and a theoretical lens. The single case study enabled depth, but some case study characteristics might have influenced the final outcomes. Other programs might show other characteristics and therefore different responses to the success factors formulated.

The theoretical lens used, formulated by literature in other academic fields than program management, selected that search strategy to include all information available. However, due to this chosen search strategy, important literature may have been omitted. Therefore, it might be possible that the theoretical factors were incomplete and that it has affected the final results.

The research findings and thus the theory developed by this research is not yet well-grounded and its generalisability is limited. The research shows some influential factors and limitations to consider when evaluating the academic contribution of the study. The research findings might not yet be the perfect recipe for achieving adaptive cooperation in all programs. However, they provide a good starting point for additional research and provide guidance for program managers.

The research findings suggest different recommendations. To put this factors into practice, it is recommended to develop tools for programs specifically to achieve the success factors formulated. The program environment has an influence on the effectiveness of tools. Therefore, new tools for programs specifically should be developed to ensure the final formulated factors can indeed by implemented by program managers. Due to lacking theory, this can best be done in ongoing programs, where iterations can take place for the optimal tool development.

Also, recommendations can be made for further academic research. One important recommendation is to further study programs and their cooperation strategies. The single case study from this

research is influenced by its program characteristics and thus might have over- or underestimated the influence of certain aspects on its ability to cooperate in an adaptive manner. These additional case studies can provide valuable insights, regarding the influence of the now formulated factors. By doing so, it can contribute to the groundedness and generalisability of the theory developed by this research.

Contents

List of Figures

List of Tables

Nomenclature

Abbreviations

Abbreviation	Definition
CAS	Complex Adaptive Systems
CoSEM	Complex System Engineering and Management
CT	Commissioning team
EKB	ERTMS Kijfhoek - Belgische grens (ERTMS Kijfhoek - Belgian border)
ERTMS	European Railway Traffic Management System
EU	European Union
IO	Implementing Organisation
MRQ	Main research question
MT	Management Team
PD	Program Directive
SRQ	Sub-research question

1

Introduction

In the present era, there is an increased demand for travel, encompassing both passenger and freight transportation. Commuting to work, engaging in various activities, and ensuring the smooth flow of products through the supply chain all necessitate robust transportation networks. To accommodate these global trends, large infrastructural projects are being started (Van Ruijven & Tijm, 2023). These projects deal with a significant level of complexity. The primary focus of these projects is to efficiently deliver their intended scope within predetermined time and budget (Flyvbjerg, 2007). However, many large, complex infrastructure projects are known to have substantial cost overruns (Flyvbjerg et al., 2003; Herrera et al., 2020; Love et al., 2015). These cost overruns often result in delays (Rathi & Khandve, 2016). Due to the deployment of large infrastructure projects by governmental bodies, the cost overruns incur financial implications for society (Miranda Sarmento & Renneboog, 2017).

Not only in projects, but also in programs these cost overruns and delays frequently occur. A program encompasses multiple projects that are either executed concurrently or sequentially, collectively working towards a common goal that cannot be attained through isolated efforts (Lycett et al., 2004; Pellegrinelli, 1997). The main difference between a project and a program lies in their objectives. A project focuses on delivering specific results within a defined scope, while a program aims to achieve a broader goal (Weaver, 2010). Different projects are performed concurrently or sequentially, contributing to the achievement of this broader goal of the program. These projects lead to different interdependencies between each other (Weaver, 2010). An example of such dependency is the creation of a digital system that requires input from another yet to be created system. Without this input and integration of both systems, the digital system cannot be tested properly and cannot be delivered. These dependencies show that the projects have to be carefully managed in the context of the program and that cooperation is necessary to ensure the different projects can be integrated. This stipulates the importance of program management.

The highly changing and complex environment, affected by dependencies and uncertainties, in which these projects are realised, requires an approach that enables to reflect on developments and to react to them in a controlled way. The dependencies and uncertainties prevent program managers from predetermining the complete process of executing the program to achieve the program's broader goal. Additionally, new insights may lead to a desire for alterations in the approach and thus in how the goal is achieved. A program should therefore remain adaptive and open to changes during its execution. Instead of a predetermined, clearly set out path towards the broader goal, an adaptive approach enables the program managers to deal with uncertainties and newly gained insights during the duration of the program. It enables adjustments to be made for the optimal approach to achieve the program's objective.

Programs often lack the flexibility to adjust for new insights, such as technological innovations, stakeholder interference and a changing institutional context (Ministerie van Infrastructuur en Waterstaat, 2022; Rijkswaterstaat, 2022b). This lacking flexibility is one factor that causes delays and cost overruns where an adaptive approach could limit these negative consequences of arisen issues. In conclusion, adaptivity is an essential characteristic of program management to achieve program success. This highlights the need for program managers to incorporate measures in their program management approach to achieve adaptivity (Rijkswaterstaat, 2022a). Adaptivity contributes to the controlled exe-

cution of programs and their projects (Rijkswaterstaat, 2022a).

An example of such a complex program, dealing with cost overruns and delays and in need of an adaptive approach, is the European Railway Traffic Management System (ERTMS) program in the Netherlands (Ministerie van Infrastructuur en Waterstaat, 2023b; Vasudev et al., 2023) The ERTMS program is responsible for the implementation of ERTMS in the Netherlands, which is a new digital track safety system for the railway system (ERTMS NL, n.d.-a). This new system is developed to increase the safety on and around the railway tracks. Additionally, the system will be implemented throughout Europe and makes international travel easier due to interoperability of the system (ERTMS NL, n.d.-a).

The complexity of this implementation is fed by different uncertainties, temporal factors, and stakeholder environments (Vasudev et al., 2023). ERTMS can only function if both track and train are able to operate the new system, that itself consists of several subsystems, yet to be developed. The development of the subsystems is done by different parties. This shows that the several projects to be executed cause different interdependencies between parties and their projects.

The ongoing development of the ERTMS technology necessitates frequent updates, while the full extent of its features remains unknown, contributing to a sense of uncertainty. Additionally, the multi-actor environment should be kept satisfied and willing to cooperate, due to their pivotal role in the operating railway system. For program success, requirements should be correctly included in designs leading to the final outcomes and afterwards, correct integration of the different projects should be done. Therefore, program management of ERTMS is also focused on system integration. The dynamic environment, due to uncertainties and dependencies, that system is operating in, requires a system integration strategy to be able to adjust based on new insights. This emphasises the need for an adaptive approach to successfully manage the program.

These dependencies, the multi-actor environment and current selected program approach lead to different concerns and a specific challenge on cooperation in the ERTMS program (chapter 6). The various projects that show interdependencies, executed by the different involved parties, need to be aligned in time and fit each other for system integration. Cooperation between the involved parties to correctly integrate the different projects is thus essential. Given, the dependencies and uncertainties, a possible cooperation strategy should thus include elements for flexibility to account for any additional requirements, desired benefits, or new insights arising during the different phases of the program. The program can only be adequately managed if its characteristic adaptivity is also achieved to a desired level.

Project management has been studied often and many tools and strategies have been developed to assist in successful delivery of projects. However, as chapter 3 will argue, program management is hardly studied. The existing theory argues for the importance of governance and organisational structure, and thus the cooperation within a program, to enable flexibility to adjust, supporting successful program and project management. However, no specific recommendation is provided regarding the structure of the governance or organization. This lack of knowledge on adaptive program management thus leaves program managers without theoretical guidance to formulate their cooperation strategy. Consequently, they depend on what happens in practice and the lessons learned for decisions that yield the best possible outcome.

The current strategy employed in the ERTMS program shows cost overruns and delays and that it does not adequately include adaptivity in its cooperation strategy to deal with the complexity and dependencies of the program. Therefore, the ERTMS program is in need of an adaptive cooperation strategy to contribute to successful fulfilment of its program objective. This program environment and aimed deliverables highlight the need for the development of theory on adaptive cooperation strategies in program management. The ERTMS program operates in a specific environment, influenced by context factors, and therefore, a holistic approach is necessary for studying the program's cooperation strategy and its ability to be adaptive.

1.1. Research objective

It is concluded that there is a scientific and societal need for the development of theory on program management, and specifically for adaptive cooperation strategies. Cooperation is a crucial part of pro-

grams due to the dependencies and should therefore receive attention in the development of strategies that assist programs countering cost overruns and delays.

This study is focused on the development of theory for adaptive cooperation strategies that support good program management. It employs an exploratory approach, where it combines extensive literature study with a single case study, to develop an understanding of the system, in which the case operates, and the necessary factors to be included in a strategy for cooperation in programs to be adaptive. This approach and the selected research methods are discussed in more detail in chapter 2 and 4.

1.2. Relation with the Complex System Engineering & Management program

This problem is typically for Complex System Engineering and Management (CoSEM) students to study. The implementation of the new track safety system is important for increased international train travel and for an increased safety on and around the tracks. ERTMS is to be implemented in an operating railway system, which increases complexity. This means that the appointed program directive should carefully consider the technology of ERTMS, the involved stakeholders, the institutions and regulations and the interplay between the aspects for successful implementation. The implementation has to deal with various uncertainties and dependencies, making it a complex environment with difficulties to predict the progress on the implementation. A socio-technical approach is necessary where the interplay between technology, institutional context and social dimensions are aligned. Systems thinking is therefore applicable. ERTMS itself is a technical system and additional systems and software need to be developed for ERTMS can be operated. The different actors in the railway system, such as passenger and freight operators and infrastructure managers, have different interests in the railway system and thus also perceive the implementation of ERTMS differently. The multi-actor environment should be carefully managed to ensure all parties contribute to the transition to ERTMS and keep the railway system operating. Finally, the system is implemented in a operating environment where various regulations and institutions play a role. These should also be considered to fully understand the system. Consequently, this shows the need for a multidisciplinary approach to develop theory that can contribute to achieving adaptivity through a cooperation strategy in programs. This approach typically fits the CoSEM Master program.

1.3. Research structure

This thesis has the following structure. First, the research approach and research questions are discussed in chapter 2. Secondly, chapter 3 presents a systematic literature review that discusses the state-of-the-art knowledge on adaptivity in program management, identifying different knowledge gaps. Chapter 4 explains the performed research methods and data collection for answering the different sub research questions (SRQ). Additionally, further elaboration is provided on the interview methodology and coding process for analysis, which are part of a single case study. Chapter 5 presents the theoretical lens developed for this study by extensive literature study. This lens, displaying eight identified success factors for adaptive cooperation in programs based on existing literature in various academic fields, is compared with the results from the interviews. Chapter 6 and 7 focus on the single case study performed. Chapter 6 presents a short case study introduction on the ERTMS program for some additional context to better understand the system the program is operating in. Chapter 7 then presents the results obtained from the interview data and perceived success factors for adaptive cooperation in the case study. Thereafter, chapter 8 consequently compares the success factors from theory and the case study to identify differences and similarities. The differences and similarities are further interpreted and lead to a final list of success factors for adaptive cooperation. Next, chapter 9 reviews several factors that have influenced the final results, and discusses the limitations of the research methods. All information obtained in this research, finally leads to answering the main research questions and to formulating the conclusions of this research in chapter 10. This chapter also presents the practical implication and recommendations following the study.

2

Research Approach and Sub-research Questions

Chapter 1 showed the societal and academic relevance for studying the different success factors that enable adaptive cooperation in programs. It showed the need of a systematic and holistic approach to identify factors that could be enhance adaptive cooperation within programs. This thesis answers the following main research question (MRQ):

What success factors could be included in a strategy for adaptive cooperation to support successful program management?

The chapter elaborates on the selected research approach and the formulation of sub-research questions (SRQ) to support the MRQ.

2.1. Exploratory approach

The MRQ, the lacking theory and the societal need for information on adaptive program management, made it most suitable for the researcher to select an exploratory approach for this study. An exploratory research approach is focused on creating a better understanding of the problem and not necessarily to provide conclusive evidence (Dudovskiy, n.d.; Swedberg, 2020). Studies using this approach often result in a range of causes and alternative options for a solution instead of only one solution (Dudovskiy, n.d.). Exploratory research can function as base for conclusive research (Sandhusen, 2008). A possible limitation of exploratory research is that it generates qualitative information and interpretation of that data is subject to bias. Also, often a modest number of samples is included in the research, making it difficult to generalize it to similar problems (Dudovskiy, n.d.).

With an exploratory research approach, it is aimed to further understand the cooperation strategy in a program and how it influences the ability to be adaptive. These insights can support theory development on adaptive cooperation strategies in programs. For this research, a single case study was performed. The specific case studied provided valuable insights in the interaction of different aspects of the system it operates in and identify success factors for an adaptive cooperation strategy in this specific case. By choosing this method, it is aimed to explain the complex social phenomenon and identify patterns holistically. The discrepancy, between the functioning of the designed strategy in theory and practice of the selected case study, highlights the importance of considering the program's context factors and thus the need for a holistic approach.

2.2. Single case study

A single case study focusing on a specific part of the cooperation within the Dutch ERTMS program was used as part of this exploratory approach to identify success factors for adaptive cooperation strategies in this specific program. It is sometimes argued that a single case study lacks generalisation and thus has limited value for theory development (Flyvbjerg, 2006). The outcomes of a single case study provide insights for that specific context and it is debatable whether these results would also be

discovered in other contexts. An advantage of a single case study is its depth which can trump breadth (Flyvbjerg, 2006). The depth provides specific insights that might not have been revealed in case of broader studies with more cases (Yin, 2003). Therefore, for creating high-quality theory single case studies are more suitable (Dyer & Wilkins, 1991).

The complexity of the ERTMS program calls for an in-depth analysis of the case and therefore, depth is favoured above breadth. The single case study provided valuable insights in the functioning of the cooperation in this program to extract possible success factors for adaptive cooperation. The single case study also included verification to increase the reliability and plausibility of the final outcomes.

2.2.1. Scope of the case study

The implementation of ERTMS in the Netherlands is an extensive program and knows many aspects. Therefore, within the planning for this thesis, it is not possible to study the program completely. A specific scope was chosen for the single case study to focus on. This scope was chosen with the MRQ in mind and consideration of the progress reports (Ministerie van Infrastructuur en Waterstaat, 2023a; Ministerie van Infrastructuur en Waterstaat, 2023b). The exact scope also influenced the SRQs and therefore, this scope is further explained based on the “Programmabeslissing” (2019).

The scope focuses on the migration step ERTMS Kijfhoek-Belgian border (EKB). This step focuses on putting the section Kijfhoek-Belgian border, equipped with ERTMS, into service. In order to do so, the different subsystems need to be completed and integrated with each other. Systems that need to be finished are for example track conversion, the modification of all trains operating at this location, both passenger and freight operators, with the ERTMS software, training of personnel on trains and safety systems. At the end of the migration step, there should be a well-functioning transport system, with minimal hindrance for the users. A Program Directive (PD) is appointed for the program to facilitate and coordinate the different migration steps. For this specific migration step, a commissioning team (CT) is set up. Members of this CT are representatives from the different involved parties and the PD. The team, led by the PD, works on equipping the appointed track with ERTMS and a functional transport system at the end of the migration step.

EKB is one of the first sections to be converted in the scope of this program, making it interesting to study this case specifically. The success factors for adaptive cooperation in this migration step can provide insights for new teams to be organised and how the upcoming migration steps and CTs can include these insights.

Adaptivity is desired for the whole program to deal with the changing environment and achieve optimal solutions (Vasudev et al., 2023). The migration step of EKB has to deal with different delays, and therefore adaptivity is also desired in the approach for this migration step (Ministerie van Infrastructuur en Waterstaat, 2023b). The cooperation between involved parties is a crucial aspect of this migration step and therefore its progress. The complex environment for EKB to be implemented in, constantly influences the behaviour and positions of actors in the subsystem. To better understand the processes happening, regarding collaboration between parties, in the steps taken to coordinate this ERTMS implementation, this part of the program is chosen as scope for this research. The case study focuses on the functional governance and collaboration within the CT of EKB. The system, the CT is operating in, is considered holistically and by doing so, aspects influencing the adaptivity of the team are identified. With these insights, success factors are perceived that could ensure the team’s adaptivity.

2.3. Systems Thinking

To fully understand the socio-technical system the program is operating in and the system’s elements, systems thinking was applied. A system consists of elements, interconnections and purpose (Meadows, 2008). Systems thinking can help to understand the system structure and the dynamic behaviour, and possibly to reduce complexity (Arnold & Wade, 2015). It thus creates a holistic overview of the complex phenomenon and carefully considers all aspects and interdependencies. Other research perspectives often oversee the interconnections between components and neglect humanistic principles such as choice and intentionality, therefore missing crucial information to establish links between components and their functioning (Horrock, 2019).

As this study is interested in the interactions between involved parties, technology and institutional context, systems thinking helped to clearly set out the different interconnections. The ERTMS program is dealing with many dependencies and has a specific program environment. Therefore, the system

was considered holistically to prevent overseeing effects of connected system elements. Systems thinking was used to identify the system elements of the specific scope selected in the ERTMS program. These system elements and their interconnections are carefully considered. The interconnections highlighted various crucial aspects to consider when intervening in the system. Hence, systems thinking aided in a better comprehension of the system the ERTMS program operates in and thus the aspects to consider when intervening in this system. For project management and the consideration of the project's environment, systems thinking has been applied earlier (Morris, 2002). This methodology has been quite influential and impacted the perceptions on project management and its possibilities and limitations. For consideration of programs, a collection of projects, systems thinking was argued by the researcher to be suitable to develop a holistic understanding and gain new insights.

2.4. Sub Research Questions

To answer the MRQ required different steps to be taken. To further specify what is researched and what these steps entail, SRQs were developed. Each SRQ represents a step in the research.

1. What success factors for adaptivity and adaptive cooperation can be derived from literature?

A theoretical lens is created to define a list of success factors that arise from different areas where adaptivity and adaptive cooperation is achieved or aimed for. As there is no state-of-the-art knowledge on adaptive cooperation strategies in program management, a theoretical lens is developed based on adaptivity and adaptive cooperation in other academic research fields. This theoretical lens, for SRQ 1, is thus used to identify factors that could be included in a cooperation strategy of a program to ensure the team's adaptivity.

These success factors are used to compare with the case study and thereby analyse whether these factors are indeed significant and whether any additional factors could be formulated.

2. What success factors for adaptive cooperation can be identified in the commissioning team of ERTMS Kijfhoek-Belgian border?

SRQ 2 focused on the cooperation within the CT of EKB. Section 2.2.1 has already explained the exact scope of the research and therefore of SRQ 2. The commissioning team operates in a certain system to put EKB into service. The case has its specific complexities such as technological aspects and the multi-actor environment. Therefore, an overview of identified system elements was developed based on qualitative research, and the interconnections between these aspects. These aspects can be actor-related but also technology- or process-related. Systems thinking (section 2.3) was applied to answer this question. Answering SRQ 2 resulted in insights concerning the system, the team is operating in, and how different system elements influence the team's ability to be adaptive. The success factors perceived that followed from these system elements and interconnections showed what system elements are considered to be important for adaptive cooperation based on the CT of EKB in the ERTMS program.

3. What similarities and differences exist between the success factors from the theoretical lens and those observed in the commissioning team of ERTMS Kijfhoek-Belgian border?

The final third question linked the answers of the SRQ 1 and 2. The success factors from the case study are compared to the theoretical success factors for adaptive cooperation in programs. By doing so, it is aimed to find out whether these theoretical factors are indeed used in practice and whether the case study provided any additional information or new factors that could be added to those from the theoretical lens. The answer to this third question elaborated on the similarities between the factors and discovered possibilities for new success factors following the differences.

The answers to these three SRQs enabled the researcher to answer the MRQ. Now that a research approach is selected and all SRQs to answer the MRQ have been identified, it is interesting to study the existing literature on program management and adaptivity. The next chapter will present the literature review, identifying academic knowledge gaps.

3

Literature review

The introduction showed that cooperation and program management, specifically its characteristic adaptivity, are necessary for successful completion of programs. An exploratory approach is required to find out what success factors can be incorporated to facilitate adaptive cooperation in a program. This chapter focused on the identification of academic knowledge gaps based on the state-of-the-art knowledge on program management and adaptivity in program management. After identification of these knowledge gaps, the research methods are chosen in the next chapter 4.

A literature review was executed to develop a state-of-the-art understanding of factors that support successful program management and adaptivity in project and program management. Configuration management is often mentioned in project management to demonstrate how changes are managed and is therefore used in search for information on adaptivity.

3.1. Methodology and results

The literature review is executed by using the database SCOPUS. Based on the different search terms and manual assessment for relevance, articles were selected. Due to limited relevance of search outcomes and frequently cited papers, snowballing was applied as well. Table A.1 in appendix A shows an overview of the steps taken and resulting articles. The literature review contains the information of 11 selected papers.

The outcomes focus on the current knowledge for program management to achieve success. It also considers what is known on adaptivity in program and project management. Table 3.1 gives an overview of the key conclusions of the selected papers.

The synthesis on these papers is presented. Consequently, knowledge gaps in the existing literature are identified.

Author(s) and PubYear	Conclusion	Focus area
de Groot et al. (2022)	Program organization is crucial for the learning processes in a program and its management. Next to that, innovation cannot be completely developed at program level.It needs to dive in the project levels as well.	Organizational structure
Martinsuo and Hoverfält (2018)	Organizational management is responding to changes and therefore crucial for configuration management in programs. Goal-oriented configuration aims to develop new systems, services and infrastructure	Organizational structure
Pitsis et al. (2018)	Other than large projects, in megaprojects stakeholder engagement is even more important and crucial for project success. The longer duration and complexity requires additional planning and inclusion of stakeholders and their learnings.	Stakeholders
Whyte et al. (2016)	Development of configuration management is to manage change in projects. It provides a set of tools for maintaining integrity	Configuration management
Pellegrinelli et al. (2015)	Ambidexterity in program and project management opens up additional organization structures and how that can affect decision-making. Innovation, flexibility and experimentation should occur at the program level in defining the components. Ambidexterity can provide in turbulent environments for flexibility.	Organizational structure
Ali and Kidd (2013)	Critical success factors of configuration management. Configuration management plays a major role in reducing costs, minimizing risks and avoiding delays in development and operations. A well-functioning configuration management strategy is thus important for each project.	Configuration management
Moreira (2010)	Agile relies more on the strength of the teams and their interactions. This means that to include the right amount of agility in configuration management, organizational structure, culture and teams need to be considered.	Agility in configuration management
Greer et al. (2009)	Project management tools fall short in solving program management issues. The dynamic and interconnectedness between projects and their aspects is insufficient incorporated in these tools to be used for program management.	Management approaches
Grzegrzolka (2009)	Agility in configuration management becomes more popular. Inclusion of agile aspects in configuration makes the process incremental, cooperative and adaptive. Often used in software configuration	Agility in configuration management
Lycett et al. (2004)	Program management is flawed because it is assumed that program management is just a cumulation of project management steps and that there is one solution for all programs. Their complexities cause for a solution adjusted to the specific program.	Program management
Thiry (2002)	The main difference between programs and projects is the complexity and ambiguity of the issues. Performance-based, uncertainty-reduction project tools and techniques are better suited to deal with complicated rather than complex issues.	Program versus project management

Table 3.1: Overview of selected papers in literature review

3.2. Synthesis

The different selected studies show that literature on program management is very limited. The studies that consider program management argue for the importance of the organisational structure and of the possibility to learn, for the program's ability to be adaptive (de Groot et al., 2022; Pellegrinelli et al., 2015). The complexity and ambiguity of programs are argued to be reasons for inclusion of adaptivity and performance processes in the management (Thiry, 2002). The stakeholders must be sufficiently included for the program to be successful. Lycett et al. (2004) argues that programs are not a scaled-up version of project management and there is no one-size-fits-all approach for program management. Additionally, it is said that existing project management theories and tools inadequately address the complexities of large programs (Greer et al., 2009). They insufficiently incorporate the interconnectedness and emergent behaviours crucial for successful completion of these programs (Greer et al., 2009). Programs and projects thus indeed need a different strategy to bring them to success.

In project management, agile methodologies, enabling to adjust for yet unforeseen effects, have gotten increased attention over the years (Grzegrzolka, 2009). What can be concluded is that agility relies more on the strength of the team and their interactions. Combining agility and configuration management enables frequent change under control (Moreira, 2010). Again, it is stretched that the exact configuration management approach highly depends on culture and governance that exist within a company (Moreira, 2010).

Ali and Kidd (2013) researched different success factor groups for configuration management, that can support system integration: decision taker(s), execution strategies, performance monitoring, resource allocation, effective environment, communication and process boundary. These identified success factor groups again show how the environment, its stakeholders and organisational structure influence the success of configuration management.

3.3. Knowledge gaps

A critical success factor for program management seems to be focusing on the organisational structure and the stakeholders involved. The structure forms the basis for cooperation and is thus crucial for relationships and commitment. However, there is not one solution presented in existing literature. Stakeholder engagement, organisational structure and culture within a program thus require additional research.

Another knowledge gap that can be identified is that program and project management seem to be closely linked, but that they should actually be seen as different definitions with their own characteristics. Program management shows some shortcomings and also, the tools of project management are insufficient for this purpose. There could be additional research to what aspects of project management can be used for program management and where misalignment occurs to steer managers in a more effective direction.

The final knowledge gap considers system integration and agility. An crucial note is that this information is only found for project management and not for program management. Including agile parts in configuration management can provide frequent change while keeping it under control. Again, the governance structure and culture within a project management organisation influences the effectiveness of the configuration management strategy employed.

3.4. Concluding remarks

The literature review showed that the successful employment of program management and the incorporation of adaptivity in system integration approaches are yet insufficiently studied. Some aspects can be pinpointed as important for achieving program success and for achieving controlled change within the program: organisational structure, governance and program's complexity. However, no clear direction on how to overcome the challenges has been suggested.

For the ERTMS program, it is concluded that the current approach seems to be inaccurate for achieving a fully functional transport system, partially due to a lack in adaptivity in chapter 1. This chapter also argued that cooperation is crucial due to the dependencies and uncertainties. This need for cooperation is confirmed by the literature suggesting that organisational structure, governance and the program's complexity highly influence the program's success. These aspects are part of the cooperation within a program. The missing information on how to overcome these challenges, specifies

the knowledge gap for this research: the interpretation of a cooperation strategy that ensures adaptive program management for successful program delivery.

An in-depth study should be performed on the aspects influencing the cooperation strategy to see their effects on the program's ability to be adaptive. By doing so, the theory on adaptive program management can be refined, supplemented and adjusted.

The knowledge gaps identified and societal relevance together highlight the importance of the main research question. The next chapter discusses the chosen research methods and data collection to answer the formulated SRQs and MRQ in chapter 2.

4

Research Methods

The previous chapter showed the academic knowledge gap found in the selected literature. The knowledge gap considered the absence of cooperation strategies, defining the organisational structure and governance in a program, facilitating adaptive program management. This chapter presents the different research methods selected to answer the sub research questions (SRQ) and thus fill this knowledge gap. Finally, a flow research diagram is presented to show how the different chapters, research questions and methods are connected throughout the research.

4.1. Research methods and data collection

The different SRQs, from chapter 2, required varying research methods and data. This section discusses the chosen methods, data collection, and requirements.

4.1.1. Literature study

For answering SRQ 1, a literature study is performed. This method is of qualitative nature and is used to gain a deeper understanding of concepts and theories. Academic resources were found via the databases SCOPUS and Google Scholar. By also applying the snowballing method, it is aimed to include all relevant literature for the theoretical lens (Lecy & Beatty, 2012). The different studies and information sources covered different aspects and were carefully evaluated on applicability. The different aspects are evaluated on whether characteristics of a program or program management are recognized for this applicability consideration. A clear understanding is covered on different aspects of adaptivity, how adaptivity is already used in different system areas and how adaptive collaboration can be achieved. Insights on these aspects enabled the researcher to formulate different success factors for adaptive cooperation in programs. Finally, these theoretical success factors identified for adaptive management, adaptive systems and adaptive collaboration were used to compare to case study success factors in SRQ 3.

4.1.2. Single case study

To answer SRQ 2, the single case study is performed (already introduced in chapter 2). To support this method, desk research and semi-structured interviews were chosen as research methods. Again, both methods are of qualitative nature and used to gain deeper understanding of the socio-technical system in which the CT of EKB is operating for successfully commissioning EKB. To obtain information on the cooperation within the team, and to identify system elements, and their interconnections, interviews were conducted. Members of the CT and other involved stakeholders in the migration step were interviewed for identification of system elements that influence the cooperation within the CT of EKB and identification of the perceived connections between the elements. These interviews contributed to the holistic approach necessary.

For the interviews it is chosen to conduct semi-structured interviews. The semi-structured interviews included eight predetermined questions. By doing so, the researcher had sufficient time to pose additional unplanned questions that helped clarifying given answers or elaborations on earlier questions. The unplanned questions enabled the interviews to go more in-depth on subjects that the interviewee

brings up itself and thus can provide additional insights, whereas the predetermined questions ensure that comparison can be made on these answers (George, 2023). Experiences and perspectives from the interviewee got sufficient attention by deploying this method. The interviews contributed to an inductive approach that allows for identification of the system elements and their connections, without theoretical framework.

For semi-structured interviews, the interviewer should be flexible and adapt questions based on the subject's understanding of the topic (Kakilla, 2021). Interviews are susceptible to biases and very time-consuming and expensive (Alshenqeeti, 2014). The benefits however outweigh the disadvantages: interviews are personal, enabling respondents to open up more and create an interactive conversation. This in-depth information is desired due to the single case study and theory development this depth enables (Dyer & Wilkins, 1991).

Due to the lack of any existing theoretical framework, deductive analysis was not possible. Therefore, inductive thematic analysis was more suitable for the analysis of the interview data. This inductive thematic content analysis identified recurring patterns across the data without any predefined theoretical framework (Go Transcript, n.d.). Atlas.ti was selected as software to aid in the data analysis. Inductive thematic analysis started by a first round of coding to familiarize with the data. This was done open-minded and important aspects based on expert knowledge are coded. Small recurring patterns are extracted from these first coding step (initial codes). The initial codes are again used to summarize and formulate sub-elements. Finally, themes were identified. The identification of themes is done by summarizing the sub-elements (Damyanov, 2023). The coding process is part of systems thinking (section 2.3) that identified the different system elements and interconnections. This enabled holistic analysis of the system and its functioning. As the interviews are executed in Dutch, the coding and process of structuring is also provided in Dutch in appendix F.

Sample size

The semi-structured interviews each had a duration of approximately 60 minutes. The anonymised interview summaries can be found in appendix C. In a span of four weeks, the researcher conducted 11 semi-structured interviews with 12 interviewees and afterwards summarized them.

The members of the CT of EKB were invited to participate in the interviews. Each of the members was also asked whether they would recommend any colleagues that might be interesting for the researcher to interview based on their roles in the ERTMS implementation and migration step of EKB. This has led to the used sample size in the research. The program coordinator of the migration step and other contacts within the researcher's reach helped organise all the interviews. At the start of each interview, the interviewee was asked to sign, if agreed to, an informed consent form stating what happens with the data gathered and for what purposes. The to be signed forms can be found in appendix B. The interviewee received a summary of the interview as soon as possible to check and to provide feedback before publishing. This check also has been a way to verify if the researcher had interpreted the conversation correctly in the eyes of the interviewee. Opt-out was always possible, but none of the participants had withdrawn.

After analysing the interview data, the observations from the data were presented to the interviewees by means of a verification session. In one of the regular meetings of the CT, the researcher has presented its observations and perceived success factors. After the presentation of the results, the floor was opened for questions and discussion. By performing this session, the researcher aimed to check whether its observations are indeed as the interviewees experience the cooperation or whether the observations come as surprising. Minutes are taken from this meeting to save the results for analysis at a later moment. The verification process contributed to the reliability of the results.

4.1.3. Comparative analysis

Finally, theory and the case study were compared through a comparative thematic analysis. The analysis compared the success factors from theory and the case study in order to discover similarities and differences. The similarities contributed to the plausibility that the theoretical success factors indeed help in achieving an adaptive cooperation strategy for programs. The differences were considered to analyse the need for adjustments or additions in the final list of success factors following this research. These results and their interpretations, that answer SRQ 3, were direct input for answering the MRQ.

The MRQ is answered by formulation of a list of success factors that could support in achieving successful adaptive cooperation management in programs. The theoretical factors were used as starting point and altered and adjusted based on the similarities and differences from SRQ 3. Specific attention was paid to the factors that show academic insights obtained by the research.

4.2. Flow of the research design

The research has different phases. After going through these phases, the main research question can be answered. Each phase thus is a sub step that will answer a SRQ that eventually will lead to all information necessary to answer the MRQ. The research design flow diagram (figure 4.1) visualises all the phases of the research and their linked research method and SRQ.

The different steps for the research to be taken to finally answer the MRQ have been explained. The next chapter continues with the first research phase that is focused on the development of the theoretical lens to answer SRQ 1.

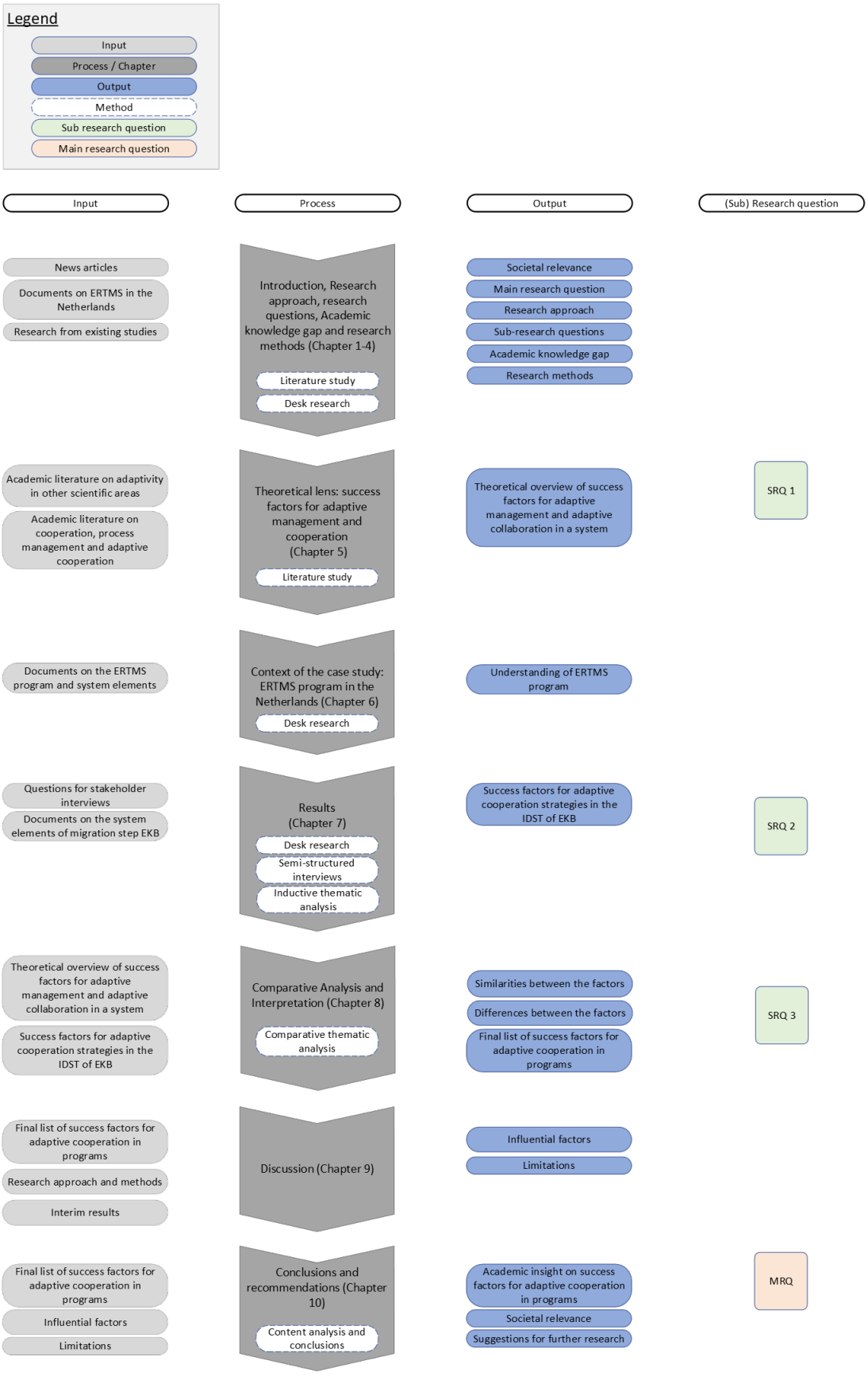


Figure 4.1: Research flow diagram

5

Success Factors for Adaptive Cooperation in Programs: A Theoretical Lens

Dependencies and uncertainties play a significant role in programs. Insights due to new information, based on these uncertainties and dependencies, might cause a desire to change course or make adjustments in the planning, for a more optimal solution, given the program's broader goal. These more optimal solutions can also contribute to cost reductions or speeding up processes. A strictly defined project scope hinders these adjustments and thus hinders the achievement of an optimal solution, due to missing adaptivity. Adaptivity can thus support in optimally achieving the program's broader goal and therefore, programs desire a level of adaptivity in their management approach. Especially in the cooperation mechanisms, as this is a crucial factor for program success, this adaptivity should be included (chapter 1).

As state-of-the-art knowledge on program management lacks information on adaptive cooperation strategies, a new theoretical lens was developed. This theoretical lens is created through in-depth study of existing literature into adaptivity in other research areas and adaptive cooperation. The chapter defined success factors for adaptive cooperation in programs based on this literature study.

The literature study is performed by searching different databases for academic sources, namely SCOPUS and Google Scholar. Appendix A.2 shows the different search strings used to find the literature regarding these topics. Only manual selection for relevance is applied, as the researcher aims to include as much information as possible. This process supported the creation of a holistic view on the literature available to extract the success factors. The success factors are identified based on recurring patterns within the literature. The final outcome of this chapter is a set of success factors for adaptive cooperation in programs, following the researcher's theoretical lens. The chapter answers SRQ 1:

What success factors for adaptivity and adaptive cooperation can be derived from literature?

5.1. Adaptivity in different research fields

Adaptivity is embedded in some existing systems. An example are complex adaptive system (CAS) which can be defined as "dynamic systems able to adapt and evolve in a changing environment" (Chan, 2001). These systems are often self-learning and adapt to changes affecting the system. Agents in this system show emergent patterns and are subject to different feedback loops throughout the system (Carmichael & Hadžikadić, 2019). These CAS require a holistic view due to the different system elements (agents) and their interactions (Carmichael & Hadžikadić, 2019). In order for the system to be adaptive, it is important that the agents exhibit feedback mechanisms and that these mechanisms are endogenous to the system itself (Carmichael & Hadžikadić, 2019). An agent in such system follows its own local rules and uses its own attributes in applying those rules. Rules activate different other actions and therefore provide feedback to other agents. Examples of CAS are political transitions, economy and ecosystems. These systems all show that the different elements interact in time and space and

adaptively react to actions from others (Bednar & Page, 2016). Individuals and their behaviours respond, react and thus adapt. These systems inherit properties due to interactions among components and continuous feedback between the system components (Levin, 1998). For these systems to be improved and managed, focus should be on more social acts that take the stakeholders into account (McDaniel, 2008).

For policy-making there is also some existing knowledge on how to include adaptivity. Policy making is highly dependent on the environment it is operating in (Walker et al., 2001). The system policies are operating in, consists of many actors and therefore of many adjusting behaviours. These actors learn and adapt based on policies, actions from others and information gained. Policies should therefore be able to adapt based on new behaviours in order for the policies to achieve the goals they are designed for. Strategies developed, for example by Walker et al. (2001), allow to cope with uncertainties and respond to changes over time, facilitating a learning process. By doing so, it is aimed to develop policies that are ”adaptive - devised not to be optimal for a best estimate future, but robust across a range of futures” (Walker & Marchau, 2003). There is continuous need for innovation, monitoring and improvement (Swanson et al., 2010). An additional factor policies need to take into account is its window of opportunity. The environment should be able to absorb the proposed policy for it to achieve its premeditated goal. Walker et al. (2001)’s often cited approach argues to first focus on making objectives explicit and understanding what is aimed to achieve. Policy success should be clearly defined. Also, the approach argues for the definitions of conditions for the policy to be adapted and thus have clear understanding for when to be adaptive.

Resilience can be linked to adaptivity to prevent stagnation. Resilience focuses on the maintenance of essential functions and thus also for a team or system to continue in newly occurred situations (International Energy Agency, 2015). Stakeholders play a crucial role in the identification of these essential functions (Connelly et al., 2017). Therefore, resilience-based approaches are often used to develop governance structures and policies, taking into account these different stakeholders and the system dynamics (Clement et al., 2024). This argues for a holistic view to understand the system and its possible resilience, with consideration of the system beyond its borders and also include the environment it is operating in (Fiksel, 2003). Examples of systems where resilience is stated to be of importance are energy systems, transport systems and health systems.

Resilience is a factor that specifies how quickly one can recover from disturbances, fostering flexibility and adaptivity (Tushar et al., 2024). For effectively studying a system’s resilience and improvements, it is suggested to split the system into subsystems and identify the interactions. This holistic view can help design actions for achieving resilient systems. Resilience is focused on continuation of the initial processes. Therefore, measures for resilience are designed, that focus on minimal disturbances to the initial processes, such as care and transportation of provisions, and on minimal impact on the quality standards (Foroughi et al., 2022). A system should be able to prevent stagnation through resilience but also to adapt and continue performing to its optimal capacity (Bukvić et al., 2022).

For project management some knowledge is available on adaptivity and adaptive tools. In almost every project, uncertainty and complex conditions challenge project managers to operate in an adaptive way. Traditional project management tools mostly focus on avoiding change and try to deliver projects within time, budget and with quality standards set. Most management approaches cannot deal with the dynamics and interdependencies of complex systems (Nyfjord et al., 2014). Agile project management (APM) enables the management of a project to better balance both predictability and flexibility. The agile method is considered as a project management approach for social processes (Howell et al., 2010; Whitworth and Biddle, 2007). For successful APM it is stated that a clear process for feedback is very important (Hass, 2007). The APM-approach is customer-centric and requires regular acceptance (Hass, 2007). APM consists of many iterative planning and development cycles, allowing a project team to constantly evaluate the evolving product and obtain feedback from different involved stakeholders. The agile management approach is often linked to Information Technology and software engineering domains where it undergoes a process of development, testing and adjusting. These tools often have a premeditated outcome but no clear path in how to achieve that, similar to a program. An incremental approach is suitable to shape this path. Four value principles were defined for APM (Agile-Alliance, 2001):

- Individuals and interactions over processes and tools.
- Working products over comprehensive documentation.
- Customer collaboration over contract negotiation.
- Responding to change over following a plan.

The value principles show that an agile approach is more focused on people than processes (Hass, 2007). As it is a more people focused approach, collaboration and cooperation between teams, team members and stakeholders receives additional attention (Masood & Farooq, 2017). This is in line with Howell et al. (2010) & Whitworth and Biddle (2007) arguing agility to be a social process. Shared learning is often a challenging task for organisations used to a traditional approach (Masood & Farooq, 2017). Agile approaches try to formulate part of systems that are independent and can therefore be worked on independently. This also argues for the need of an integration environment (Masood & Farooq, 2017). APM uses feedback loops to review and check whether the people involved still agree. This feedback loops enable adaptation and adjustment.

In line with agile project management, some project management perspectives arise that also focus on learning and demonstrate an interest in the underlying social process. Uncertainties in complex environment require more flexibility. Plans thus need to be flexible enough to allow for these changes (Pollack, 2007). These perspectives take into account many more aspects than only the traditional controlled aspects (time, budget and quality) (Karrbom Gustavsson & Hallin, 2014). It is related to the human side of projects and their management. Morris (2002) suggests to manage projects within their social context: management of projects. One has to take into account that projects have an environment that influences tools to manage the projects. Not all elements can be solely considered individually, but the sum of elements shows all interactions and management options. A final approach suggested is the prepare-and-commit approach by Koppenjan et al. (2011). This approach argued for broad task definition, functional development of requirements and facilitation of change where possible and open information exchange. However, this approach is challenged by system integration (Koppenjan et al., 2011). Other means have to be developed for system integration.

5.2. Adaptive cooperation

Cooperation strategies have been widely researched in academic fields other than programs. Each project, organisation and program chooses a specific form for the organisation and a governance structure. These decisions influence the way of cooperating with the various stakeholders involved. This means that these different forms also have an influence on the adaptivity of a team.

A suitable organisational structure for solving complex problems and ensuring commitment is a network (Ganeshu et al., 2024). These networks are formed with a high level of trust among actors. These actors are interdependent and have the freedom to experiment and innovate (Ganeshu et al., 2024). The basis of networks is thus complementary strengths, meaning each participant contributes with something the other participants need (Sorensen & Gudmundsson, 2010). Networks can excel when information is intensively exchanged, and when there is room for flexibility and learning. Networks might fail when there are insufficient number of participants and there is too little trust among participants (Sorensen & Gudmundsson, 2010). Governing networks is argued to be a complex task, especially considering the decision-making processes (Klijn & Koppenjan, 2016b). The network's characteristics result in an erratic process and therefore satisfactory results are difficult to achieve (Klijn & Koppenjan, 2016b). Networks require appropriate network management. Network management is defined as "all deliberate strategies aimed at facilitating and guiding the interactions and/or changing the features of the network with the intent to further the collaboration within the network processes" (Klijn & Koppenjan, 2016a). The purpose of network management is thus argued to be facilitation of interactions and information exchange between involved actors.

Networks require more than one actor for solving and dependency on each other's resources requires collective actions of several actors. Network governance is complicated due to the changing strategies of the actors and the unforeseen results of interacting strategies (Klijn & Koppenjan, 2016b).

Process management is suitable for the network structure and characteristics. Process management focuses on decisions to be made following a process of consultation and negotiation within other parties (De Bruijn et al., 2010). The result of a process therefore depends on the goals. Project management assumes problems and solutions to be reasonably within certain limits, and therefore only works in a static world. The dynamics world in which programs are being executed thus highlight the need for process management (De Bruijn et al., 2010). Process management takes dynamics of the environment into account and is thus better adjustable when changes occur (De Bruijn et al., 2010). In projects, decisions are made based on information and the assumptions that there is a right and wrong choice. However, in processes relations highly influence the decision-making and focus is on gains and losses (De Bruijn et al., 2010). Process management is used for problems that have to be solved or require change and consider unstructured problems. Each process has different type of actors, with different interests, resources and power. These differences cause for actors determining their consequent steps on their own position in the decision-making process and the position of others (De Bruijn et al., 2010). The interdependence and interests of actors highly influence the decision-making processes. In process management, it is suggested to go through decision-making processes in rounds (De Bruijn et al., 2010). Processes aim for consensus, commitment and/or tolerance. A good process thus requires the following aspects:

1. An open process.
2. Parties are offered security through protection of their *core values*.
3. The process offers sufficient incentives to ensure continuation and momentum.
4. The process offers sufficient guarantees that the desired results adhere to quality standards.

The strategic behaviour and unpredictable human factors are causes for the flexibility necessary and thus argue for adaptivity in the cooperation strategy. For successful process management, it is often favoured to not have central steering in order for the strategy to be effective. In order for these processes to be adaptive, focus is on relations between the actors and keep all parties interesting in participating (Pratt Miles, 2013).

Both process management and network management are discussed in the context of project management and not program management. This might influence the applicability of their factors for adaptive cooperation in programs. As it is stated that program management does indeed differ from project management, it cannot be assumed that these factors correspond one-to-one.

The characteristics of network and process management show various alignments with the complexities a program needs to deal with. A program is still a collection of projects but with a different final purpose. Programs with different involved actors show similarities with a network structure and the dependencies between actors align with the dependencies between projects performed by the different actors. The similarities seen with network management argue for its inclusion in success factors for adaptive cooperation in program management.

For process management, it is stated that it is suitable for network structures and their characteristics. As it is argued that a program shows sufficient similarities with a network structure, process management can also be applied here. The exact management tools might differ, but the network structure in a program also needs their processes to be handled carefully.

Another consideration is that network and process management are not necessarily linked to being an adaptive approach. However, it is stated that networks excel when there is room for flexibility and learning, aspects that are associated with adaptivity. When developing a management approach for these networks, it should include this room for flexibility and thus a degree of adaptivity. Also for process management, as it focuses on establishing a suitable decision-making process for networks, it should take this necessary flexibility for network excellence into account. Network and process management are therefore both argued to influence the team's ability to be adaptive.

Different organisational forms exists, but only one form was defined that incorporates possible elements that enable adaptivity. Constantine (1993) suggests an open paradigm, which is linked to adaptive collaboration. This paradigm states that the individuals in this organisational form are connected by collective interests due to negotiations and discussions. Roles and responsibilities are flexibly shared and

there is elaborate information sharing. However, this paradigm shows weaknesses as it is suggested to be inefficient and to lack smooth and simple operations (Constantine, 1993).

5.3. Success factors for adaptive cooperation in programs

The previous sections discussed the state-of-the-art literature on adaptivity in different research areas and adaptive cooperation. Following this available theory and applicability considerations by the researcher, a list of success factors can be identified for adaptive cooperation strategies in programs. These aspects included can thus be seen as essential elements to include in a strategy on cooperation to be adaptive in the system one is operating in.

- Feedback loops (Carmichael and Hadžikadić, 2019; Hass, 2007).
- Sum of system elements, no individual considerations (Fiksel, 2003; Morris, 2002).
- Not all elements must be predefined, leave room for definitions and changes (Agile-Alliance, 2001; Koppenjan et al., 2011).
- Consider the stakeholders and how they influence the system (Clement et al., 2024; Connelly et al., 2017; Karrbom Gustavsson and Hallin, 2014; Masood and Farooq, 2017).
- Actors have collective interests (Constantine, 1993).
- Roles, responsibilities and information are shared (Constantine, 1993; Masood and Farooq, 2017).
- High level of trust between the actors (Ganeshu et al., 2024; Sorensen and Gudmundsson, 2010).
- Facilitation of effective interactions and information exchange between the involved actors. (Klijn and Koppenjan, 2016a; Sorensen and Gudmundsson, 2010).

This list of success factors answers SRQ 1, identified through a newly developed theoretical lens, is used to compare theory and the case study. The next chapter provides some more details on the case study's context, considering the concerns and issues regarding the ERTMS program. This context information specifies the environment in which the commissioning team of EKB is operating.

6

The Context of the Case Study: ERTMS Program in the Netherlands

The migration step of EKB is one of the ten migration steps in the program for implementation of ERTMS in the Netherlands. Before studying the specific migration step, it is therefore useful to have some additional information for the context of the migration step. Several documents were used to gather information concerning this context, to be found in appendix E. This section provides some context on the ERTMS program to better understand the case study, its application and the program's challenges stretching the need for adaptive cooperation.

6.1. What is ERTMS?

ERTMS is a system for railway operations that can control, command, signal and communicate. The digital system is able to manage the railway operations and control the safety on and around the tracks. The European Union has set different goals for international travel and also for the interoperable European railway network. ERTMS is a system that should support these interoperability goals. Implementing ERTMS contributes to both the national government's long-term rail agenda as well as to the Trans-European Transport Network regulation goals.

In the Netherlands, there is currently an automatic train safety system (ATB). The transition towards a digital system is necessary for further development of the Dutch railway system. Due to the need for maintenance on the Dutch railway infrastructure, the implementation of ERTMS is chosen as part of this necessary maintenance. For the Dutch implementation, it is decided to implement ERTMS while the railway system remains in continuous operation, significantly increasing the complexity of the program.

6.2. The program directive and the program's organisational structure

The program directive (PD) is an independent organisation that has been realized to coordinate the implementation of ERTMS in the Netherlands. The PD is responsible for taking steps in preparation of implementing ERTMS and determining the planning for the complete implementation at an overarching scale. The PD sees itself as facilitator and coordinator of the program activities and not manager of the ERTMS solution.

The PD is not executing tasks to implement ERTMS itself. Therefore, it cannot determine the correct way of implementing ERTMS without consulting all implementing organisations (IO) and other stakeholders within or affected by the system. The IOs are the crucial, participating parties in the railway system such as the infrastructure manager, operators for passenger, freight and historical purpose, material owners and railway contractors (ERTMS NL, n.d.-b). Together with the IOs, the railway system will be equipped with ERTMS. The IOs need to implement ERTMS themselves, based on the planning and steps defined by the PD. These different stakeholders also have their own responsibilities in the program. The PD is in need of clear responsibility of tasks and therefore needs a secure information position in the cooperation between stakeholders. The commissioning teams (CT) are set up to facilitate

the cooperation between IOs, the PD and potential other involved actors on specific migration steps. During the realisation phase, of which commissioning EKB is part, the PD keeps a coordinating role in the coordination between stakeholders.

6.3. The goals of the ERTMS program and its approach

A specific approach is selected for the ERTMS program that should be able to facilitate the following processes. The PD is responsible for coordinating the implementation of ERTMS throughout the Netherlands with a specified scope and is thus mostly occupied with connecting stakeholders and system integration. Based on the preset goals, different migration steps can be identified that together should lead to fulfilment of these goals. The execution of these migration steps is done in collaboration with IOs. The IOs all have specific expertise and will be appointed as responsible organisations for different substeps in these migration step. At this moment, the IOs get quite some freedom to individually perform the tasks asked and negotiated in that collaboration. The different migration steps show various interdependencies. Some of these steps need to be finished for the others to continue. Continuous monitoring on these dependencies is thus important.

The PD is focused on system integration and coordination between the IOs to monitor and ensure progress on the different migration steps and their sub-steps. The PD develops top-requirements on strategic level and defines them into migration steps on tactical levels. CTs together with the PD determine their course in achieving the tactical goals. The IOs consequently continue working on these migration steps by executing different steps on operational level that combined should lead to fulfilment of the specifications on tactical levels. If this fulfilment is not achieved or slightly different from what was expected, the PD and IOs can again look at the tactical level requirements and decide whether adjustment is necessary. Cooperation between involved parties is thus an important aspect of the ERTMS implementation. The sector-wide approach and challenge require all parties to put in efforts to continue operating a well-functioning transport system.

6.4. Second Opinion report

Vasudev et al. (2023) performed a Second Opinion on the approach selected by the PD for the ERTMS program. The report brought forward that there are several issues with the selected approach and that it argues the approach to be insufficient for achieving the program's objectives within the timescales proposed. To improve the probability of program success, changes in governance, planning, risk management, technical and integration leadership, as well as in scope and cost control are suggested. The PD is therefore challenged to revise its approach.

The cost overruns and delays in the program and conclusion from the report that it is unlikely to achieve its objectives are a consequence of the program management deployed. The different aspects to reconsider in a strategy show the following concerns (Vasudev et al., 2023):

- Governance: different bodies are inadequately organised and do not meet enough to know what is going on. There is a need for steering at different levels in the program. This should enable to make deviations to ensure progress and momentum. [Page 19]
- Planning: an integrated program schedule is essential to obtain accurate feedback from IOs. Currently, the embedded float is often wasted by the time the PD identifies a potential risk. [Page 23]
- Risk management: a new strategy has been implemented to foster a shift in the risk culture and empower employees to voice concerns about risks. Clearly defining responsibilities and roles is crucial for enhancing the program's success.. [Page 24]
- Leadership: the IOs primarily make decisions about systems integration independently, while the PD lacks sufficient leadership in its role. As a result, IO projects are managed as a collection of separate projects rather than as a technically integrated whole-system implementation. [Page 36]
- Scope and cost control: improved budgetary control and a sharper focus on the defined scope are necessary. Adopting a proactive approach in defining the program's needs from the outset is desired, with less emphasis on seeking cost-saving opportunities at a later stage. [Page 45]

The aspects clearly show that cooperation and working methods are important to manage a program well and complete it successfully. Most aspects show that at this moment, information lacks and that action is often taken only after the fact when new insights are discovered. Additionally, it is seen that the PD has an passive attitude, awaiting the progress made by the IOs. An adaptive approach, that is focused on finding the best possible solution within the framework of the program at any time, can therefore play an important role in successfully accomplishing the program. Adaptivity, as characteristic of program management (chapter 1), is now lacking and should be tried to achieve through a revised strategy to support good program management.

6.5. Challenge for the ERTMS program

The second opinion report showed the need for adaptivity in various aspects of program management for successfully implementing ERTMS and thus for measures to include adaptivity in the program management. While reading the second opinion report by Vasudev et al. (2023), the “Programmabeslissing” (2019) and the progress reports (appendix E), the researcher recognized a specific challenge for the ERTMS program that would benefit a more adaptive approach.

ERTMS is an unknown system and not all effects of the implementation on the existing system are known. During the implementation of the system on specific tracks, new insights might be gained that affect the current plans and require adjustments. Due to these uncertainties, the teams should thus be able to deal with new insights. During the development of any sub-part for the ERTMS implementation, new insights may emerge, necessitating the consideration of the insight’s impact on the implementation across all interconnected elements. Integration of systems is crucial and insight or changes in sub-parts of the system need to be communicated as soon as possible between the different involved parties. This requires extensive cooperation. This cooperation should make it possible to deviate based on new insights in order to maintain progress and limit cost overruns and delays. Each migration step has its own uncertainties to deal with and specifications that require attention. Therefore, cooperation stays a crucial element for successful completing the program.

The challenge highlights the importance of cooperation and communication between the involved parties. The dependencies and uncertainties in the program stretch the importance of management approaches that focus on the governance of the program, and the cooperation and communication within the program to overcome these challenges.

Combining the challenge with the concerns identified in the second opinion report by Vasudev et al. (2023), the researcher concluded that the ERTMS program is in need of factors that it can include in its cooperation strategy to achieve this desired adaptivity. Adaptive cooperation focuses on enabling teams to timely identify problems affecting the planning and budget given the scope of the program, allowing adjustments to be made in order to maintain progress and work towards achieving the program’s goal. This adaptive cooperation can tackle some of the aspects that have to be reconsidered in the revised strategy.

The context on the ERTMS program provided, understanding of the system the teams are operating in, and identified challenge makes it possible to dive into the specific migration step of the case study and perform an in-depth single case study focused on adaptive cooperation.

7

Results

Chapter 6 showed that adaptive cooperation is crucial for continuation and successful completion of the ERTMS program and thus also for the migration step of EKB. This chapter presents the results of the performed case study through semi-structured interviews, which focused on the identification of success factors for adaptive cooperation in this migration step. Shortly, the governance, tasks and complexity considerations of the CT of EKB are explained. Thereafter, the interview data is discussed and the observations from the analysis are highlighted. The data identified three system elements and the most important relationships between their sub-elements are displayed. These sub-elements and relationships are used to formulate perceived success factors for adaptive cooperation for the CT of EKB. Finally, the chapter discusses a reflection from the researcher on the results.

7.1. Migration step EKB: governance and strategy

This section provides more detail on the migration step of EKB. The information is obtained by several publicly available documents (appendix E) and a one-off participation on a meeting of the CT by the researcher. Figure 7.1 visualises the involved parties and their tasks for migration step EKB.

The migration step EKB is performed by a commissioning team (CT). This CT is a composite group of representatives from involved parties who all have a task within the execution of the migration step. Delegates from passenger train operators in this area, departments from the infrastructure manager and, freight operators by rail are invited to these meetings, next to delegates from the PD. Each actor joining this meeting has a specific task and dependency on other actors in the migration step and thus needs to inform the other actors regarding the status quo of projects in this meeting. Additionally, the meetings of this CT can support a moment of intermediate reporting and feedback. Possible arisen issues or new risks are discussed during these meetings as well. It can then be discussed how to continue in order to achieve the migration step successfully. Due to the interdependencies and the railway system's section only able to operate with ERTMS when all parties finish their tasks at the same planned time, the execution phase also needs coordination and thus timely cooperation. From the PD, there is one appointed chair of this commissioning team and this person should facilitate and coordinate the cooperation and system integration for all tasks and parties towards the implementation of their assigned steps. The coordination between parties can highly influence the migration step's objectives. The cooperation strategy within the team should thus enable for the cooperation to go smoothly and achieve what the involved actors aim for. The formal governance should also support this.

The migration step of EKB has, next to the complexity of implementing a new system in a working environment, an additional level of complexity as it is one of the first track sections to be commissioned. This means that it is dependent on several other migration steps to be finished in time for EKB can be commissioned according to the planning. Any delays in earlier steps might impact the planning of EKB. Simultaneously, it is necessary for the CT to continue with the preparation steps for the commissioning. The step also has its own challenges that require sufficient attention. Stagnation should be prevented or limited where possible. To deal with these both self-encountered obstacles as challenges that are provided by other steps it is dependent on, the team should be able to act in an adaptive manner.

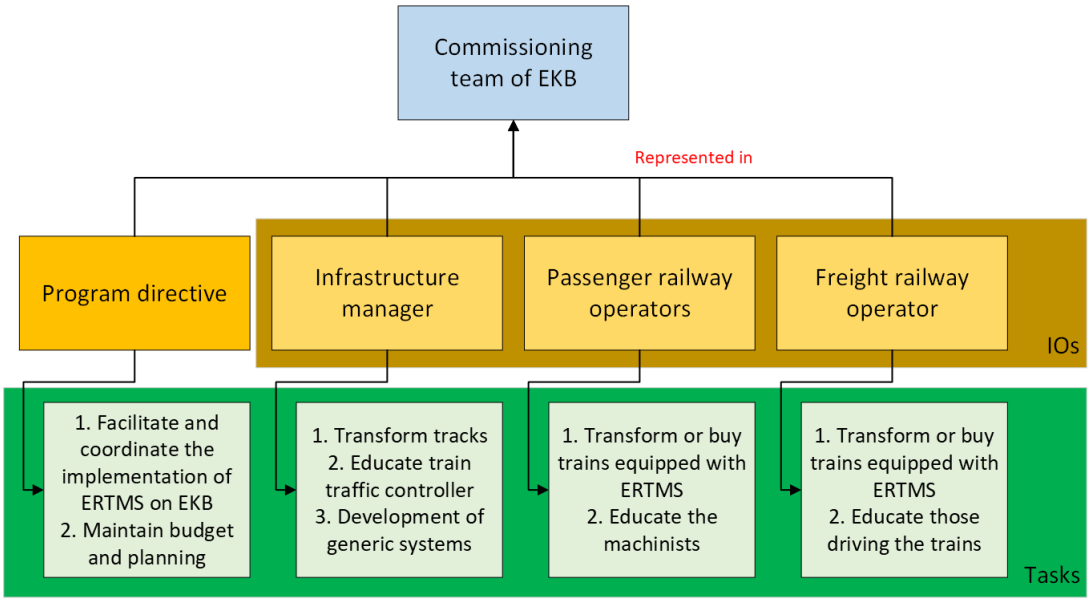


Figure 7.1: The commissioning team of EKB and their tasks

Interview number	Function
1	Representative (member CT)
2	Project manager (former member CT)
3	Project manager (member CT)
4	Representative (member CT)
5	Project manager
6 & 7	Project manager (member CT)
6 & 7	Manager of operations
8	Representative (member CT)
9	Chair (member CT)
10	Planner (member CT)
11	Project manager
12	Project manager

Table 7.1: Anonymised nterviewees

The governance strategy following the “Programmabeslissing” (2019) does not specify how the commissioning teams should communicate and cooperate. It is therefore interesting to focus on how this works in practice. As adaptivity is one of the targeted goals for the team, the researcher was interested in how the team works and whether this approach shows if the team can handle certain aspects in an adaptive manner. The interviews gained more insights in the functioning of the CT and what aspects influence the team’s ability to be adaptive.

The participants of the interviews are (formerly) part of the commissioning team of EKB or are involved in specific steps required for the commissioning of EKB. By not only including the team members, a diverse sample size is established to include the different perspectives on the collaboration in this migration step. Table 7.1 shows the different interviewees and the interview number linked to each summary provided in Appendix C.

7.2. Analysis

This section presents the observations and results from the interview analyses. The data has been coded and resulted in the observation of system elements and their sub-elements. The coding process and intermediate results of these steps can be found in appendix F.

Per system element, the sub-elements are discussed based on the interview data. Each system

element is closed by a short recap of the observations. The observations on the different sub-elements and the frequency of occurrence of used codes, supported the researcher in identification of the most important relationships. These relationships are used to formulate success factors for adaptivity in the CT of EKB and thus answer SRQ 2.

What success factors for adaptive cooperation can be identified in the commissioning team of ERTMS Kijfhoek-Belgian border?

7.2.1. Elements of the system

During the final step of coding, theme identification was performed on the identified sub-elements. These themes revealed three system elements influencing the cooperation within the team and ability to be adaptive: Information, Culture and Organisational Structure. These elements, and their sub-elements, are discussed in further detail based on case information with some paraphrases quoted from the interviews (with number linking to the summary from appendix C). The paraphrases are extracted from the interview summaries and thus not the exact words of the interviewee but paraphrased by the researcher. The paraphrases were originally in Dutch and translated for this section.

Information

Information is one of the system elements that emerges from the observations in the interviews and thus influences the CT's cooperation strategy and the ability to be adaptive. The CT has a certain way of exchanging information, which determines the system they are operating in. This subsection contains some observations from the interviews that consider how information plays a role in the cooperation of the CT of EKB. Table 7.2 shows the codes identified that provide details on the role of information in the CT of EKB and their frequency of occurrence. The sub-elements, that are formulated based on these codes, are discussed sorted by the frequency of the codes. The frequency provides information on the importance of the sub-elements.

Initial Code	**Frequency of occurrence**
Dependency on others	21
Goals	20
Interests	15
Dependency in the planning	12
Content of the information	11
Information flows	11
Uncertainties	11
Individual goals	9
Information for trust	5

Table 7.2: Initial codes Information

Uncertainty and dependency

- "With EKB, it is important that all previous migration steps are completed before EKB can be commissioned." [Interview 4]
- "Dependencies on other projects and interests in organisations are discussed, but the CT remains dependent and cannot proceed in every situation if those dependencies are not resolved." [Interview 3]

The interviewees highlight that dependencies highly influence the progress of EKB. It is dependent on previous migration steps and at the same time dependencies between involved parties impact the progress. The interviews reveal that uncertainties influence the possibility of the team to adapt. A wait-and-see attitude has been seen to await more certainty. Decisions are postponed, therefore limiting the adaptivity of the team.

Information is being shared between involved parties. The information can provide more certainty for other parties and inform them on certain aspects they are dependent on. However, the information shared is not enough to remove all uncertainties, and the dependency on each other also remains high because not all information is yet available.

Content, interests and goals

- ”A shared goal is crucial.” [Interview 1]
- ”You also noticed within the team that the goal was not the same for everyone.” [Interview 2]
- ”Because of the different levels of issues involved, the interests for each level must also be considered. If everyone is in the team with this mindset and works for it, the CT should succeed.” [Interview 9]

Most interviewees state that a shared goal is crucial for the effectiveness of the CT. When formulating their own sub-goals towards preset main goals, their own organisation’s interests also come into play. Their approach, how to achieve the goals, and formulation of sub-goals are therefore influenced by these interests. Due to the differently formulated sub-goals, information, being shared in support of achieving these (sub-)goals, is exchanged differently for each party.

It is stated that diverse interests and pace between organisations sometimes lead to ineffective communication of information. Effective communication of information is crucial to ensure that parties can continue on their processes and that stagnation, due to missing information, is limited. If information cannot be provided by any of the members, additional people are invited to the meetings of the CT to ensure that the involved parties have the detailed information necessary for continuing their steps.

The timeline of the CT is experienced differently by the involved parties. This influences the information that is shared, as people are well aware of the information important for their own steps to be taken and are therefore more likely to share information for the progress of their own step rather than for someone else.

Information flows through organisations and in the CT

- ”What happens to the information after the CT is not clear to every party.” [Interview 1]
- ”As we get further into operations, I think it’s good if content managers join/become part of the team more often to have more direct information flows and be able to interact quickly. That allows the team to work more adaptively.” [Interview 9]
- ”The members of the CT work well together in taking steps towards commissioning. Yet we don’t always have all the information we need.” [Interview 9]

Information flows through the organisations and through the CT. The information shared within the team should reach the correct departments that need to act upon this information.

The interviews show that it is not always clear how information is used from the CT. Much information is shared but not all parties are already in the same phase and thus not all information shared might be useful. The sharing of information contributes to smooth system integration if communicated with the right persons.

Information sharing for trust

- ”In the CT, trust was created by posing many questions to each other at the start of the process and getting to know each other’s views well.” [Interview 9]
- ”There must also be a mutual trust that a goal is being worked on together and so that there is no need to look deep into each other’s kitchens.” [Interview 1]
- ”Meanwhile, you see that things in the CT are often taken for truth and sufficiently researched when people share information and that questions are now mainly for clarification.” [Interview 9]

Trust is aimed to create through information sharing. The interview data shows that mutual trust is important. Mutual trust enables that it is not necessary to always want to gain extremely detailed information on each other’s choices and thus mutual trust can speed up the pace of cooperation. At the same time, it is felt that it is sometimes unclear what happens with the information of the CT in the organisations afterwards. Activities and working frameworks should be established together to work on this mutual trust from the beginning of the CT.

It is argued that the CT is functioning as necessary, that it enables information to be shared and that other organisations also can use this information for their steps in the implementation strategy. It is discussed that members of a team should carefully consider and learn to understand each other's interests and motivations to develop mutual trust.

Recap of sub-elements for Information
The interview data shows different sub-elements of the system influencing the system element Information. Uncertainty and dependency underscore the importance of information sharing. Hence, throughout cooperation, information influencing uncertainties and dependencies should be available to facilitate adaptivity. By finding mutual (sub-)goals based on corresponding interests, the information can be shared more effectively and at the right time for all parties. Information flows should be carefully designed to ensure it reaches those who are in need of the specific information. This contributes to having the necessary information at the right place in the right time, therefore enabling adaptivity. Finally, information sharing is necessary for building of trust. If designing a cooperation strategy that should enable adaptivity, these sub-elements regarding information can to be considered.

Culture
The culture within a team determines the functioning of a team. Each team requires a different approach and therefore, the culture should fit the team members and team goals. In the interviews, some aspects can be identified that have an impact on the culture in the team. Table 7.3 shows the codes identified that provide details on the role of the culture in the CT of EKB and their frequency of occurrence. The sub-elements, that are formulated based on these codes, are discussed sorted by the frequency of the codes.

Initial Code	Frequency of occurrence
Working method	28
View on adaptivity	27
Adaptive behaviour	21
Dependency on others	21
Trust culture	17
Adaptivity	13
Processes	12
Attitude	9

Table 7.3: Initial codes Culture

Working method

- "Then you need to look at what you can roughly incorporate in a schedule with certain level of certainty and leave the rest a bit more loose and open to developments." [Interview 3]
- "The operators has signed a cooperation agreement with the Program Directive to set frameworks for the cooperation." [Interview 6 & 7]

The working method focuses on the operational aspects and the processes and procedures to be followed. Within the frameworks of the method, the team develops part of its culture. The interviews argue that the team should feel responsible for and adhere to a mutual goal. The processes should thus be designed to fulfil this mutual goal. The planning used in the program should reflect the planning of all projects integrated and information should be shared by the individual parties to keep this planning up-to-date based on their (individual) projects. This procedure is crucial for the progress of the team. Another insight on the working method is that uncertainty is seen as a given in the ERTMS-environment and thus that a balance should be found for the team to operate when some aspects are more certain than others. The procedures should include aspects how to deal with this uncertainty. Finally, agreements have set some frameworks for the cooperation between parties to set a standard for this.

View on adaptivity

- ”Adaptivity is thus perceived very differently from one organisation to another but also within departments of organisations.” [Interview 3]
- ”If you make choices only after 2 years, it is limited adaptive. So there does need to be thought in your formalisation and decision-making processes to attach a certain time component to it.” [Interview 4]
- ”In some areas, it is possible to make targeted adjustments, but in some aspects this is less easy” [Interview 12]

In the interviews it is questioned when adaptivity is necessary and to what extent. Respondents suggest that it depends on the impact of the decision and the impact on the stakeholders. It is suggested that adaptivity will probably be more useful during the execution phase and not necessarily in the preparation phase. It is also stated that the term adaptivity is viewed very differently in the different organisations involved. These different views influence the wish to be adaptive or not and whether they show a willing attitude towards suggested changes. These attitudes influence the team’s culture.

Lastly, it is suggested that being adaptive requires a certain time component and that only changing course does not make a team adaptive. It should be able to do so in a certain period of time, which is influenced by the size and impact of the decision. The different views on adaptivity influence the culture of the team as the team members consider different options when unforeseen circumstances occur. This mindset influences the options they consider to be valid or useful for continuation on the migration step.

Dependencies from other parties

- ”There is thus a strong dependence of the operator to the concession granter for participation in the transition to ERTMS.” [Interview 6 & 7]
- ”The additional dependencies from the many parties, urges the team to handle occurred things in an adaptive manner.” [Interview 12]

The culture in the team is influenced by dependencies. Dependencies occur based on system integration but also due to (financial) regulations and impact the possibilities for adaptivity of some actors. The dependencies influence the progress made on different aspects of the parallel projects. Also, the CT is only to perform and operate on the dependencies within their power.

Dependencies have to be considered at any time. It is seen that decisions, that already have been made, limit the room for adjustments and thus that dependencies have to be taken into account when final decisions are made. The dependencies from the parties strongly influence the attitudes towards each other and the need for cooperation. To ensure positive attitudes throughout the cooperation process, these dependecies have to be carefully handled.

Trust culture

- ”This trust prevails within this CT. This is also where you have to be very careful because this is going to be very difficult to regain.” [Interview 9]
- ”For the CT to function well, it is important to really trust each other and work as a team.” [Interview 4]

Again trust is seen as a factor that influences the culture within the team and a factor that enables effective cooperation. The representatives should receive a level of trust from within their organisation. This trust can afford the representative greater autonomy, eliminating the need for constant reassessment of consent from all organisations they represent. Trust is also seen as requirement in the team itself for effective cooperation. The members trust each other and most things can be discussed as they know that the other members will not misuse the information given. Members of the team are committed to maintaining this trust. They keep conversing when uncertainty arises and building trust from the start of the team is highly valued. That provides a good starting point for all the challenges to come.

Recap of sub-elements for Culture
The interview data shows different sub-elements of the system influencing the system element Culture. The working method sets out processes and procedures for the team and its culture to operate in. These procedures should include aspects of importance for the whole team, such as a complete planning and acknowledgement of uncertainties. This method is affected by the different views on adaptivity, influencing the team member's attitude towards suggested changes by the participating parties. The attitude might influence the willingness to cooperate. The dependencies on other parties cause attitudes within the team towards each other. These attitudes are also fed by the member's interests. Positive attitudes and willingness to cooperate are important features for the culture in the team. The interviews also highlights the importance of a trusting culture within the CT, if adaptivity is desired. The uncertainties and dependencies require for the team to trust on each other's information. A trust culture enables smooth decision-making and contributes to adaptivity of a team. These sub-elements of the team's culture require attention when aiming for an adaptive operational framework for the team's cooperation.

Organisational Structure

The structure of the CT and the roles of the members within the CT and its own organisation are frequently mentioned during the interviews and thus considered of importance to further study the collaboration. The governance and organisational structure set the frameworks for the team to operate in and thus determine their possibilities. Table 7.4 shows the codes identified that provide details on the role of the organisational structure in the CT of EKB and their frequency of occurrence. The sub-elements, that are formulated based on these codes, are discussed sorted by the frequency of the codes.

Initial Code	Frequency of occurrence
Adaptive behaviour	21
Roles	21
Mandate	17
Representation	14
Formal structure	8
Role of the PD	4

Table 7.4: Initial codes Organisational structure

Members, roles and knowledge in the CT

- "I asked for additional experts on the topics to join the meeting to ensure the right knowledge en information was available." [Interview 8]
- "If you want to make these decisions at the table, other people should join the CT." [Interview 4]

It is argued that the CT is not yet complete with all necessary stakeholders and that the members also have their own goals in mind when discussing elements in the CT. The team has members that are less expert on the subjects discussed, and fulfil a representative role. Based on the members now, it is argued that additional information is necessary to make the right choices and that it might be that the current team cannot do this properly.

Formal position and mandate

- "The CT has no official place in PD governance and therefore no mandate to make decisions there." [Interview 4]
- "The fact that the CT actually has no ability to take official decisions itself is not a major obstacle, according to the interviewee." [Interview 8]
- "To be adaptive and take decisions, you need a mandate. You only get that the moment you have trust." [Interview 3]

The mandate of the team is further discussed. The team has no formal place and therefore no formal power to decide on any subject. The fact that there is limited possibility to do so, is valued differently. It is argued that mandate is necessary for a team to be adaptive and that when mandate falls short that the team should lobby more instead of decide for themselves. An assigned mandate to a team must take into account any legal mandates of other parties. Also, the roles as representatives have the consequence of having to go back to the organisations themselves to check whether they agree instead of for this person to decide based on the information it has at that moment. Mandate is also linked to trust.

Role of PD in CT

- ”However, it is certainly nice that the PD is present in the CT as an independent body. After all, the larger program goals also need to be safeguarded and overseen.” [Interview 8]

The PD is argued to have a valuable role in the CT and cooperation. The independence of the PD is crucial. Having the PD as member of the CT ensures that larger program goals are also safeguarded.

Recap of sub-elements for Organisational structure
The interview data shows different sub-elements of the system influencing the system element Organisational Structure. The members, roles and knowledge should fit the project’s phase and to be made decisions. If the correct knowledge is available due to correct definition of roles and selection of members, it enables the team to make decisions with the right information. Not only the right information should be available, but also the formal structure and mandate have to be set out clearly. Finally, the presence of an independent party overseeing the activities contributes to the team’s adaptivity. The consideration of these sub-elements regarding the organisational structure could contribute to the adaptivity of the team.

7.2.2. Interconnections

Now that there is an understanding of the system elements and what they entail based on their sub-elements, their interconnections are further studied. As the sub-elements provide more detailed information on the exact meaning of the system elements, the sub-elements are considered for defining the relationships.

During the coding process and identification of the sub-elements and final system elements, the interview data showed several relationships and overlap between these sub-elements. Some sub-elements showed a reciprocal relationship where changes in one sub-elements would also change another sub-elements. Also, the coding process showed that some sub-elements are separate aspects of the system but that they were often mentioned during the interviews together with another sub-element. These identified relationships are further specified and their effects on the team’s ability to be adaptive are considered. By considering the different interconnections and system elements, systems thinking is applied as explained in chapter 2. The holistic analysis of the cooperation system of the CT of EKB, through systems thinking, is crucial for determining a new strategy or designing success factors. Overlooking relationships might cause different effects than aimed for.

To select the most important relationships, the frequency of occurrence of the linked initial codes and overlap seen in the different sub-elements identified, were considered. The codes considering dependencies and uncertainties were disregarded as they do not necessarily influence the cooperation but consider the importance for adaptivity in the team operating in a program (chapter 1 and 6). Also, the sub-element, views on adaptivity, was disregarded as this is considered a consequence of team members, their roles and interests. These aspects were included in other codes as well. Table 7.5 displays the codes that occurred the most (14 or more) and thus are considered as important relationships. The sub-elements formulated by these codes are considered for identifying the relationships. These relationships were detailed based on the interview data. During the process of detailing these relationships, an intersection between the sub-elements ”Trust culture” and the sub-element ”Information sharing for trust” is seen. This sub-element was therefore added to the observations on the relationships, despite its absence in the list of most frequent occurred codes.

The different relationships are displayed in figure 7.2. It displays the reciprocal relationships between different sub-elements.

Initial code	Frequency of occurrence
Working method	28
Roles	21
Goals	20
Mandate	17
Trust culture	17
Interests	15
Representation	14

Table 7.5: The most frequent used codes

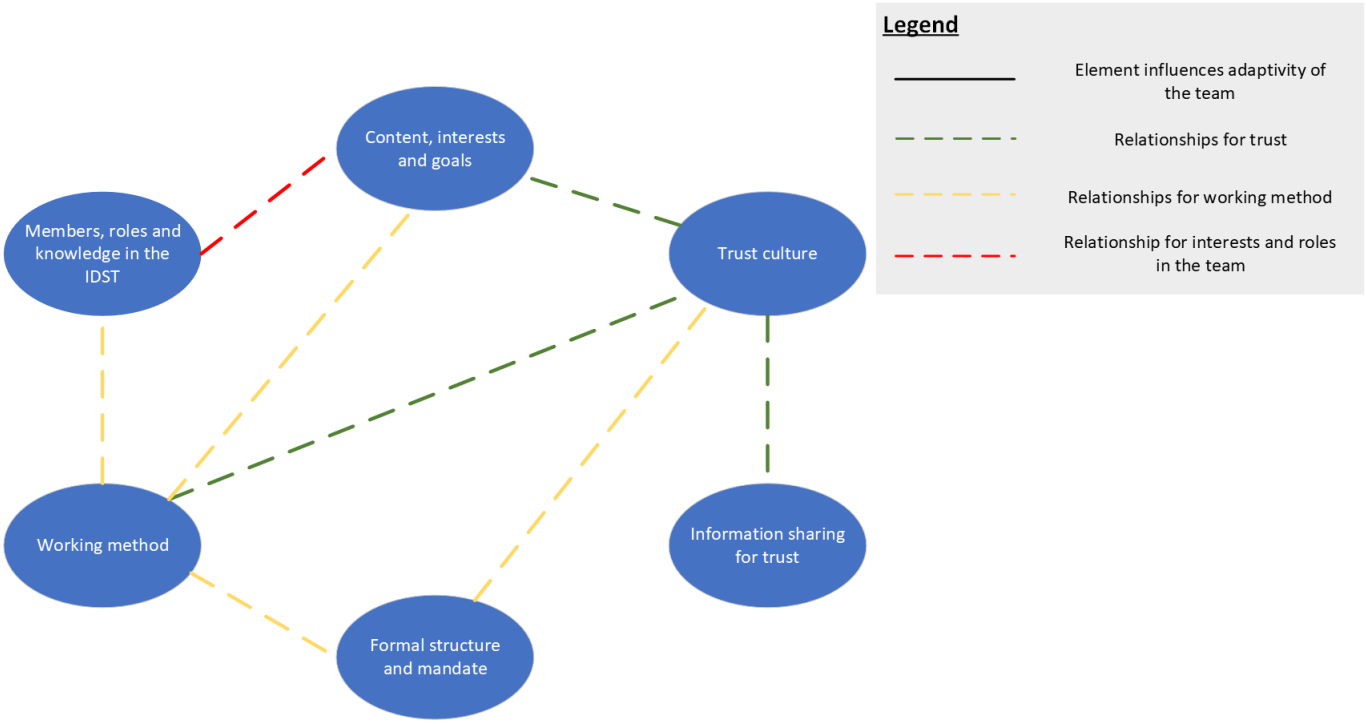


Figure 7.2: System elements and interconnections

Trust culture is influenced by interests, working method and information sharing

This relationship is marked by the green dashed lines in figure 7.2. Trust culture is influenced by many factors. The interests of the team members can differ and therefore, some decisions might impact these interests differently. If one member suggests an option, this could either be because it is the best for all members or because it fits its own interests best. The interests therefore influence the trust within the team. Information sharing is a possible measure to facilitate a more trustful environment. Frequent information sharing and openness to all questions can help create trust in a team. After a while, trust will replace the need for more information by members and thus reduce the information sharing a bit more, speeding up the process. Finally, the working method of the team influences trust. The interests and information sharing also determine part of the designed processes for the working method. This working method should thus fit all interests and provide in what is necessary for the members to trust each other.

Working method is influenced by interests, formal structure, team members and trust culture

This relationship is marked by the yellow dashed lines in figure 7.2. As shortly stated above, working method is influenced by many other factors. How the team will exactly function not only depends on the agreed formal structure and procedures but also on the interests of the members, the type of people and the trust created in the team. The formal structure sets out the formal powers of the team and to what rules and obligations they must adhere, and the working method sets out the frequency of the

team meetings. The procedures and processes of the working method should be carefully aligned with the mandate and formal position of the team. The team dynamics, influenced by interests, trust and human characteristics, determine how frameworks of the formal structure are interpreted and thus what the day-to-day practices of the team are. The human factor is crucial to consider when designing a working method for the team.

Team members and roles are connected with interests

This relationship is marked by the red dashed line in figure 7.2. The interests of the team members and organisations they represent highly impact the form of cooperation. The interests are represented differently based on the roles developed and deployed in the team. Additionally to the roles, the team members have their own characteristics and therefore influence team dynamics. The way these members carry out the interests thus also differs per member, influencing the overall functioning of the team.

The relationships discussed show how the different sub-elements affect each other and therefore, the importance of considering the relationships when evaluating the team's cooperation strategy on adaptivity, and not solely the sub-elements individually. These insights contribute to the holistic view of the system the team is operating in.

7.3. Success factors following the case study

The identified relationships showed how sub-elements are interconnected and thus how the sub-elements influence each other in the system the cooperation strategy is operating in, thereby influencing the adaptivity of a team. Based on the relationships identified, success factors were defined. These factors can therefore be seen as success factors for adaptive cooperation in the CT of EKB. Each success factor thus represents one relationship or a combination of relationships (table 7.6). This list of success factors answered SRQ 2.

1. Mandate and a clear formal structure for the operational framework of a team.
2. Continuous building of trust through transparent communication and mutual understanding of goals and interests.
3. Alignment of interests for formulation of mutual goals and intermediate goals.
4. Adequate available knowledge through roles and responsibilities for informed decision-making.
5. Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making.

Success factor	Represented relationship(s)
1	Working method and formal structure & mandate (one yellow dashed line)
2	Trust and information sharing, interests and goals & working method (green dashed lines)
3	Content, interests and goals and working method (one yellow dashed line)
4	Members, roles and interests & goals (red dashed line)
5	Working method and content, interests & goals, members, roles & knowledge and formal structure (remaining two yellow dashed lines)

Table 7.6: Success factors and linked relationships

7.3.1. Verification of results from the analysis

As stated in chapter 4, the perceived success factors are verified with the members of the CT of EKB and thus the majority of the interviewees. During one of their meetings, the concept-findings have been provided and additional questions are posed based on the findings that reflect on the results, whether they recognize the results and what they view to be surprising. The purpose of this verification is to test whether the research has indeed delivered results that are representative for the experiences of the interviewees themselves.
The verification session did not result in a vivid discussion but it merely resulted in two main comments:

- How do you interpret mandate? Mandate also has legal aspects and for some parties involved their mandate is legally defined. There must be significant attention for the mandate you wish to give the CT in comparison and context of other legal bodies and dependencies.
- It is mentioned that all information should be available by the researcher, but it can be questioned whether all information would not just increase complexity. Only targeted information would be best.

The comments made during this session provide some more detail for mandate and information sharing, which was added more explicitly in the results afterwards, but did not contradict the researcher's interpretation. Based on the feedback and focus points received, it was assumed by the researcher that the results correctly interpreted the interviews.

7.4. Reflection on results

The results from the interview data provided detailed information on the cooperation within the CT of EKB. The researcher shortly reflects on the results.

The literature study for identification of the academic knowledge gaps (section 3.2) showed the importance of organisational structure and governance for program success. The literature focused on in chapter 5, that showed different success factors on adaptivity and adaptive cooperation, discussed that the agile method is considered as a project management approach for social processes (Howell et al., 2010). Other project management tools and approaches had focused on development of tangible and measurable aspects such as budget control, planning and different organisational structures (Morris, 2002; Pollack, 2007). As agility is also considered to show a project's ability to be adaptive and change due to new insights, mostly social processes were expected to influence the adaptivity of cooperation strategies. However, the importance of the organisational structure and governance should not be forgotten. Another consideration is that it was argued that to improve and manage systems, such as Complex Adaptive Systems (CAS), focus should be on social acts and on stakeholder influence (McDaniel, 2008). Based on these considerations, the researcher had expected that adaptivity showed a link to social processes that affect a team's ability to be adaptive. These social processes can be consequences of the chosen organisational structure and governance.

Most of the identified relationships indeed considered aspects that focus on social processes that influence the adaptivity of the CT of EKB. The relationships focused on culture within the team and how different interests, roles and team member characteristics influence this culture and the sharing of information for the team to base their decisions on. The influence of these social processes on adaptivity was thus expected by the researcher.

However, one success factor surprised the researcher. The identified success factor *Mandate and a clear formal structure for the operational framework of a team* was not necessarily expected to impact the team's adaptivity. While the mandate and formal structure lay down the operational frameworks, that can ultimately influence the attitudes of parties and thereby affect social processes, these aspects are defined as starting point for the programs and are not open to interpretation by participants of the cooperation. The formal structure is a result of the decisions on organisational structure and reporting lines. The combination of the mandate and formal structure set out the strict operational framework that specifies the possible actions and tasks of the team. The organisation is often considered as mechanistic, where goal achievement is at the heart of the organisation and it is considered how to best coordinate organisational functions for that purpose (Pollack, 2007). This perspective suggests that the organisational structure, and thus formal structure and mandate, is a tangible, measurable aspect of project management. The identification of this factor, focused on measurable aspects instead of social processes and acts, for successful adaptive cooperation thus surprised the researcher.

This chapter analysed the interview data and resulted in a list of perceived success factors for adaptive cooperation following the case study. The next chapter focuses on answering SRQ 3. It compares the perceived success factors from the case study, with theoretical success factors and considered whether they align or whether the case has revealed any new success factors for adaptive cooperation in programs. By interpreting these differences and similarities, a list is formulated with success factors for adaptive cooperation in programs that could be applicable to other cases as well.

8

Comparative Analysis and Interpretation

The identified success factors from the case study (chapter 7) are compared to those following from the theoretical lens from chapter 5. This chapter focuses on the similarities and differences between the success factors from the case and those from the theoretical lens. Afterwards, the results from this comparison are interpreted to discuss the obtained insights from the comparison. The chapter thus answers SRQ 3:

What similarities and differences exist between the success factors from the theoretical lens and those observed in the commissioning team of ERTMS Kijfhoek-Belgian border?

8.1. Comparative analysis

To compare the theoretical success factors with those identified in the case study, comparative thematic analysis was performed. This comparative assessment explored whether the characteristics of the success factors observed in the interview data correspond to those of the theoretical factors. The comparison resulted in three aspects: factors that intersect and thus show similarities (1), factors only in theory (2), factors only in the case study (3). Figure 8.1 visualised the three aspects. Each aspect of the figure is discussed in more detail.

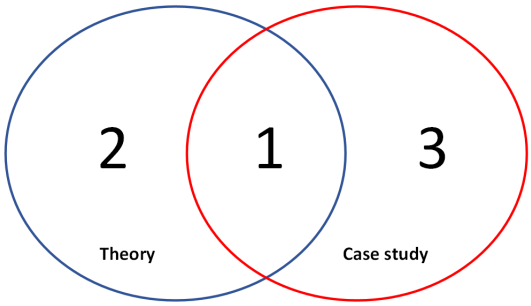


Figure 8.1: Three steps of comparison

Similarities discovered enabled the researcher to argue that it is plausible that this factor indeed helps in achieving adaptive cooperation, whereas the differences may cause the researcher to rethink the success factors from theory and maybe alter or add any success factors.

Figure 8.2 shows the differences and similarities between the theoretical and case study success factors. Arrows between factors highlight the existence of similarities between the factors, area 1 in figure 8.1. The green coloured factors in the theoretical success factor box are those that are not recognized in the case study, area 2 of figure 8.1 and the red coloured factors in the case study box are those that are not represented by any theoretical factor yet, and thus represents area 3 in figure 8.1.

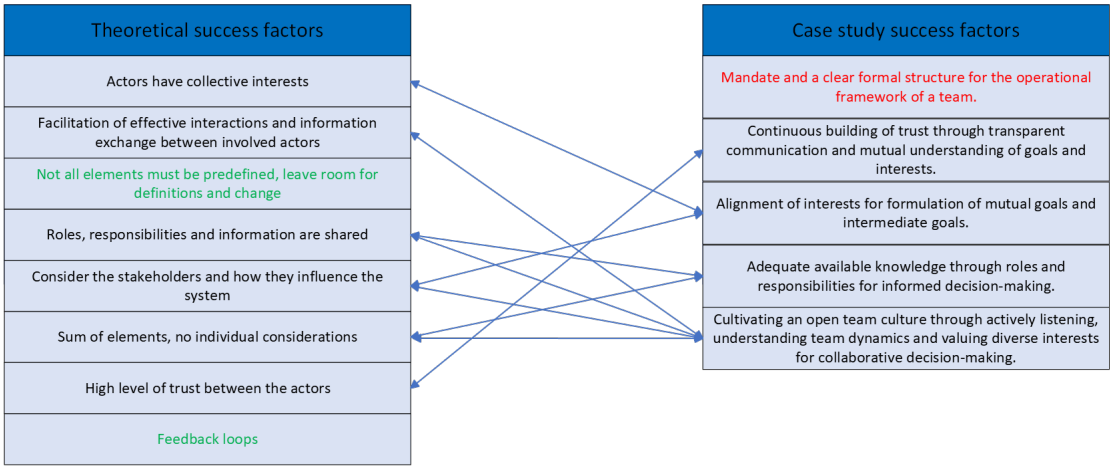


Figure 8.2: Comparative analysis

8.1.1. Analysis on the similarities between the factors

First, the found similarities and thus the area 1 in figure 8.1 are discussed in more detail. The similar success factors are presented and the links are explained per theoretical success factor with data from the interviews.

Actors have collective interests

Figure 8.2 shows that this theoretical factor shows similarities with one case study factor:

Alignment of interests for formulation of mutual goals and intermediate goals

The case of EKB shows that actors participate in this collaboration with individual interests (based on the organisation's goals) and that there are different perceptions on how to achieve the mutual goal set. The involved parties have different interpretations of the goals and how to achieve this. Within the CT of EKB, the members spend time to understand each other's motivations and the impact of (small) changes on the organisation's functioning. It can be said that in this case there are limited collective interests, but that it is tried to understand each other's interests. This understanding can contribute to identification of the context in which the team must operate and to finding the mutual goal for the team to pursue.

This success factors thus puts in an additional requirement. Next to collective interests, these interests should lead to the development of a mutual goal for the team to be adaptive.

Facilitation of effective interactions and information exchange between the involved actors

Figure 8.2 shows that this theoretical factor shows similarities with the following case study success factor.

Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making

Facilitation of effective interactions and information exchange between the involved actors is focused on ensuring the team can cooperate to its optimum. This facilitation takes place in several aspects of the cooperation given the interview data. The team is motivated to carefully listen to each other and understand each other's interests. There is an opportunity for questions for additional understanding of what another person is concerned about or represents. By understanding each other well, the likelihood of emerging behaviour is reduced. Establishing shared goals and keeping all stakeholders involved is another aspect of network management in the case. The PD actively tries to facilitate these interactions to ensure the team can cooperate as it wishes. It manages the network the team members are part of. Additionally, sufficient attention should be paid to understand the different team characteristics and dynamics due to the diverse team members and their own way of operating. In the CT, there is extensive information sharing. Updates are given and questions are asked to better understand the information

at hand. By bringing the team together in a safe environment, interactions and information exchange is facilitated.

The case study success factor provides some additional detail on how to manage the team carefully. The goal of this network management is to keep stakeholders involved and together function as a team and not as individuals.

Roles, responsibilities and information are shared

The theoretical factor shows similarities with different case study factors as can be seen in figure 8.2.

Adequate available knowledge through roles and responsibilities for informed decision-making

Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making

The interview data shows that roles, responsibilities and information are topics discussed very often. The separate roles in the team and linked responsibilities are discussed and show what the team members aim to achieve. Although these roles seem to be defined separately and are not shared, the perception of fulfilment of these roles is quite similar and thus one could argue that the final responsibility is shared but that roles on how to achieve that can differ. The sub-goals set are thus diverse and the roles aim for these sub-goals separately. Information is shared where possible. The data shows that the different team members do not see the operating environment as hostile or that they do not experience any mistrust towards members. They are willing to share information and also to go into further detail to establish a level of trust. However, the data also revealed that not all information is available for the team to operate as desired. In conclusion, the CT of EKB does try to share roles and responsibilities to together work towards a mutual goal, but the interpretation of these roles and responsibilities leaves room for improvements. Information sharing is indeed part of the collaboration strategy.

Both success factors from the case study focus on the elements of the theoretical success factors. Information should be shared and roles should fit the team's goals. This also means that roles and their responsibilities should be carefully designed and fit for what the team aims to achieve. The team should together feel responsible for finalising the project successfully. Again, some additional detail on how to achieve the success factor is brought by the case study.

Consider the stakeholders and how they influence the system

This theoretical factor shows similarities with two case study factors as well (figure 8.2).

Alignment of interests for formulation of mutual goals and intermediate goals

Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making

The interview data reveals that stakeholders are very important in the cooperation of the CT of EKB. Due to the different dependencies, the different stakeholders should keep communicating and be involved in the steps taken to commission EKB. For consideration of the stakeholders and how they influence the system, attention is paid to understand the motivations of the members and to become aware of each other's dependencies and the impact of certain choices. The CT meets frequently to ensure timely communication. Another way of considering the stakeholder in the CT is that certain parties have cooperation agreements (samenwerkingsovereenkomsten) that underline the commitment of effort between parties. It can thus be argued that stakeholder management is done in the case of EKB and thus that this success factor can indeed contribute to an adaptive cooperation strategy.

These case study success factors as well argue that carefully monitoring the stakeholders and their influence should be done to establish an adaptive cooperation within the team. Specifications on how to consider the stakeholders can be added based on the case study.

Sum of system elements, no individual considerations

Similarities are seen between this theoretical factor and two case study factors (figure 8.2).

Adequate available knowledge through roles and responsibilities for informed decision-making

Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making

The sum of elements represents the complete system and not only individual considerations. Especially in programs, this consideration is crucial due to the many dependencies. For the CT of EKB, it can be seen that they know the dependencies and act upon that knowledge. Information is shared early on and members are regularly updated to ensure that the timing of the elements that have interfaces can take this into account. In the beginning of the cooperation, the members operated more from a tunnel vision perspective. Later, the team started to develop a more mutual way of working and identification of the impacts of decisions on the different parties. The role of the PD is important for this factor as it operates as independent party that keeps in mind the overarching goals that should be achieved by this step. It thus fosters the goals of the sum of elements. For the case of the CT of EKB, it can thus be argued that this consideration is very important due to the dependencies and impact of individual decisions. An independent role could support this factor, but there might be other options that can help for the team to set this focus.

Both success factors show the importance of establishing elements that support the team's goals. The team's goals and roles should at its turn be defined based on the sum of elements and not be an individual team goal. This mutual goal supports the shared responsibility of sharing adequate information.

High level of trust between the actors

The need for trust is recognized in both theory and case study. This theoretical factor shows similarities with one case study factor:

Continuous building of trust through transparent communication and mutual understanding of goals and interests

The case study argues the significance of trust for adaptivity of a team. The actors should be able to trust the information provided by team members and that they operate based on the mutual goals and interests and that they do not pursue any contradictory goals. In the team, attention is paid to develop a level of trust. Information is shared where possible, and members can pose questions for clarification. In this team, it was seen that over time, more information was considered the truth and additional information was often not necessary to make a decision. This shows the establishment of trust in the team. The differences in interests are high and therefore trust is a crucial factor in cooperation. The team is aware of the trust they have built together and argue that when new team members are added that this same process of trust building needs to take place. For the case of CT of EKB, it can thus be said that there is a high level of trust between the actors and thus that this success factor indeed can be seen as an important element of adaptive cooperation strategies for programs.

8.1.2. Theoretical factors not represented by the case study factors

This section provides more detail on the success factors that are part of area 2 of figure 8.1 and thus the theoretical factors that do not show similarities with the formulated case study success factors.

Not all elements must be predefined, leave room for definitions and changes

Figure 8.2 shows that this factor is not connected to one of the case study factors. Considering the interview data, the room for changes is disputable within the team. The team is aware of the need to be adaptive due to yet unknown elements and a changing environment. It also recognizes that some decisions, that have high sunk costs or large impacts on other elements, limit the possibility to be adaptive. Certainty provides a solid base for decisions, but that is limited for the CT of EKB. Not all aspects are considered as possibility for adaptive management. On the other hand, some aspects are deliberately left undefined by the team to ensure that there will be room for changes. So, for the case of EKB, it can be said that where possible, this room for changes is tried to safeguard but that the team also recognizes that certain elements need to be defined without any later changes. This success factor is thus applied in the CT of EKB.

Although the case study success factors do not show similarities, the case study has shown that the team does indeed try to leave room for changes and that it recognizes that some things will become clear later on. Efforts are being made to include the success factor in reality.

Feedback loops

The other theoretical factor that does not show similarities with any case study factors is the existence of *feedback loops*, displayed by the green coloured text in the theoretical success factors box in figure 8.2. The interviews reveal some information on information flows and the importance of regular information exchange on progress, but the existence of feedback loops does not become evident from the data.

8.1.3. Case study factors not represented by theoretical factors

Not all identified success factors from the case study show similarities with the theoretical success factors during the comparative analysis (area 3 of figure 8.1). This section thus considers the red coloured text in the case study success factors box from figure 8.2. This unused factor is studied in more detail.

For this study, one factor defined is not part of any success factors defined by literature. The factor is discussed in more detail to see why this can be seen as additional success factor for adaptive cooperation in programs.

Formal structure and mandate

The success factor *Mandate and a clear formal structure for the operational framework of a team* does not fit any of theoretical success factors but is mentioned often in the interviews. Mandate is suggested by the interviewees to be necessary for the team itself to make decisions. Without mandate, the team can only write down supportive information for others to make the decision. If mandate is assigned to the team, the team can make decisions itself based on their own information and this speeds up the process for any necessary changes to decide upon. As adaptivity is strongly connected with a time component by the interviewees, this mandate is thus necessary. The mandate and formal structure should fit the members of the team. For effective decision-making, one wants to ensure that sufficient and the correct information is available. Therefore, formal structure and the members of the team, with linked roles and responsibilities, need to be considered together. Those should fit the goals and tasks of the CT. For the CT, the limited mandate is not seen as too much of a hindering factor at this point. However, when the realisation and execution starts, it is argued that there should be a possibility to quicker make decisions and thus that the team requires mandate with sufficient knowledge in the team to make the right decisions. For the CT of EKB, the design of formal structure and mandate is time-sensitive and depending on the phase of the project. There should be sufficient attention and considerations on whether iteration is necessary.

8.2. Interpretation of results from the comparative analysis

The comparative analysis revealed differences and similarities between the theoretical success factors and identified ones from the case study. This section shortly reflects on the found similarities and differences and defines different success factors based on these reflections. Table 8.1 presents what factors from theory and the case study are used to formulate the final list of success factors. This table is a result of the different insights discussed.

8.2.1. Interpretation of similarities

Many similarities are seen between the theoretical success factors and case study success factors. The comparison of these factors resulted in insights that the case study factors often can add some specifications and possible measures on how to achieve the theoretical success factors. With this information, the success factors can be made specific and provide guidance for the program managers how to implement the factors in their cooperation strategy. This contributes to the practical implication of the research results.

Two theoretical aspects showed similarities with the same case study success factors. These similarities showed the influence of both factors on adaptivity and also, the case study factors provided some additional information on how to achieve these aspects with extra details. When reconsidering the formulation of the success factors, these theoretical factors, *Roles, responsibilities and information are shared* and *Consider the stakeholders and how they influence the system*, can be combined and specific additions can be made based on the case study factors.

Another notable insight is that four of the six theoretical factors, that show similarities with the case study factor, discussed the open and transparent culture of a team that is necessary for achieving

adaptivity. This finding argues for the influence on adaptivity of this factor and therefore, inclusion in a cooperation strategy.
These two insights lead to the formulation of the first success factors:

(1) Foster team openness and transparency by recognizing uncertainties, understanding motivations and interests, acknowledging team member dynamics and considering stakeholder influence to anticipate changes.

The success factor *Roles, responsibilities and information are shared* was also linked to *Adequate available knowledge through roles and responsibilities for informed decision-making* which emphasizes the importance of information and roles in the cooperation to be adaptive. The first success factor formulated on similarities focused more on the culture affected by the roles and partially neglects the information sharing that was included in this factor. However, the success factors repeatedly stated the importance of information flows and sharing of information. These linked factors considered how roles can lead to different information being shared. The consideration of responsibility and information sharing, also suggested the importance of considering the program as a whole and not as individual projects. The third success factor *Sum of elements, no individual considerations* could thus also be linked to these factors. A new success factor is formulated based on these insights:

(2) Alignment of individual roles with collective goals by considering the broader context of the individual projects, thus of the program.

Actors have collective interests and *High level of trust between the actors* both showed a nearly one-on-one similarity with a case study success factor. This high commonality between theory and case study suggested the distinct influence of these factors on adaptivity in a cooperation strategy. The researcher therefore formulated the following factors:

(3) Based on collective interests, a mutual goal and sub-goals concerning how to achieve this goal can be defined by a team.

(4) Continuous trust building in the team through elaborate information sharing and efforts to understand the team members' motives.

8.2.2. Interpretation of the differences

Apart from similarities, the factors have also shown several differences that are important to highlight. The theoretical factors that were not represented by the case study factors have different interpretations. The factor *Not all elements must be predefined, leave room for definitions and change* was not represented by one case study success factor but was recognized in the interview data and thus applied in the case study. This insight suggested that the factor is indeed influential for the adaptivity of the team. The factor is therefore incorporated in a success factor formulated based on similarities:

(1) Foster team openness and transparency by recognizing uncertainties, understanding motivations and interests, acknowledging team member dynamics and considering stakeholder influence to anticipate changes.

The second factor, namely *feedback loops*, was also not represented in the success factors from the case study. The interview data said very little about the existence of feedback loops in the cooperation. Consequently, the success factor has not been reinforced by the case study, reducing the plausibility of the factor to be of influence for achieving successful adaptive cooperation.

However, the fact that the factor was not resembled by the case factor does not argue that the factor is not influecing the team's ability to act in an adaptive manner. The case study explicitly discussed the role of information and the need for all involved parties to have the information necessary available. It is expected that the different parties take the information into account and possibly that the information is used for their own processes. As the team is not always completely up-to-date on the progress of all parties and lacks targeted information, it could be argued that the absence of feedback loops cause this. If the feedback loops are implemented, the different actors actively share their updates and progress, and what has happened with the information from the other parties. The absence of the factor in the case study, complemented with the interviews arguing the need for targeted information sharing, argued in favor of the feedback loops influencing the adaptivity of a team. In addition to the different theoretical sources demonstrating its influence, the feedback loops are argued to be of influence for an

adaptive cooperation strategy by the researcher. This factor remains the factor as defined in chapter 5:

(5) Feedback loops

Finally, one case study factor was not represented by the theoretical factors. The case study factor, *Mandate and a clear formal structure for the operational framework of a team*, is considered to be of significant influence for adaptivity in a team due to the interview data. The frequency of discussing mandate of a team during the interviews, and thus identification of an important relationships considering mandate, indicated its influence of the success factor on adaptive cooperation. Although, the theory did not include aspects on these factors, the interview data sufficiently argued the importance of the inclusion of the factor in an adaptive cooperation strategy. Based on the presence of this factor in the case study, the researcher reasoned that this factor could be included to achieve an adaptive cooperation strategy. This factor thus also remains as it was defined in chapter 7:

(6) Mandate and a clear formal structure for the operational framework of a team

Success factors from theory and the case study	**New formulated success factor**
Roles, responsibilities and information are shared Consider the stakeholders and how they influence the system Facilitation of interactions and information exchange between the involved actors Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making Alignment of interests for formulation of mutual goals and intermediate goals Not all elements must be predefined, leave room for definitions and change	(1) Foster team openness and transparency by recognizing uncertainties, understanding motivations and interests, acknowledging team member dynamics and considering stakeholder influence to anticipate changes.
Adequate available knowledge through roles and responsibilities for informed decision-making Sum of system elements, no individual considerations Roles, responsibilities and information are shared	(2) Alignment of individual roles with collective goals by considering the broader context of the individual projects, thus of the program.
Actors have collective interests Alignment of interests for formulation of mutual goals and intermediate goals	(3) Based on collective interests, a mutual goal and sub-goals concerning how to achieve this goal can be defined by a team.
High level of trust between the actors Continuous building of trust through transparent communication and mutual understanding of goals and interests	(4) Continuous trust building in the team through elaborate information sharing and efforts to understand the team members' motives.
Feedback loops	(5) Feedback loops
Mandate and a clear formal structure for the operational framework of a team	(6) Mandate and a clear formal structure for the operational framework of a team

Table 8.1: Formulated success factors

The interpretations considered the similarities and differences found between the theoretical and case study success factors. They led to different insights on the influence of factors on adaptivity and suggest possible adjustments of the earlier perceived factors. These insights are used to conclude on a final list of success factors that could be included in a cooperation strategy to ensure adaptive program management. This final list of success factors and reflections throughout the research enable the researcher to conclude on its main findings and contributions to academic purposes. The conclusion (chapter 10) answers the MRQ of this thesis. The next chapter discusses different aspects of the research that have influenced these final results and the research's limitations.

9 Discussion

This chapter presents a comprehensive discussion on the reliability, validity and accuracy of research's findings on success factors for adaptive cooperation to support program management (table 8.1). In the research, a theoretical lens was developed to identify success factors for adaptive cooperation in programs based on existing literature on important factors that achieved adaptivity and adaptive cooperation in other academic research areas (chapter 5). Additionally, a case study was performed to identify success factors for adaptive cooperation that became apparent through empirical evidence (chapter 7). The comparison between the theoretical and reality success factors showed differences and similarities and gave several insights (chapter 8). The insights from the differences and similarities are further interpreted and led to the final formulation of success factors that could achieve adaptive cooperation supporting good program management (section 8.2).

As the results of the research are now established and interpreted, it is time to reflect. This chapter focuses on discussing the influential factors of this research. The specific case study and some assumptions and chosen approaches by the researcher might have affected the reliability and validity of the results throughout this study. These factors are discussed in more detail in section 9.1.

In section 9.2, the research's limitations are considered. These limitations focus on the selected methods. Finally, following the final results, the reflections on influential factors, and limitations identified, a conclusion can be drawn in the next chapter. This chapter also concludes on the practical implication of the research findings and presents recommendations for both program managers and academics.

9.1. Reflection on influential factors for the results

The previous chapters (5, 7, and 8) have shown different interim results to answer the linked SRQs. This reflection specifically focuses on the influential factors that were actively influenced by the researcher throughout the research or factors that are linked to this case study specifically.

9.1.1. Focus areas from chapter 3

Chapter 3 showed various literature that provided information on success factors for program management and the inclusion of adaptivity in program and project management. Table 3.1 displayed the various focus areas of these selected papers. The papers that provided information on program success all considered the influence of organisational structure.

The theoretical lens, on adaptivity and adaptive cooperation in programs, was developed through an extensive literature study. This literature study did not result in specific information about organisational structures and their influence on adaptivity and adaptive cooperation. Apparently, when searching for adaptive systems and adaptive cooperation in other academic research fields, this organisational structure is not considered. As adaptivity is considered an essential aspect for good program management and thus as an aspect for program success, it was expected that this organisational structure focus from the literature review in chapter 3 would be considered in other research areas for adaptivity and adaptive cooperation as well.

However, the key finding of this research following the case study focused on the mandate and formal structure. This factor is more in line with the organisational structure already pointed out by the literature review in chapter 3. This reflection shows that as adaptivity and program management are not necessarily linked in literature, success factors for achieving an adaptive program management approach might be overlooked. By only considering adaptivity and adaptive cooperation in other academic research fields than program management for the development of the theoretical lens, the existing information on success factors for programs had been neglected. If adaptivity is indeed considered to be an inherent characteristic of program management, then this information should also have been considered when formulating measures to achieve adaptive cooperation strategies to support good program management.

It can thus be questioned whether the theoretical lens indeed covers all information available on adaptivity and adaptive cooperation in programs. The selection process on what literature to include in the theoretical lens thus strongly influenced the identified success factors and therefore, also the final research findings that conclude on possible factors that could support good program management by establishing an adaptive cooperation strategy.

9.1.2. Selected interviewees

The members of the commissioning team of EKB were invited to participate in the research. They were also asked if they could recommend other individuals from their organizations who would be valuable to interview regarding the study topic. All organisations are equally represented in the commissioning team, making it a balanced group to interview.

With the addition of different other people to the sample size, a change in composition occurred. In the end, the sample size consisted of 12 people, where the organisations were represented differently. One organisation was represented by four interviewees, where another was only represented by one. Due to time constraints, and a satisfactory number of interviewees being achieved, the researcher had chosen to continue with this slightly unbalanced sample size. As the different organisations all represent different interests and therefore, might have different views on the current process in the team and program, the results may be somewhat influenced by the composition of the group of interviewees. Some experiences and opinions from this specific organisation might recur more often in the interviews. Because of the coding process selected, these recurring patterns were more likely to emerge as important elements in the collaboration, while it might have been solely one organisation's view. The unbalanced sample size might thus have influenced the perceived case study success factors and thus the final results.

Another consideration for the used sample size, influencing the final results, is that some interviewees were not directly involved with commissioning EKB but focused on more general transitions, that are also necessary for commissioning EKB. As there is a dependency from these interviewees on the information that is discussed in the CT of EKB, the researcher argued it to be interesting to also interview them. It enabled the researcher to also discover how the cooperation in the CT affected the general processes in the organisations itself. Due to the continuous processes, the information from the CT of EKB is important for them to consider. For these departments, it is also important to timely share insights and prepare the CT for possible adjustments necessary. The interviewees could not necessarily respond to any questions on how the team cooperates, but they provided insights regarding how information from the team and their department was exchanged and what they aimed to achieve by sharing this information. The interviewees were included as they provide valuable insights on how cooperation between involved parties continues after the CT and contributed to the holistic approach necessary to evaluate the cooperation in the CT of EKB. It should be considered that these people are not of the CT and might not have mentioned anything on their working method or culture, influencing the frequency of recurring patterns in the data. If these aspects were discussed less in these interviews due to the respondents selection, it might have influenced the perceived case study factors and thus the final results.

Both considerations thus show that the selection of the respondents, where the researcher has actively made decisions, might have affected the final results. This influential factor should taken into consideration when concluding on the final results.

9.1.3. Feedback loops

The success factor feedback loops derived from the literature by the theoretical lens in chapter 5 did not find a one-on-one similarity with the case study success factors for adaptive cooperation. In chapter 8, it has already been discussed that the feedback loops are still included in the final list of success factors that could be included in an adaptive cooperation strategy to support good program management. Although, the case study did not show the existence of feedback loops, the researcher concluded that based on the wish to exchange targeted information extensively, there would be a need for these feedback loops in the CT of EKB.

In this case, the fact that the success factor was not present in the case study demonstrated the need for it to be implemented. This demonstration is supported by the various insights gained from the interviews that the team requires extensive information sharing that is necessary for the different parties to continue with their to be performed tasks. The involved parties need to take the right information into account and report back to their own organisation that might react upon this information. Again, this reaction should be communicated within the team to consult the other involved parties and ensure system integration will be possible. This closes the loop. If this information is continuously exchanged in a transparent manner, uncertainty will be reduced and the parties are able to continue their processes while being dependent on one another.

Theory already showed that feedback loops influenced the ability of a team to be adaptive as it focused on continuously having all information available to decide on how to continue. While the case study showed an absence of this factor, the information obtained from the interviews rather argued that the inclusion of feedback loops in the cooperation strategy could positively influence the adaptivity of the team. The researcher therefore concluded to include the feedback loops in a final list of success factors, even though there had been no evidence of this factor influencing the team's adaptivity from the case study.

The researcher specifically looked for the purpose of feedback loops and identified alignment between the purpose of feedback loops and the perceived need for information exchange in the case study. Specifically this line of reasoning influenced the results as feedback loops is considered to influence a team's ability to be adaptive and important to include in a list of success factors. A more straight line of reasoning would have concluded that the factor was not reinforced by the case study and thus that its influence could not have been confirmed. Then, the factor might not have been part of the final list of the suggested factors to include to achieve adaptive cooperation.

9.1.4. Interpretation by the researcher

The interpretation of results into the final list of success factors for adaptive cooperation to support program management was affected by the researcher's decisions and assumptions. Two aspects of the interpreted results showed significant influence on the final results.

Role of information

The role of information is often discussed, as well as in theory as in the case study. Given the final list of formulated success factors from table 8.1, it was seen that information and the exchange of information is only mentioned once explicitly to facilitate trust building. This is notable as the case study revealed the system element Information as one of the three key factors that influence the adaptivity of a team. In this final list of factors, information is not mentioned explicitly by the different factors but many factors consider the influence of information and the desire to have targeted information and extensive information exchange.

The system elements Culture and Organisational structure are represented in the success factors 1, 4 and 6 from table 8.1. When having a closer look at the other three factors, it is seen that information plays a crucial role in these factors but that is not explicitly mentioned.

- Factor 2 argues that individual roles should be aligned with collective interests. The final aim of this factor is to ensure targeted information is shared where the roles in the team consider the information necessary for the program to continue and not solely their own projects, what might limit the information shared.

- Factor 3 considers that collective interests should be identified and that it supports goal formulation. The actors involved should actively share their interests and how certain elements of the program affect their interests and sub-goals. This factor is more focused on personal information

sharing, where factor 2 is focused on information sharing that follows the project execution per party.

- The final factor, factor 5, the feedback loops focuses on the information exchange and how information is used by other parties and again by the commissioning team to formulate the optimal strategy in achieving the program's and migration step's objective.

The researcher believes that information plays a crucial role in the formulated factors, but its implicit inclusion might downplay its influence for achieving adaptive collaboration in programs. As the theory and case study both argued for the influence of information on adaptive cooperation, it is important to explicitly consider the role of information in the cooperation strategy and carefully examine what the factors imply regarding information.

Balance in final list of success factors

Table 8.1 showed the formulation of success factors based on the interpreted similarities and differences discovered by the theory and case study. It is notable that factor 1 is a combination of six merged factors, while the different other formulated factors show a maximum of three merged factors. Factor 1 is considerably longer with more details, due to the merge of six factors. One could argue that the factors are therefore not balanced and that this factor might be considered more important than the others.

As mentioned in section 8.2.1 the factor *Cultivating an open team culture through actively listening, understanding team dynamics and valuing diverse interests for collaborative decision-making* showed many similarities with the theoretical factors and thus is considered an influential factor for the adaptivity of a team. This already argued for the importance of this factor to be considered for adaptive cooperation strategies.

This insight thus suggested that this factor is very likely to influence the team's ability to be adaptive, but did not necessarily argue that it is more important than others. The researcher aimed to formulate the factors as specifically as possible to clearly indicate how aspects can be achieved. The detailed description of the factor primarily explains how to achieve an open and transparent culture, rather than argue for its stronger influence on adaptive cooperation compared to other factors.

The researcher cannot assert that any one factor is more important than the others for achieving adaptive cooperation and thus sought to create a balanced list of factors. There was a trade-off between balance and detail. The factors now provide sufficient detail for practitioners to clearly understand what to work on. It should be noted in the conclusion that this list represents a balanced approach, with no single factor being more important than the others.

9.1.5. View on adaptivity

Involved parties participating in programs and specifically in the ERTMS program showed different interests and goals that support their working method. During the interviews, it was questioned how adaptivity was viewed by the different interviewees. Chapter 7 also showed that this view on adaptivity was an important sub-element of the culture within the team, affecting the team's ability to be adaptive.

Different views on adaptivity and when adaptivity is desired, influenced the team's adaptivity. Due to the different interests of the involved parties, their attitudes towards adaptive approaches depend on what can be gained. Agreement on when to be adaptive and to what purpose would possibly influence the team's ability to be adaptive.

It was seen that the interviewees agreed that to be adaptive, certain changes have to be made in a timeframe fitting the size and impact of the decisions. Only adjusting did not suffice the definition of adaptivity, in the respondents' view. There needs to be timely decision.

The interviewees showed different views on when to be adaptive. Adaptivity was mostly desired during the execution phase of the migration step. In that phase, information exchange on insights should allow for timely adjustments to ensure continuation and prevent stagnation. However, it was also seen that for some decisions in earlier phases, this adaptivity had already been necessary. As the views differed on when adaptivity is necessary, the team struggled during this period to achieve an interim result that satisfied all involved actors.

In this specific case, it was seen that views on adaptivity differed and that it could limit the team's ability to be adaptive. The interests from the different parties, and thus what is aimed to gain by being adaptive, influenced this view on adaptivity. When the program and migration step are considered to be

one task and goal to fulfil as a team where there are equal benefits and losses, the involved parties are expected to see adaptivity as a useful characteristic of program management enabling to achieve the optimal outcome. The now divided interests caused the actors to act in an adaptive manner only when it suits their interests and goals. Although, the interviewees stated the importance of adaptivity in the execution phase, it is questionable if individual interests are then surpassed and if they are all willing to work in an adaptive manner to achieve the optimal result for the sector and not for the individual parties.

The different views on adaptivity thus also impacted what is felt to be hindering adaptivity as a team and what is enabling adaptivity. If no adaptivity is desired, the team might function perfectly. Whereas actors in need of an adaptive approach can mention several aspects that hindered them from achieving adaptivity. The different views therefore influenced the set of perceived case study success factors. It is questioned whether these perceived factors would differ if the views were more aligned.

9.1.6. Context factors

A final reflection on the results is that the results are affected by different context factors. The case study was performed during an ongoing program and a CT that has already started to cooperate but still needs to cooperate for more years. Another important context factor to consider was the publication of the second opinion report a few months before the start of this research. Additionally, the progress reports showed a potential shortcoming in budget and delays at that time. Both factors possibly influenced the answers given during the interviews.

The second opinion report of Vasudev et al. (2023) was very critical and hard conclusions were drawn based on the current approach and feasibility of the program's objective through this approach. The conclusions showed as considered in chapter 6 that adaptivity was lacking and that the different organisational bodies should show a more adaptive approach to limit cost overruns and delays. It can be questioned whether the need expressed for adaptive approaches by the interviewees is indeed their own opinion or whether this is a consequence of the report arguing for its need in a revised strategy. It can also be questioned whether the interviewees completely spoke the truth regarding their perception of how the cooperation goes. The second opinion put the program under more scrutiny. As a result, small mistakes can quickly be magnified and may have caused a culture of fear within the team to raise all events honestly during the interviews.

Finally, the program is ongoing, and also the cooperation of this CT. The team will have to continue to operate in the coming years. This might have caused that the interviewees were not as free as possible to speak their hearts on the different aspects and processes experienced.

These two context factors of the selected case study might have influenced the answers given during the interviews and therefore, the perceived results following the interview analyses. It should be kept in mind that this specific context thus might have influenced the results in some way. This is a reason why the generalisability of the final research findings must be carefully considered.

9.1.7. Concluding remarks on the influential factors

The different influential factors are discussed and showed their potential influence on the final results obtained by this research. Throughout the research, the researcher has made specific choices and discovered various aspects. The influential factors mostly might have impacted the reliability of the research findings. Specific choices of the researcher, such as the composition of the sample size, the selection process for literature and line of reasoning, may have had an impact on the results. These choices, based on the researcher's expectations, can be seen as a consequence of researcher's bias and might have influenced the reliability of the final research outcomes.

Secondly, the researcher's choices in interpreting the results significantly impacted how those results are presented. These choices might have introduced bias and ambiguity, affecting the clarity and accuracy of the findings.

Finally, it can be questioned whether the interview questions are all questioned fully open, transparent and honest. The semi-structured interviews thus might not have led to insights that accurately reflect on the attitudes, experiences and opinions. This impacted the research's validity.

The different influential factors question the generalisability of the research findings. The conclusion considers the factors and concludes on the research findings while taking these factors and their influence into account.

9.2. Limitations

During the research, several limitations have become clear. This section reflects on the research methods and data collection used for this research. The limitations discussed are inherent aspects of chosen methods that might have impacted the (interim) results, and were not affected by the researcher's choices itself.

9.2.1. Research planning

A first important limitation for this research has been time. The ERTMS program is suitable for a case study. Due to the average time limit of six months of a master thesis, a specific scope and sample size for the interviews has been chosen. If more time would have been available, the scope could have been widened or more people involved could have been interviewed for additional insights. The planning enabled an in-depth study but more insights could have contributed to generalisability of the research findings. In conclusion, the researcher has obtained sufficient high-quality data to make underpinned arguments and draw conclusions.

9.2.2. Researcher bias

The introduction of the research method (chapter 2) already mentioned the interviews might be susceptible to bias of the researcher. Throughout the period of conducting interviews, more information was gained by the researcher, as it had experienced all interviews. Any additional questions that could be posed during the interviews were influenced by the information already obtained. Aspects that stood out to the researcher might have received more attention in the interviews yet to come.

Additionally, the interviews were summarised for the thesis and therefore, the researcher was able to select the aspects of the interviewed it valued most to include in the summaries where other aspects could be disregarded based on the researcher's bias. The summaries reduced the qualitative data to be analysed, but might have already filtered out some information and led to missing out on some insights. It is suggested to use the complete interview transcripts during the coding process to include all information obtained by the research method, therefore limiting researcher bias.

9.2.3. Single case study

Again, it should be considered that this study made use of a single case study as it aimed for an in-depth analysis of a specific context. This contributed to theory development. The now specific context of the migration step of EKB, with its dependencies, uncertainties, multi-actor environment and being part of the ERTMS program, might have influenced the significance of some factors. The depth obtained by the single case study consequently might have a strong influence on the final results. Breadth can be sought to overcome this limitation, by performing a multi-case study.

9.3. Contribution of the research

With a single case study and extensive literature study, this thesis has provided success factors that are argued to be influencing the adaptivity of a team cooperating in programs. This thesis addressed the knowledge gap on cooperation strategies that achieve adaptivity to support good program management.

The influential factors and limitations pointed out some aspects influencing the reliability, accuracy and validity of the research. Additionally, as the factors have not yet been tested more frequently in other cases, limited generalisation of the results is possible. The theory developed by this research is not yet well-grounded and accepted theory in literature.

However, the thesis provides a starting point for programs to adapt their strategy in a targeted manner to achieve adaptivity. It should be kept in mind that it is not yet well-grounded theory and that still adjustments and new insights can be revealed, impacting the exact influence of the success factors on achieving adaptivity in the cooperation. The success factors developed might thus not be a perfect recipe for achieving adaptivity, but can already be implemented. A first step is taken in theory development on adaptive program management, therefore aiding program managers to adequately manage their programs.

10 Conclusion

The different SRQs in the previous chapters have provided information to answer the MRQ. This chapter concludes on the research findings and what new insights are gained. The conclusion provides an answer to the MRQ. Additionally, it suggests a practical implication for how to use the research findings in practice for the ERTMS program. Finally, recommendations can be made on useful integration of the results in practice and on future academic research possibilities (section 10.3 and 10.4)

10.1. Success factors for adaptive cooperation in programs

There is lacking information on how adaptivity can be included in a strategy to support good program management. This limits the programs to deal with complexity and dependencies and thus can hinder successful fulfilment of programs. Specifically for cooperation, which is a crucial part of program management, there is a need to identify measures that could enable adaptive cooperation between parties. This study therefore focused on the identification of success factors for adaptive cooperation strategies in programs and answers the following question:

What success factors could be included in a strategy for adaptive cooperation to support successful program management?

The key insight of the research findings is the influence of one formulated success factor on the team's adaptivity. The factor *Mandate and a clear formal structure for the operational framework of a team* was not yet discussed in theory and surprised the researcher to encounter in the case study (factor 6 in table 8.1). This success factor shows the significant influence of the organisational structure on adaptivity and focuses on defining a clear formal structure and mandate to set the operational framework of the team. The factor focuses on a tangible and measurable aspect of program management and not on social processes and acts what had been expected based on existing literature. The researcher had not expected that strict rules on the organisational structure would enable adaptive cooperation. When setting up a team, careful thought should be given to the mandate that is attributed and the formal position within the program. These attribution decisions should consider the exact purpose and tasks of the team. The mandate should fit the team's tasks to ensure it can perform these tasks correctly. It is concluded that the measurable aspect formal structure and mandate, besides social processes, plays a pivotal role in the adaptivity of the team and that sufficient attention should be paid to its design. This factor should not be overlooked and can be seen as the starting point for adaptive cooperation, making it a crucial factor to implement in an adaptive cooperation strategy.

In addition to this key insight, five other success factors have been formulated to include in an adaptive cooperation strategy for program management. These theoretical factors were confirmed by the interview data and perceived factors from the case study. Factor 1 to 5 from table 8.1 could be considered for adaptive cooperation in addition to the mandate and formal structure.

The MRQ considers table 8.1 and can therefore be answered as follows:
To achieve an adaptive cooperation strategy it is important to set a mandate and formal structure, that determine the team's operational framework. This determined operational framework is necessary for

the team to act in an adaptive manner. If done correctly, fitting the team's goals and tasks, other theoretical success factors, focused on social processes, could be included in the adaptive cooperation strategy to support this program management approach.

The study aimed to contribute to theory development on adaptive cooperation strategies in programs. The research has been able to identify six success factors for adaptive program management. These factors both specified theoretical success factors derived from other academic research areas and identified a new success factor based on the case study. The newly identified factor strongly contributes to the development of theory where existing factors have been strengthened in reliability. Especially the new factor, mandate and formal structure, is of academic importance and contributes to theory development on adaptivity in program management.

10.2. Practical implication

For the ERTMS program, the research has two practical implications. First, the CT of EKB should include feedback loops in their cooperation strategy. The research findings establish that the implementation of feedback loops could positively affect the information being shared, making it more targeted. The feedback loops should ensure that team members regularly update each other on the actions taken en newly gained insights. The feedback loops should enable the team to act upon the new insights and act in an adaptive manner. By implementing feedback loops, it is aimed to support targeted information exchange that provides accurate decision-making by the team.

Not only feedback loops are argued to be implemented. The PD and CT of EKB should also establish the mandate and formal structure of the specific CTs and those to be set up in the program. This establishment defines the operational framework of the team and makes it possible for the team to work in a more targeted way. The team will then exactly know what is in their power and what information is necessary to ensure progress in the migration steps. The PD should already have a detailed look at what mandate and formal structure is fitting for the CTs in the different phases of their migration steps. The preparation and execution phases may require different actions from the team and thus a different mandate and formal structure. In all cases, the to be established mandate and formal structure should be carefully considered in the legal context of the program and (inter)national jurisdiction. The mandate and formal structure should fit the team's tasks and existing institutional context.

10.2.1. Practical implication for other programs

Due to the limited generalisability of the final research findings, because of the influential factors and limitations discussed, the final formulated factors cannot be directly implemented in other programs. Nevertheless, the interim results show a practical implication for other programs. The research has identified three main system elements in the cooperation strategy of the CT of EKB that influence a team's ability to be adaptive: Information, Culture and Organisational structure. When examining these main system elements at a more detailed level, thus focusing on their sub-elements, it is evident that they are strongly influenced by the characteristics of the program. However, when only considering these main system elements, they can provide guidance for the themes that should be carefully considered when developing an adaptive cooperation strategy. Therefore, for other programs, it is possible to focus on these main system elements, Information, Culture and Organisational structure, to explore opportunities for more adaptive collaboration. Programs should have a close look at these main system elements and how these elements interact with one another.

10.3. Recommendations for program managers

The final list of formulated success factors for adaptive cooperation in programs has been developed to contribute to theory and provide guidance for program managers to achieve this adaptive cooperation and improve their program management. Although the theory is not yet well-grounded, program managers can use the insights from this research:

1. For ERTMS, a specific recommendation can be made. The PD, as program manager of the ERTMS program, should implement these success factors in the cooperation strategy of another yet to be started CT. As the context of the migration steps will show various similarities, the factors

can be used to see if these factors indeed provide in the desired adaptive cooperation. By carefully monitoring the CT's progress and whether the team members are satisfied with the approach, the PD can further iterate in how to best include these factors in their adaptive cooperation strategy. By implementing these factors in another team and monitoring this process, it can further specify the cooperation strategy in order to successfully deliver the program and achieve the objectives.

2. As stated, the success factors are not yet well-grounded theory but can still provide guidance for the program managers to improve the program's functioning. To do so, some tools and management approaches need to be developed to implement the success factors correctly. It is therefore recommended that, given the minimal theory on program management, different tools are developed in ongoing programs that can support in achieving the success factors for adaptive cooperation. The tools could thus focus on aiding to understand team dynamics or recognizing uncertainty. As a program has a different objective than a project, the dynamics in a team might also be influenced by this objective. Additionally, the longer duration of programs compared to projects, might influence the team dynamics. As program characteristics differ from project characteristics, it is argued that program management needs its own tools. These developed tools can be shared between programs to support successful program delivery.

10.4. Recommendations for further academic research

Considering the outcomes of the study, influential factors, and limitations, four recommendations can be made for further academic research. These recommendations consider three themes: further detailing the new factors, additional case studies, methods, and scope.

10.4.1. Further detailing the new factors

The interpretation of the results showed that the researcher decided to include feedback loops and mandate and the formal structure of a team. The decisions to include these factors have also been based on the researcher's expert opinion, while the other factors were confirmed due to similarities between theory and the case study. Future research could therefore also focus on studying these aspects in more detail to consider its exact effects on the adaptivity of a team. This could also further specify how these aspects could be included in a cooperation strategy. It would be interesting to know what mandate is suitable for the different program phases. Also, interests is expressed on whether there are different types of feedback loops and then which best suits programs. Future academic research could focus on further detailing these new, not yet specific, factors.

10.4.2. Additional case studies

Another important avenue for future research would be to do additional case studies and study the success factors for adaptive cooperation in programs formulated at the end of this research. The first case study has altered some aspects that had been found in theory. Consequently, for plausibility and reliability of the research findings, it is important to see whether these success factors are also applicable in other cases. Cooperation in teams really depends on the team members, their dynamics and the context they are operating in. The single case study used in this research and its context might influence the effectiveness of the success factors. It would be interesting if it were studied whether these factors are applicable differently in various cases and to see whether team members and their context really influence this effectiveness to achieve adaptivity. Therefore, additional case studies could be done and their findings should be compared. The theory developed can then be validated, and a contribution can be made to the groundedness of the theory. It is important that these case studies show sufficient depth and that the system is again holistically considered to prevent overseeing relationships and thus critical system characteristics.

10.4.3. Methods

Interviews are susceptible to bias and therefore, future research should also look into different research methods that could contribute to theory development on adaptive program management. Some methods are less susceptible to a researcher's bias and could provide other insights. Also, this study mostly used qualitative research methods. It would be interesting to look for different research methods, either of qualitative of quantitative nature, and study the outcomes following these other methods. Again, this

could contribute to the groundedness of the theory developed on adaptive program management.

10.4.4. Scope

This research has focused on how adaptivity can be reached through cooperation as this was argued one of the essential aspects of program management. Besides cooperation, there are many more factors playing a role in program management. In the different aspects of program management, such as risk management and project control, there might be more success factors that provide information on how adaptivity can be achieved in program management. These other factors could again help in development of theory on adaptive program management. Future research can focus on other aspects than cooperation and see whether different success factors can be derived for adaptive program management and thus support theory development.

References

Agile-Alliance. (2001). Manifesto for agile software development. http://www.agilemanifesto.org

Ali, U., & Kidd, C. (2013). Critical success factors for configuration management implementation. *Industrial Management & Data Systems*, *113*(2), 250–264. https://doi.org/10.1108/02635571311303569

Alshenqeeti, H. (2014). Interviewing as a Data Collection Method: A Critical Review. *English Linguistics Research*, *3*(1). https://doi.org/10.5430/elr.v3n1p39

Arnold, R. D., & Wade, J. P. (2015). A Definition of Systems Thinking: A Systems Approach. *Procedia Computer Science*, *44*, 669–678. https://doi.org/10.1016/j.procs.2015.03.050

Bednar, J., & Page, S. E. (2016). Complex Adaptive Systems and Comparative Politics: Modeling the Interaction between Institutions and Culture. *Chinese Political Science Review*, *1*(3), 448–471. https://doi.org/10.1007/s41111-016-0039-6

Bukvić, L., Škrinjar, J. P., Škorput, P., & Vrančić, M. T. (2022). Overview of Resilience Processes in Transport Management Systems. https://doi.org/10.1007/978-3-031-05230-9{_}76

Carmichael, T., & Hadžikadić, M. (2019). The Fundamentals of Complex Adaptive Systems. https://doi.org/10.1007/978-3-030-20309-2{_}1

Chan, S. (2001). Complex adaptive systems. *ESD. 83 research seminar in engineering systems*, 1–9.

Clement, S., Jozaei, J., Mitchell, M., Allen, C. R., & Garmestani, A. S. (2024). How resilience is framed matters for governance of coastal social□ecological systems. *Environmental Policy and Governance*, *34*(1), 65–76. https://doi.org/10.1002/eet.2056

Connelly, E. B., Allen, C. R., Hatfield, K., Palma-Oliveira, J. M., Woods, D. D., & Linkov, I. (2017). Features of resilience. *Environment Systems and Decisions*, *37*(1), 46–50. https://doi.org/10.1007/s10669-017-9634-9

Constantine, L. L. (1993). Work organization. *Communications of the ACM*, *36*(10), 35–43. https://doi.org/10.1145/163430.163435

Damyanov, M. (2023, February). How to do thematic analysis? https://dovetail.com/research/thematic-analysis/

De Bruijn, H., Heuvelhof, E., & Veld, R. (2010). *Process management: Why project management fails in complex decision making processes*. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-13941-3

de Groot, B., Leendertse, W., & Arts, J. (2022). Learning across teams in project-oriented organisations: the role of programme management. *The Learning Organization*, *29*(1), 6–20. https://doi.org/10.1108/TLO-06-2020-0118

Dudovskiy, J. (n.d.). Exploratory Research. https://research-methodology.net/research-methodology/research-design/exploratory-research/

Dyer, W. G., & Wilkins, A. L. (1991). Better Stories, Not Better Constructs, to Generate Better Theory: A Rejoinder to Eisenhardt. *The Academy of Management Review*, *16*(3), 613. https://doi.org/10.2307/258920

ERTMS NL. (n.d.-a). ERTMS in Nederland. https://www.ertms.nl/default.aspx

ERTMS NL. (n.d.-b). Implementerende organisaties. https://ertms.nl/programmaorganisatie/implementerende+organisaties/default.aspx

Fiksel, J. (2003). Designing Resilient, Sustainable Systems. *Environmental Science & Technology*, *37*(23), 5330–5339. https://doi.org/10.1021/es0344819

Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, *12*(2), 219–245. https://doi.org/10.1177/1077800405284363

Flyvbjerg, B. (2007). Policy and Planning for Large-Infrastructure Projects: Problems, Causes, Cures. *Environment and Planning B: Planning and Design*, *34*(4), 578–597. https://doi.org/10.1068/b32111

Flyvbjerg, B., Skamris holm, M. K., & Buhl, S. L. (2003). How common and how large are cost overruns in transport infrastructure projects? *Transport Reviews*, *23*(1), 71–88. https://doi.org/10.1080/01441640309904

Foroughi, Z., Ebrahimi, P., Aryankhesal, A., Maleki, M., & Yazdani, S. (2022). Hospitals during economic crisis: a systematic review based on resilience system capacities framework. *BMC Health Services Research*, *22*(1), 977. https://doi.org/10.1186/s12913-022-08316-4

Ganeshu, P., Fernando, T., Therrien, M.-C., & Keraminiyage, K. (2024). Inter-Organisational Collaboration Structures and Features to Facilitate Stakeholder Collaboration. *Administrative Sciences*, *14*(2), 25. https://doi.org/10.3390/admsci14020025

George, T. (2023, June). Semi-structured Interview | Definition, Guide & Examples. https://www.scribbr.com/methodology/semi-structured-interview/

Go Transcript. (n.d.). 6 Easy steps in learning how to analyze interview data in qualitative studies. https://gotranscript.com/blog/analyze-interview-data

Greer, D. R., Black, L. J., Eslinger, S., Houston, D. X., & Adams, R. J. (2009). Assessing executability in large complex programs. *2009 IEEE Aerospace conference*, 1–10. https://doi.org/10.1109/AERO.2009.4839718

Grzegrzolka, P. (2009). Configuration management in agile software development. *BIR 2009: the eight international conference on perspectives in business informatics research*.

Hass, K. (2007). The blending of traditional and agile project management. *PM world today*, *9*(5), 1–8.

Herrera, R. F., Sánchez, O., Castañeda, K., & Porras, H. (2020). Cost Overrun Causative Factors in Road Infrastructure Projects: A Frequency and Importance Analysis. *Applied Sciences*, *10*(16), 5506. https://doi.org/10.3390/app10165506

Horrock, S. (2019, November). Four Kinds of Thining: 2. Systems Thinking. https://humanisticsystems.com/2019/11/25/four-kinds-of-thinking-2-systems-thinking/

Howell, D., Windahl, C., & Seidel, R. (2010). A project contingency framework based on uncertainty and its consequences. *International Journal of Project Management*, *28*(3), 256–264. https://doi.org/10.1016/j.ijproman.2009.06.002

International Energy Agency. (2015). Making the Energy Sector more Resilient to Climate Change.

Kakilla, C. E. (2021). Strengths and Weaknesses of Semi-Structured Interviews in Qualitative Research: A Critical Essay. *Preprints*, (2021060491).

Karrbom Gustavsson, T., & Hallin, A. (2014). Rethinking dichotomization: A critical perspective on the use of “hard” and “soft” in project management research. *International Journal of Project Management*, *32*(4), 568–577. https://doi.org/10.1016/j.ijproman.2013.10.009

Klijn, E., & Koppenjan, J. (2016a). *Governance networks in the public sector*. Routledge.

Klijn, E., & Koppenjan, J. (2016b, June). The Shift toward Network Governance. In *Theory and practice of public sector reform* (pp. 158–177). Routledge. https://doi.org/10.4324/9781315714141-11

Koppenjan, J., Veeneman, W., van der Voort, H., ten Heuvelhof, E., & Leijten, M. (2011). Competing management approaches in large engineering projects: The Dutch RandstadRail project. *International Journal of Project Management*, *29*(6), 740–750. https://doi.org/10.1016/j.ijproman.2010.07.003

Lecy, J. D., & Beatty, K. E. (2012). Representative Literature Reviews Using Constrained Snowball Sampling and Citation Network Analysis. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1992601

Levin, S. A. (1998). Ecosystems and the Biosphere as Complex Adaptive Systems. *Ecosystems*, *1*(5), 431–436. https://doi.org/10.1007/s100219900037

Love, P. E. D., Smith, J., Simpson, I., Regan, M., & Olatunji, O. (2015). Understanding the Landscape of Overruns in Transport Infrastructure Projects. *Environment and Planning B: Planning and Design*, *42*(3), 490–509. https://doi.org/10.1068/b130102p

Lycett, M., Rassau, A., & Danson, J. (2004). Programme management: a critical review. *International Journal of Project Management*, *22*(4), 289–299. https://doi.org/10.1016/j.ijproman.2003.06.001

Martinsuo, M., & Hoverfält, P. (2018). Change program management: Toward a capability for managing value-oriented, integrated multi-project change in its context. *International Journal of Project Management*, *36*(1), 134–146. https://doi.org/10.1016/j.ijproman.2017.04.018

Masood, Z., & Farooq, S. (2017). The benefits and key challenges of agile project management under recent research opportunities. *International Research Journal of Management Sciences*, *5*(1), 20–28.

McDaniel, R. R. (2008). Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation. *Performance Improvement Quarterly*, *20*(2), 21–41. https://doi.org/10.1111/j.1937-8327.2007.tb00438.x

Meadows, D. (2008). *Thinking in Systems: A Primer*. Chelsea Green Publishing.

Ministerie van Infrastructuur en Waterstaat. (2022). *Achtste Voortgangsrapportage - Tweede half jaar 2022* (tech. rep.). Programma Hoogfrequent Spoorvervoer.

Ministerie van Infrastructuur en Waterstaat. (2023a, April). *18e voortgangsrapportage van het Programma ERTMS* (tech. rep.). Ministerie van Infrastructuur en Waterstaat.

Ministerie van Infrastructuur en Waterstaat. (2023b, June). *19e voortgangsrapportage van het Programma ERTMS* (tech. rep.).

Miranda Sarmento, J., & Renneboog, L. (2017). Cost Overruns in Public Sector Investment Projects. *Public Works Management & Policy*, *22*(2), 140–164. https://doi.org/10.1177/1087724X16668357

Moreira, M. E. (2010). *Adapting Configuration Management for Agile Teams* (1st). Wiley.

Morris, P. W. G. (2002). Science, objective knowledge and the theory of project management. *Proceedings of the Institution of Civil Engineers - Civil Engineering*, *150*(2), 82–90. https://doi.org/10.1680/cien.2002.150.2.82

Nyfjord, J., Bathallath, S., & Kjellin, H. (2014). Conventions for Coordinating Large Agile Projects. https://doi.org/10.1007/978-3-319-14358-3{_}6

Pellegrinelli, S. (1997). Programme management: organising project-based change. *International Journal of Project Management*, *15*(3), 141–149. https://doi.org/10.1016/S0263-7863(96)00063-4

Pellegrinelli, S., Murray-Webster, R., & Turner, N. (2015). Facilitating organizational ambidexterity through the complementary use of projects and programs. *International Journal of Project Management*, *33*(1), 153–164. https://doi.org/10.1016/j.ijproman.2014.04.008

Pitsis, A., Clegg, S., Freeder, D., Sankaran, S., & Burdon, S. (2018). Megaprojects redefined – complexity vs cost and social imperatives. *International Journal of Managing Projects in Business*, *11*(1), 7–34. https://doi.org/10.1108/IJMPB-07-2017-0080

Pollack, J. (2007). The changing paradigms of project management. *International Journal of Project Management*, *25*(3), 266–274. https://doi.org/10.1016/j.ijproman.2006.08.002

Pratt Miles, J. D. (2013). Designing Collaborative Processes for Adaptive Management: Four Structures for Multistakeholder Collaboration. *Ecology and Society*, *18*(4), art5. https://doi.org/10.5751/ES-05709-180405

Programmabeslissing. (2019).

Rathi, A., & Khandve, P. (2016). Study of Factors Influencing Cost Overruns: An Overview. *International Journal of Science and Research (IJSR)*, *5*(3), 334–336. https://doi.org/10.21275/v5i3.NOV161792

Rijkswaterstaat. (2022a, February). *Verdieping Adaptiviteit in het MIRT* (tech. rep.). Ministerie van Infrastructuur en Waterstaat.

Rijkswaterstaat. (2022b, March). *Hoogwaterbeschermingsprogramma - 2, 21e Voortgangsrapportage* (tech. rep.).

Sandhusen, R. (2008). *Marketing* (4th). Barron's Educational Series.

Sorensen, C. H., & Gudmundsson, H. (2010). The impact of governance modes on sustainable transport – the case of bus transport in Greater Manchester, UK. *World Review of Intermodal Transportation Research*, *3*(1/2), 8. https://doi.org/10.1504/WRITR.2010.031577

Swanson, D., Barg, S., Tyler, S., Venema, H., Tomar, S., Bhadwal, S., Nair, S., Roy, D., & Drexhage, J. (2010). Seven tools for creating adaptive policies. *Technological Forecasting and Social Change*, *77*(6), 924–939. https://doi.org/10.1016/j.techfore.2010.04.005

Swedberg, R. (2020). 2 - Exploratory Research. In C. Elman, J. Gerring, & J. Mahoney (Eds.), *The production of knowledge* (pp. 17–41). Cambridge University Press.

Thiry, M. (2002). Combining value and project management into an effective programme management model. *International Journal of Project Management*, *20*(3), 221–227. https://doi.org/10.1016/S0263-7863(01)00072-2

Tushar, Nie, Z., Srivastava, A., & Basumallik, S. (2024). Measuring and Enabling Transmission Systems Resiliency with Renewable Wind Energy Systems. *IEEE Transactions on Industry Applications*, 1–11. https://doi.org/10.1109/TIA.2023.3328572

Van Ruijven, K., & Tijm, J. (2023, May). *Leefbaarheidseffecten van integrale infrastructuurprojecten* (tech. rep.). Centraal Planbureau. Den Haag.

Vasudev, P., Pedersen, T., Binns, C., Godziejewski, B., Lüking, J., & Bailes, R. (2023, October). *Second Opinion on ERTMS prognose eindstand* (tech. rep.).

Walker, W. E., Rahman, S., & Cave, J. (2001). Adaptive policies, policy analysis, and policy-making. *European Journal of Operational Research*, *128*(2), 282–289. https://doi.org/10.1016/S0377-2217(00)00071-0

Walker, W., & Marchau, V. (2003). Dealing With Uncertainty in Policy Analysis and Policymaking. *Integrated Assessment*, *4*(1), 1–4. https://doi.org/10.1076/iaij.4.1.1.16462

Weaver, P. (2010). Understanding Programs and Projects - Oh, There's a Difference! *PMI, Global Congress 2010*.

Whitworth, E., & Biddle, R. (2007). The Social Nature of Agile Teams. *AGILE 2007 (AGILE 2007)*, 26–36. https://doi.org/10.1109/AGILE.2007.60

Whyte, J., Stasis, A., & Lindkvist, C. (2016). Managing change in the delivery of complex projects: Configuration management, asset information and 'big data'. *International Journal of Project Management*, *34*(2), 339–351. https://doi.org/10.1016/j.ijproman.2015.02.006

Yin, R. (2003). *Case study research: Design and methods*. Sage.

A

Literature reviews

This appendix details the literature reviews and studies for chapter 3 and 5. The different search strings used for identification of literature are presented.

A.1. Literature review for knowledge gap identification (chapter 3)

To search for the state-of-the-art knowledge on program management and adaptivity, a literature review was executed. This literature review took several search strings into account. These search strings and selected literature based on these results are displayed in A.1. The information in the table ensures the literature review is reproducible.

The 11 selected papers are discussed in the main text in chapter 3, with the papers' conclusions in table 3.1.

A.2. Literature study for chapter 5

For this chapter, a literature study was performed. The researcher was interested in many subjects for identifying the success factors for adaptivity. To ensure the research is reproducible, this section contains an overview of the used search strings and databases. A search has been performed on literature and success factors for adaptivity in different academic fields (table A.2 and A.3) and another search has been performed on adaptive cooperation (table A.4 and A.5).

Approach	Search term	Resulting articles
Search for literature concerning configuration management in program management	TITLE-ABS-KEY(”program management” OR ”programme management” AND configuration OR ”configuration management”) AND (LIMIT-TO(LANGUAGE, “English”))	54
Manual assessment for relevance		**1**
Snowballing applied on selected articles		**4**
Search for how configuration management and adaptivity are already linked in literature	TITLE-ABS-KEY (”project management” AND ”configuration management” AND agile OR flexible OR adaptive OR flexibility OR adaptivity OR learning OR ”learning process”) AND (LIMIT-TO (LANGUAGE , ”English”))	52
Manual assessment for relevance		**2**
Snowballing applied on selected articles		**1**
Search for success factors of configurationo management in projects	TITLE-ABS-KEY (”project management” AND ”configuration management” AND success OR ”success criteria” OR ”success factors”) AND (LIMIT-TO (LANGUAGE , ”English”))	29
Manual assessment for relevance		**1**
Search for success factors in complex programs	TITLE-ABS-KEY(”program management” OR ”programme management” AND success OR ”success factors” OR criteria OR ”success criteria” AND complex) AND (LIMIT-TO (LANGUAGE , ”English”))	62
Manual assessment for relevance		**2**
Total		**11**

Table A.1: Search terms used for literature review in SCOPUS (07/02/2024)

Search aim	Search string
Information on CAS	complex adaptive systems
Information on CAS and application	complex adaptive systems ecology
Information on CAS and application	complex adaptive systems economy
Information on adaptive systems	adaptive systems
Information on resilience	resilience definition
Information on resilience	resilience
Information on resilience	resilience linked to adaptive
Information on resilience	creation of resilient systems
Information on adaptive policy making	adaptive policy making
Information on adaptive project management	adaptive project management
Information on adaptive project management	agile project management tools
Information on adaptive project management	agile project management approaches
Link between CAS and APM	agile methodologies and CAS

Table A.2: Search terms used for literature study on adaptivity in GoogleScholar (20/02/2024)

Search aim	Search string
Information on CAS	SRCTITLE(complex adaptive system OR ”complex adaptive systems”)
Information on resilience and in health	TITLE-ABS-KEY(resilience OR resilient AND adaptive OR adaptivity OR adaptability AND system AND tool OR tools OR approach OR approaches OR strategy OR strategies AND health)
Information on resilience and in energy	TITLE-ABS-KEY(resilience OR resilient AND adaptive OR adaptivity OR adaptability AND system AND tool OR tools OR approach OR approaches OR strategy OR strategies AND energy)
Information on resilience and in transport	TITLE-ABS-KEY(resilience OR resilient AND adaptive OR adaptivity OR adaptability AND system AND tool OR tools OR approach OR approaches OR strategy OR strategies AND transport or ”transport system”)
Information on adaptive policy making	TITLE-ABS-KEY(”adaptive policy making” OR ”adaptive policy”)
Information on adaptive project management	TITLE-ABS-KEY(”adaptive project management” OR ”agile project management” AND adaptivity OR adaptive OR flexibility OR learning)
Link between CAS and APM	TITLE-ABS-KEY(”adaptive project management” OR ”agile project management” AND adaptivity OR adaptive OR flexibility OR learning AND ”complex adaptive system” OR ”complex adaptive systems”)
Link between CAS and adaptive policy	TITLE-ABS-KEY(”adaptive policy making” OR ”adaptive policy” AND ”complex adaptive system” OR ”complex adaptive systems”)

Table A.3: Search terms used for literature study on adaptivity in SCOPUS (20/02/2024)

Search aim	Search string
Information on process management	adaptive collaboration process management
Information on process management	process management and decision-making
Information on process management	adaptive process management
Information on networks and adaptive collaboration	networks stakeholder adaptive collaboration
Information on organisational structure	organisational structure and governance projects

Table A.4: Search terms used for literature study on adaptive cooperation in GoogleScholar (20/02/2024)

Search aim	Search string
Information on organisational structure	TITLE-ABS-KEY(”organizational structure” AND network OR networks)
Information on governance	TITLE-ABS-KEY(”organizational structure” AND network OR networks AND governance)
Information on process management	TITLE-ABS-KEY(”process management” AND ”decision-making” AND stakeholders OR stakeholder)
Information on adaptive collaboration	TITLE-ABS-KEY(”adaptive collaboration” OR ”adaptive collaboration management”)

Table A.5: Search terms used for literature study on adaptive cooperation in SCOPUS (20/02/2024)

B

Informed consent form

Each interviewee has to sign an informed consent form to ensure it knows the details of the project, to create awareness concerning possible data leakages and to ensure the participant is aware of its answers being used in a publicly defended thesis and that this thesis is published on a repository afterwards. This was discussed in chapter 2.

The informed consent form signed by interviewees is displayed below.

Opening statement

You are being invited to participate in a research study titled "Adaptivity in program management". This study is being done by Mara Linssen from the TU Delft in collaboration with AT Osborne.

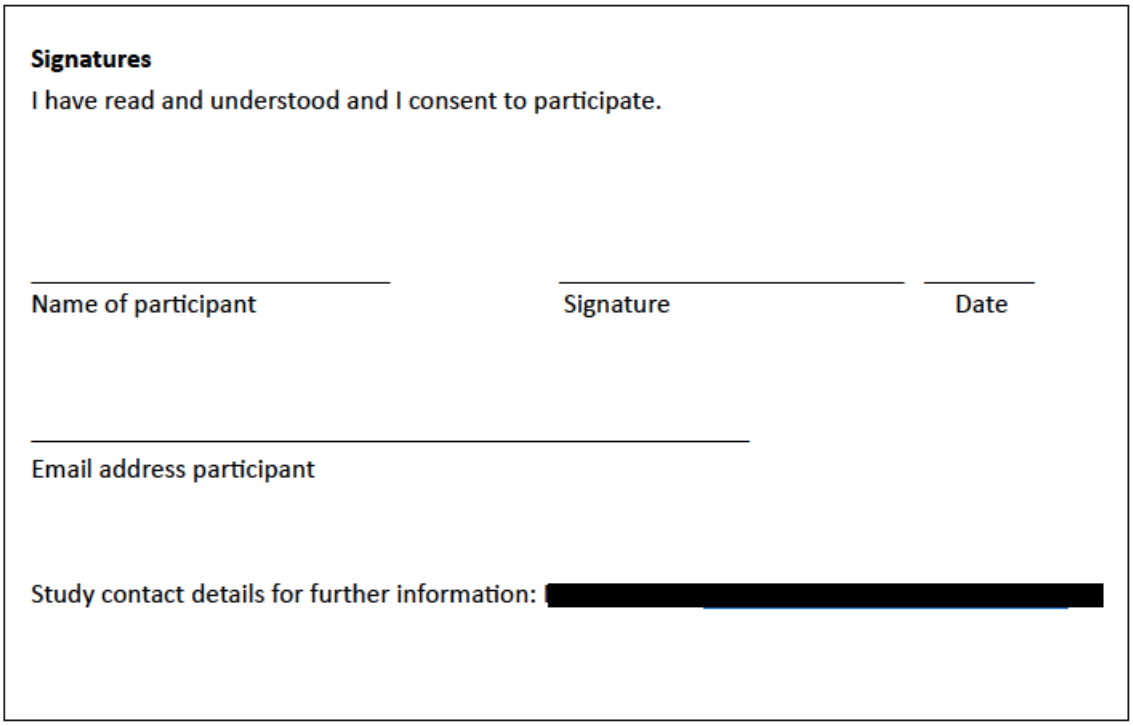
The purpose of this research study is to improve the current strategy on balancing control and flexibility within the configuration management of the ERTMS program, and will take you approximately **60** minutes to complete. The data will be used for identification of challenges in the current strategy and understand what an improvement in this strategy should accomplish, which is used in a master thesis that will be publicly defended and published afterwards. I will be asking you to answer different questions on the program's functioning, what you think currently prohibits the program from achieving success, and how you would define success for this program.

As with any online activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. We will minimize any risks by rephrasing any job descriptions (for personal identification) and to store the data on a TU Delft data storage which is only accessible be the researcher and its supervisors. The personal data collected (names, email addresses and job descriptions) will not be shared with any other party and any documentation on the interview (including a transcript and conclusions) will be anonymised. After analysing the interviews, you as participant, will receive a summary and draft of what will be documented. You can check the draft, give feedback, and opt-out if this is desired. This summary will be included in the publicly available MSc thesis.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions. The personal data collected during this interview is stored for the duration of the research and will be deleted at the latest one month after completion of the research (approximately July 2024).

For any questions or remarks, you can contact [redacted] by sending an email to [redacted]

Figure B.1: Informed consent form part 1/2



Signatures

I have read and understood and I consent to participate.

Name of participant _____ Signature _____ Date _____

Email address participant _____

Study contact details for further information: [redacted]

Figure B.2: Informed consent form part 2/2

C

Interviews

This appendix includes the predetermined questions for the semi-structured interviews. Additional questions have been thought of to guide the interviewer when necessary. The appendix presents the questions in both Dutch (the interview language) and English for overall understanding of what is asked.

At the beginning of each interview it is discussed what is meant by adaptivity. The reseacher has used the following definition throughout the interviews: *Het vermogen om je aan te passen aan onzekerheid of plaatsgevonden gebeurtenissen om het best mogelijke resultaat te behalen* and can be the translated to *the ability to adjust for uncertainty or occurred events to achieve the best possible result*.

C.1. Dutch questions

1. Kort voorstel moment van onderzoeker en geïnterviewde.
2. (Waarom zijn jullie, als organisatie, onderdeel van het ERTMS programma?
3. Welke stappen is uw functie voornamelijk mee bezig in de migratiestap EKB?)
4. In hoeverre is adaptiviteit nodig in een migratiestap zoals EKB, binnen het programma ERTMS?
    - Positief: op welke manieren wordt dat nu gedaan?
    - Specifieke voorbeelden waar meer of minder nodig?
5. In de migratiestap zitten zekere afhankelijkheden, samenwerking is daarom van belang.
    - Met welke partijen wordt er samengewerkt vanuit jullie om EKB succesvol af te ronden?
    - Hoe ervaar jij de samenwerking tussen de partijen betrokken bij de indienststelling van EKB?
6. Wat wordt er zoal besproken met het indienststellingsteam? En waarvan houdt elke partij elkaar op de hoogte?
    - Hoe transparant is communicatie en zie jij dit als formeel of informeel?
7. Zijn er afhankelijkheden die jullie voortgang beïnvloeden? Kan u voorbeelden geven?
    - Hoe gaan jullie als organisatie om met afhankelijkheden om die de voortgang beïnvloeden?
8. En hoe bijvoorbeeld met onvoorziene omstandigheden?
9. Zou je zeggen dat de huidige samenwerkingsstrategie jullie in staat stelt adaptief te zijn?
    - Wat gaat er goed aan?
    - Wat kan er beter?

- Hoe is jullie rol in die strategie?

10. Wanneer zie jij de eigen taken als voltooid en succesvol?
    - En is dan ook de hele migratiestap geslaagd?
    - Welke criteria zetten jullie hier tegenover?
11. Wanneer vind jij dat de organisatie waar je deel van uit maakt voldoende adaptief handelt in dit programma? Wanneer ben je dus adaptief?
    - Besluiten binnen x maanden?
    - Draagvlak?
    - Geen kostenoverschrijdingen en vertragingen?
    - Succesvolle oplevering?

Additional questions are designed before the interviews to help the researcher when more in-depth questions are desired.

Cooperation

12. Voor het indienststellen van EKB; is het voor u duidelijk wat u rol en verantwoordelijkheid is?
13. En zijn die rollen en verantwoordelijkheden goed verdeeld tussen de verschillende partners aan tafel? Is het ook duidelijk voor u wie wat moet doen?
14. Hoe houdt u overzicht over de voortgang voor het uitvoeren van deze taak/taken?
15. Deelt u deze voortgang met andere partijen inclusief de programma directie?
    - Zo ja, hoe vaak wordt de voortgang besproken? Wat wordt er dan precies besproken?
    - Zo nee, waarom niet?
16. Wat gebeurt er als taken of onderdelen van taken niet op tijd af zijn of over budget gaan?
17. Hoe vindt u dat de samenwerking verloopt tussen u en de andere betrokken partijen?
    - Kan u een voorbeeld geven van iets wat heel goed gaat of waar verbetering nodig zou zijn?
18. Heerst er een wederzijds vertrouwen in deze gesprekken tussen de partijen?
19. Zijn er verschillende houdingen van partijen in de gesprekken met elkaar?
20. Hoe zou u de mate van vertrouwen tussen verschillende partijen tijdens deze migratiestap beoordelen, en op welke manieren heeft dit vertrouwen de samenwerking beïnvloed?
21. Hoe worden conflicten of meningsverschillen tussen verschillende belanghebbenden opgelost tijdens deze migratiestap?

Mens - spoor - trein: aspecten van EKB Focus

22. Personeel moet worden opgeleid. Is het duidelijk wat precies van jullie verwacht wordt bij deze migratiestap?
    - Zo nee, kan u een reden geven waarom hier onduidelijkheid over heerst?
23. Zijn er afhankelijkheden die jullie voortgang beïnvloeden? Kan u voorbeelden geven?
24. Hoe ga je met deze afhankelijkheden om?
25. Hoe ga je om met onvoorzien omstandigheden?
    - Kan je voorbeeld geven van iets wat het proces heeft beïnvloed en hoe jullie daarmee zijn omgegaan?
26. In hoeverre vindt er innovatie plaats gedurende de uitvoering / het uitvoeren van taken?

C.2. English questions

1. Short moment for introduction researcher and interviewee.
2. (Why are you, as organisation, part of the program ERTMS?
3. What steps is your function mainly concerned with in the migration step EKB?)
4. To what extent do you think adaptivity is necessary in a migration step like EKB, within the ERTMS program?
    - Positive: in what ways this is currently done??
    - Do you have any specific examples of when more or less adaptivity was desired?
5. The migration step contains certain dependencies, cooperation is therefore of importance.
    - With which involved actors is collaborated, based on your organisation, to successfully complete EKB?
    - How do you experience the cooperation between the involved parties with the commissioning of EKB?
6. What is discussed with the commissioning team? And what does each party keep each other informed of?
    - How transparent is communication and do you see it as formal or informal?
7. Are there any dependencies that influence your progress? Can you give an example?
    - How do you, as organisation, deal with the dependencies that influence this progress?
8. And how do you deal with unforeseen circumstances?
9. Would you say that the current collaboration strategy allows you to be adaptive?
    - What works well?
    - What could be improved?
    - How do you define your role in this strategy?
10. When do you see your own tasks as completed and successful?
    - Does that also mean that the complete migration step is successfully finalized?
    - What criteria would you define to decide on your success?
11. When do you think the organisation you are part of is acting sufficiently adaptive in this program? So when are you being adaptive?
    - Decisions within x months?
    - Support?
    - No cost overruns and delays?
    - Successful project delivery and handover?

Additional questions are designed before the interviews to help the researcher when more in-depth questions are desired.

Cooperation

12. For commissioning EKB: is it clear what your role and responsibility is?
13. And are those roles and responsibilities well divided between the different partners at the table? Is it also clear to you who should do what?
14. How do you keep track of the progress for performing this task/tasks?

15. Do you share this progress with other parties including the program directive?
    - If yes, what is the frequence the progress is discussed? And what is discussed then exactly?
    - If not, why not?
16. What happens if tasks or parts of tasks are not completed on time or go over budget?
17. How do you feel the cooperation goes between you and the other parties involved?
    - Can you give an example of something that is going very well or where improvement would be needed?
18. Is there mutual trust in these talks between the parties?
19. Are there different attitudes from the involved parties in the meetings?
20. How would you assess the level of trust between different parties during this migration step, and in what ways did this trust affect the collaboration?
21. How are conflicts or disagreements between different stakeholders resolved during this migration step?

Personnel - track - train: aspects of focus area on EKB

22. Staff need to be trained / Tracks need to be transformed / Trains need to be transformed. Is it clear what exactly is expected of you in this migration step?
    - If not, can you give a reason why this is unclear?
23. Are there any dependencies that affect your progress? Can you give examples?
24. How do you deal with these dependencies?
25. How do you deal with any unforeseen circumstances?
    - Could you provide an example of what has impacted the process and how you dealt with this?
26. To what extent does innovation take place during the execution/performance of tasks?

D

Interview transcripts

This appendix contains all interview transcripts. These transcripts are summaries from the interview conducted and are anonymised. The summaries and checked and agreed upon by the researcher and interviewee. An additional check has taken place regarding confidential information to ensure the positions of the various actors within the railway sector. The interview summaries are provided in Dutch as the interviews were held in Dutch. Each interview is noted with a number, corresponding to table 7.1. The researcher knows the exact interviewee per interview number.

D.1. Anonymised interview summaries

D.1.1. Interview 1

De geïnterviewde is de niet-gemandateerde vertegenwoordiger van de goederenvervoerders binnen het indienststellingsteam (IDST). Het vertegenwoordigt de belangen die vallen onder IEMeV. IEMeV brengt de belangen van stakeholders zoals goederen binnen het programma.

Deelname is als vertegenwoordiger en dus niet als vervoerder zelf. De goederenvervoerders halen weinig uit deelname ten opzichte van de tijd die het kost. Wel is EKB een zodanig belangrijk baanvak voor goederenvervoerders dat een vertegenwoordiger van belang is in dit IDST. Omdat er bij EKB veel goederentreinen per dag voorbijkomen, is de noodzaak duidelijk dat ook goederenvervoer klaar moet zijn voor de ERTMS uitrol.

Op EKB rijden zeer veel goederenvervoerders en dus moet er veel materieel beschikbaar komen dat hierop kan rijden. Dit moet tijdig beschikbaar komen. Bij het MT railfreight sluiten zeker niet alle partijen aan die wel rol hebben in het tijdig beschikbaar maken van voldoende materiaal, wat zorgt voor een grote complexiteit. Daarnaast is het goederenvervoer op basis van marktwerking en zie je dat de sector op een andere manier keuzes maakt tbv ERTMS uitrol.

Die marktwerking waar het goederenvervoer zich in bevindt heeft veel impact op het tempo en de noodzaak voor de transitie naar ERTMS. Kosten en risico's zijn voor de materieeleigenaren en als zij de locomotieven ook gebruikt krijgen in andere landen zonder deze investeringen kan dat aantrekkelijker zijn. Op basis van marktprognoses en ontwikkelingen binnen ERTMS kunnen eigenaren beslissen om te investeren in locomotieven uitgerust met ERTMS. Deze keuze is ingewikkeld omdat treinen alleen kunnen rijden op minimaal dezelfde baseline ERTMS als die van de infrastructuur die er ligt. De infrastructuur ondersteunt dus alleen zijn eigen versie en nieuwer. Daardoor is een investering in een te lage versie van ERTMS weggegooid geld en moeten locomotieven met deze lagere ERTMS-versie van de laatste versie van ERTMS voorzien worden.

De financiering van goederenvervoerders en de transitie naar ERTMS is een grote uitdaging. De materieeleigenaren zijn daarom druk met het bekijken of investeringen rendabel zijn in een omgeving waar nog steeds innovatie plaatsvindt en waarbij niet elke ERTMS-variant in gebruik blijft voor minimaal 10 jaar. De houding van deze materieeleigenaren en leasebedrijven die locomotieven moeten gaan ombouwen is te vergelijken met een weersverwachting waarbij pas een keuze wordt gemaakt als het zoveel mogelijk zeker is wat het weer gaat worden. Dat betekent dat er dus een wat afwachtende houding is om zeker te zijn van de investering. Het complexe systeem, dat niet modulair is, en

de investeringsproblematiek zorgen ervoor dat het goederenvervoer beperkt adaptief is. Investeringen moeten het waard zijn en afwijken van eerdere beslissingen qua investeringen brengen nog meer kosten met zich mee. Daarom is adaptief handelen voor goederenvervoer beperkt mogelijk.

Materieeleigenaren opereren redelijk individueel en kijken vooral naar wat hun klanten nodig hebben. Zij volgen de markttrend en prognoses voor de marktvraag; hierop worden de investeringsbeslissingen gemaakt.

De trend voor het overgaan naar ERTMS in heel Europa zorgt voor vooral een timingskwestie. Afhankelijk van wanneer elk land zijn versie van ERTMS neerlegt, past de materieeleigenaar zich daarop aan.

Goederenvervoer aan boord krijgen, heeft ook verschillende economische en maatschappelijke belangen. Goederenvervoer zorgt voor werkgelegenheid en dat minder vracht per vrachtwagen wordt vervoerd, wat beter is voor het klimaat en drukte op de weg. Het is nodig voor het verwezenlijken van de Green Deal.

Hier zien we ook dat internationaal niet wordt samengewerkt en beperkte communicatie plaatsvindt. Elk land maakt eigen keuzes tbv de infraversie en daar heeft het internationale treinverkeer (waar goederen onder vallen) dan last van. Er is een onderlinge afhankelijkheid tussen materieeleigenaren en ProRail om de timing goed te krijgen voor het in dienst stellen van ERTMS L2 only baanvakken.

Als vertegenwoordiger vanuit IEMeV is het belangrijk om informatie op te halen bij het IDST om te weten wat er speelt en hoe de migratie er uit gaat zien. Daarnaast moet voor het IDST duidelijk zijn wat de opdracht is. Als elke partij enkel zijn eigen project bekijkt, ben je beperkt adaptief. Niet alle partijen die nodig zijn voor het IDST zijn aanwezig bij de overleggen en daardoor is ook nog niet volledig duidelijk wat precies nodig gaat zijn (een boodschappenlijst) voor het uitrollen van ERTMS op EKB. Spelers die missen zijn bijvoorbeeld de capaciteitsmanager zijn vanuit ProRail, die coördineert wat er allemaal buiten gebeurt, en vertegenwoordigers van de beheer- en onderhoudsafdeling. Wel heerst er een sfeer binnen het team dat men elkaar vertrouwd en op de hoogte stelt van actualiteiten met veel transparantie.

Ik probeer in het IDST dus de weerverwachting op te halen en te zorgen dat niet alles helemaal wordt vastgezet. Alle eigen projecten volledig uitwerken en geen ruimte te laten voor adaptiviteit gaat het indienststellen van EKB beperken. Het wordt dan een alles of niets strategie en die wil ik voorkomen. Er moet constant gekeken blijven worden of wat we opleveren ook in de lijn der verwachtingen ligt van de partijen die hier zo moeten opereren en beheren. Het uitwerken van kleinere stappen kan zo duidelijkheid en zekerheid geven en tegelijkertijd stellen we ons nog niet helemaal vast.

Wat er na het IDST gebeurt met de informatie is niet voor elke partij duidelijk. Inzicht in die processen zou af en toe gewenst kunnen zijn, maar er moet ook een wederzijds vertrouwen zijn dat er samen aan een doel wordt gewerkt en dus dat het niet nodig is om tot diep in elkaars keuken te kijken. Een gezamenlijk doel is cruciaal.

Het investeringsklimaat naast de complexiteit van de opbouw van het ERTMS beperkt de mogelijkheid van deze sector om adaptief te zijn. De opbouw van ERTMS moet simpeler om investeringen rendabeler te maken en daar zou een ministerie voor moeten lobbyen op Europees niveau.

D.1.2. Interview 2

Geïnterviewde is betrokken geweest bij de opstartfase van het indienststellingsteam EKB als projectmanager voor EKB.

Aan het begin is het indienststellingsteam (IDST) vooral bezig geweest met het aanleveren van documenten om te kijken naar de geschikte planning en besluitvorming voor het in dienst stellen van EKB. Er speelde op dat moment het een en ander binnen de organisatie, wat voor wat onduidelijkheid en onzekerheid heeft gezorgd binnen het IDST. Focus lag in deze periode op het proces rondom het aanbestedingsdossier rondom EKB en de indienststellingsdatum.

Er is met de verschillende partijen in het IDST een matrix opgesteld dat inzicht gaf in de mogelijke scenario's voor EKB die aan de basis lagen van de besluitvorming rondom dit baanvak. Deze matrix bracht alle consequenties in kaart voor elk scenario. Dit was dus niet zozeer gericht op het bijsturen maar bracht wel in kaart wat vervolgstappen waren van verschillende keuzes en hoe daarin alsnog tot het in dienst stellen van EKB kon worden gekomen. De besluitvorming werd uitgesteld en lag gevoelig door de uitkomsten van het second opinion rapport dat inzicht gaf in de risico's van de huidige aanpak, waardoor geld vrijgeven niet altijd even makkelijk ging en dus projecten tot wat stilstand kwamen.

Afhankelijkheden binnen EKB zorgden ervoor dat er op dit moment stilstand ontstond. Onzekerheden spelen daar ook een grote rol in. Dit heeft effect gehad op de motivatie van het team en de mensen daarin. We wisten in deze periode gewoon niet waar we aan toe waren, maar moesten wel door totdat er een ander besluit kwam. Tegelijkertijd liepen verschillende processen ook wel door. Je werkt op de vigerende planning tot er een andere wordt gecommuniceerd. Elke partij moet dan wel zorgen dat de vigerende planning up-to-date wordt gehouden en dat deze planning inderdaad het team weerspiegelt ipv losse projecten.

Uiteindelijk is er wel besloten over het aanbestedingsdossier maar niet over de indienststellingsdatum. Dit gaf bij mij nog steeds wat onrust omdat ik alsnog niet kon aansturen op een datum en dus niet echt een richtlijn had. Bijsturen kon voor niemand, vanwege te veel onzekerheden. Meer zekerheden hadden hier wel bij kunnen helpen. Het aanbestedingsdossier was heel belangrijk voor ons. Partijen aan tafel bekeken de indienststellingsdatum verschillend: als richtlijn of als harde eis. Dat betekent ook dat planningen en afhankelijkheden verschillend worden aangepakt. Vanuit mij zou er een voorkeur zijn om te varen op een datum en dus te kijken hoe bij te sturen als blijkt dat dat niet haalbaar is.

Binnen het IDST gaf iedereen aan welke consequenties langs kwam en wat de uitloop van EKB voor jou als partij betekende, maar meer kon er niet gedaan worden. Ook merkte je binnen het team dat het doel niet voor iedereen gelijk was, namelijk het in dienst stellen van EKB. Er waren binnen het IDST ook wel verschillende houdingen van partijen. Niet elke partij wil zich even hard maken voor het laten slagen van het indienststellen van EKB. Die terugtrekkende bewegingen werden niet altijd uitgesproken maar waren wel voelbaar en hebben zeker de samenwerking beïnvloed. Vertraging werd ook verschillend gewaardeerd. Een deel van het team stelt zich in op vertraging waar wij juist graag door wilden en dus ook knopen wilden doorhakken. Niet iedereen durfde die knopen door te hakken, zeker ook met de uitkomsten van het second opinion rapport.

Mandaat binnen het IDST was beperkt. Als vertegenwoordiger van verschillende organisatie(-afdelingen) kan je niet altijd alle besluiten maken in dit specifieke overleg en moet men weer communiceren naar de achterban voor er besluiten kunnen worden genomen. Dit beperkt het IDST heel erg in de voortgang van EKB. Daarnaast merk je dat de samenwerking heel erg op tunnelvisie en eigen eilandjes was. Eigen belangen gingen voor de gemeenschappelijke. Mensen moeten daarom open staan om van elkaar te leren en elkaars afwegingen te begrijpen.

ProRail wil voor ERTMS gaan en heeft dit ook gekozen als onderhoudsstrategie voor achterstallig onderhoud dat toch uitgevoerd moest worden. Deze strategie moet dan wel door alle partijen worden gesteund, anders is het weggegooid geld en moet ProRail naar een andere strategie gaan kijken. Het gezamenlijke doel van ERTMS en indienststellen van EKB moet dus duidelijk zijn in het IDST. De andere houdingen van NS en goederenvervoerders vergeleken met ProRail zorgen weleens voor onvoorziene omstandigheden. De doelen van ERTMS liggen vaak hoger dan die van de organisatie zelf. Dat betekent dat elke organisatie ook weer anders met het project omgaat en er verschillende eisen aan stelt voor de afronding.

Als je je als team inzet voor een project, is de teleurstelling ook groter als dingen niet lukken. ProRail

kan bijna gezien worden als belanghebbende in deze transitie en dus ook in het baanvak indienststellen. Daarmee geeft ProRail zichzelf een andere positie aan tafel in het IDST van EKB. Er lopen heel veel projecten tegelijk om dit voor elkaar te krijgen en coördinatie en voortgang is daarom belangrijk. Afhankelijkheden hebben veel impact op de planning van ProRail.

D.1.3. Interview 3

Geïnterviewde houdt zich bezig met het ombouwen van de infrastructuur op EKB. Deze rol controleert of het werk gedaan is maar is niet zelf in contact met alle partijen die het werk uitvoeren. Het aansturen van het werk wordt gedaan door IEP.

Over adaptief handelen geeft de geïnterviewde het volgende aan: praktijk wijst vaak uit dat alle gemaakte plannen een goed startpunt zijn maar dat een organisatie altijd onderhevig is aan veranderingen en wijzigingen.

Door leden van het indienststellingsteam (IDST) al te ontmoeten vanaf het begin van het proces, wordt er een begrip voor elkaar en elkaars standpunten ontwikkeld. Ook krijg je een kijkje in elkaars keuken qua problematiek op organisatorisch niveau, maar ook technisch. Elkaar helpen en ondersteunen gaat op den duur tot duurzame oplossingen leiden.

Het indienststellen van EKB heeft met meer spanning te maken dan het indienststellen van andere baanvakken (zonder ERTMS) en dat lijkt een verklaring te vinden in eerdere projecten en uitkomsten in de infrasector. Partijen betrokken hebben vaker grote spoorprojecten uitgevoerd en het doel is voornamelijk een veilig vervoersysteem opleveren. Adaptiviteit en samenwerken hebben we vaker gedaan in deze projecten. In deze grotere projecten hebben we eerder gesprekken gehad met andere vervoerders en de omgeving omdat het project ook dat beïnvloedt. Bij ERTMS lijkt er een soort vergrootglas op te liggen waardoor het anders wordt ervaren, want in zekere zin zijn er zeker wat gelijkenissen met eerder uitgevoerde grote spoorprojecten.

Het unieke aan ERTMS is vooral dat het zo gigantisch is en we er met zo veel tegelijk aan werken. Waarbij infrastructuur en techniek beide aparte projecten zijn, die parallel worden uitgevoerd, maar erg afhankelijk zijn van elkaar.

Partijen aan tafel hebben in de basis hetzelfde doel, maar de organisaties die zij vertegenwoordigen hebben op hoger niveau verschillende belangen en wensen bij de deelname aan de uitrol van ERTMS. De belangen moeten wel matchen om te zorgen dat wat er wordt gedaan, ook op elkaar aansluit. De belangen die hoger in de organisatie spelen, zie je ook terugkomen in de samenwerking rondom EKB. Afhankelijkheden van andere projecten en belangen in organisaties worden wel besproken, maar het IDST blijft afhankelijk en kan niet in elke situatie verder als die afhankelijkheden niet worden opgelost. We kunnen alleen als IDST niet sturen op die afhankelijkheden buiten onze macht.

Met die afhankelijkheden kan verschillend worden omgegaan en hangt af van de rollen en mandaat binnen het IDST. Adaptief zijn is dus ook grotendeels afhankelijk van wat er in jouw eigen bevoegdheden ligt. Als die adaptiviteit over je mandaat heengaat, heb je anderen nodig en dan zal je meer in de beïnvloedingssferen komen dan dat je in overleg besluiten kan nemen. Je adaptiviteit als team neemt dan af omdat het meer tijd zal gaan kosten om tot nieuwe besluitvorming te komen. Vaak heerst er een houding in het IDST dat we dingen liever wat langer vaag houden en dat niet altijd concrete besluiten worden genomen.

De geïnterviewde geeft aan dat timing en plannen op het juiste moment belangrijk is. Dan moet je kijken naar wat je ongeveer met zekerheid kan inbouwen in een planning en de rest wat meer loslaten en open voor ontwikkelingen. Het grote doel blijft staan, maar de weg ernaartoe kan nog veranderen. Het zou het IDST rust geven als we ons iets meer neerleggen bij de onzekerheid die we nog wat jaren gaan voelen. Zo kunnen we beter plannen op de juiste momenten om met elkaar in gesprek te gaan.

Iedere partij is begonnen met het zetten van verschillende stappen. Dit betekent door de jaren heen dat je steeds minder keuzeruimte hebt en dat gaat men voelen. Keuzes en gedragingen worden daardoor beïnvloed. Ons eindpunt begint een beetje te zwabberen en dat geeft onzekerheid. Tegelijkertijd worden er wel keuzes gemaakt en wordt dus langzamerhand de keuzevrijheid wel iets beperkt. Denk aan de aanschaf van treinen. Dan moeten die wel een keer kunnen gaan rijden.

Onrust wordt gevoeld wanneer sommige zekerheden gaan zwabberen. Het einddoel wordt meer onzeker en tegelijkertijd de ruimte om te beweging wordt minder groot. Dat brengt spanning aan. In het IDST zie je dan dat mensen elkaar wat gerust gaan stellen om te zorgen dat het duidelijk is bij elke partij dat we stappen zetten in de goede richting.

In het interview wordt ook gevraagd of alle partijen aan tafel adaptief willen zijn. Genoeg partijen die

de transitie naar ERTMS mogelijk moeten maken zijn gewend in een directe lijn te werken en niet per se adaptief te zijn en dat heeft tot nu toe vaak ook goed gewerkt. Mocht er echt een verbetering zijn met iets nieuws, moet daar natuurlijk wel voor open worden gestaan. Bij extra baten, moet er worden gekeken naar de mogelijkheden om adaptief te zijn. Bij partijen zoals ProRail en NS is veiligheid op het spoor belangrijk maar daar hoeft niet per se een adaptief systeem voor worden neergelegd. Adaptiviteit wordt dus heel anders per organisatie maar ook binnen afdelingen van organisaties ervaren.

De ruimte voor adaptiviteit gaat afnemen en dat gaat men spannend vinden. Uiteindelijk gaan we met het in dienst stellen van EKB nog door verschillende fasen en veel leren. Het is dan fijn dat samenwerking al is opgestart en dat de sector elkaar al gevonden heeft in dit team. Dat zorgt ervoor dat er een basis is voor het flexibel oplossen van problemen later. Geïnterviewde geeft ook aan dat het erop vertrouwt dat dit team steeds nauwer met elkaar zal gaan samenwerken.

In voorgaande projecten is vaker gezien dat wanneer je mensen met kennis en een gezamenlijk doel op een probleem zet dat mensen al snel de organisatie vergeten en met elkaar aan de slag gaan om de problemen op te lossen. Dit wordt ook verwacht voor EKB als het eenmaal echt de realisatie in gaat.

Over de structuur en governance van het IDST wordt nog het volgende meegegeven. Angst kan de sfeer beïnvloeden en daarmee ook de effectiviteit en functioneren van een team. Het wordt daarom ook meegegeven dat ook successen vieren en het positief benaderen van deze uitdaging voor de hele sector kan bijdragen aan het functioneren van de teams en de uitrol van ERTMS in Nederland.

De angst is niet ongegrond en het is begrijpelijk waar de angst voor grote mislukkingen in projecten vandaan komt en toch moet je als team vormgeven aan deze angst en hoe je daarmee om gaat. Als men schuchter is in toestemmingen, komen we ook niet verder.

Binnen het IDST wordt het belangrijk geacht door de geïnterviewde dat besluiten op basis van feiten worden gemaakt en dat emotie niet te veel de overhand zal gaan krijgen. Wat de uitkomst ook is van het IDST, er zijn goede stappen gezet waarmee verder kan worden gegaan en waarvan geleerd is. En op basis van feiten kunnen de beste keuzes worden gemaakt.

Om adaptief te kunnen zijn en om besluiten te nemen, heb je mandaat nodig. Dat krijg je alleen op het moment dat je vertrouwen hebt. Het is daarom belangrijk dat het IDST en de leden daarvan door gedrag laten zien dat zij in staat zijn goede professionele besluiten te nemen met oog voor al die belangen die er spelen, dan krijg je meer mandaat. Meer mandaat, meer vertrouwen en dat biedt ruimte. Die ruimte is nodig om überhaupt adaptief te kunnen zijn als team binnen een grotere organisatie en zelfs meerdere partijen.

D.1.4. Interview 4

Geïnterviewde zit aan tafel bij het indienststellingsteam (IDST) als vertegenwoordiger vanuit een betrokken afdeling.

Bij EKB is het van belang dat alle eerdere migratiestappen zijn voltooid voordat EKB in dienst kan worden gesteld. Daarmee is de afhankelijkheid van andere partijen en hun voortgang wat groter. Processen die binnen de afdeling zijn ondernomen om EKB in dienst te stellen zijn goed opgestart en we merken dat wij klaar zijn voor de volgende stap om EKB daadwerkelijk in dienst te stellen.

Ik denk dat het IDST echt moet kijken naar wat nodig is om op datum x in dienst te kunnen gaan en wie we daarvoor op welk moment aan tafel moeten hebben. Ik wil er in mijn rol voor zorgen dat de generieke ontwikkelingen voor EKB op tijd af zijn om in dienst te kunnen gaan.

Het IDST is nog vrij nieuw en wij zijn ook nog aan het kijken wat er precies mee willen en hoe we het het beste kunnen laten werken. De onzekerheden in de ERTMS omgeving voeden dat het proces nog niet helemaal uitgedacht kan worden, maar dat is denk ik ook logisch en niet per se erg.

Het is belangrijk om te onderstrepen dat gesprekken binnen het IDST allemaal informele informatie is. Het IDST heeft geen officiële plaats binnen de governance van de PD en daarmee ook geen mandaat om daar beslissingen te maken. Dat is af en toe lastig naar de omgeving te communiceren. Wij kunnen alle informatie verzamelen en dat vervolgens aanleveren voor het MT om er een beslissing over te maken. Het proces vertraagt daardoor wel wat en de keuze wordt niet door het team gemaakt. Ik denk dat dit geen probleem hoeft te vormen. Als je aan tafel deze beslissingen wil nemen, zouden andere mensen moeten aansluiten bij het IDST.

Het IDST is nog in opstartfase en we zijn daardoor nog wat minder 1 team dan uiteindelijk gewenst. Ik zie het als mijn rol om tijdig de juiste inhoudsmanagers te kunnen laten aansluiten bij het IDST als er gesproken wordt over besluiten die hen aangaan. Ik faciliteer dat. Ik denk dat we op dit moment nog niet zover zijn met het IDST dat die inhoudsmanagers nu al moeten aansluiten. Ook denk ik dat we goed moeten kijken naar wie we vinden dat moet aansluiten in dit team in welke fase. Willen we beginnen met elke afgevaardigden en later inhoudelijker mensen uitnodigen? Of gaan we vanaf moment 1 met alle inhoudsmanagers aan de slag? Als de teams eenmaal lopen, denk ik wel dat we daar wat meer duidelijkheid over krijgen. De IDST zijn nu wat ad rem opgestart wat ervoor zorgt dat de opdracht van het team niet altijd even duidelijk is en ook dat we dus een onduidelijke plek in de governance hebben gekregen.

Er wordt weleens geopperd om in de gesprekken de eigen organisatie wat meer los te laten, maar dat zie ik niet zo snel gebeuren. Ik denk dat het goed is om met de belangen van de eigen organisatie onder de arm het gesprek te blijven voeren en dan te kijken naar wat het beste is voor de sector. Wellicht dat je dan ook zou moeten kijken naar de financiering rondom dit programma en hoe dat in de sector verdeeld is. Geldstromen die alleen een organisatie aantasten worden natuurlijk beschermd door een afgevaardigde.

Ik denk dat we als IDST adaptief moeten zijn als er baten te halen vallen. Ook moet dat vooral liggen in de mogelijkheden hoe we dingen aanpakken en niet leiden tot grote aanpassingen in onze doelen. Aanpassingen die we doen in de hoe moeten wel altijd geformaliseerd worden om te zorgen dat alles juridisch klopt en ook dat dit in het politieke spel tot geen problemen leidt. Daarom is het voor onze governance positie wel belangrijk om te kijken wat daarvoor het beste is. We moeten dus samen zeker leren hoe we formaliseren wat bedacht is. Communicatie tussen de partijen blijft daarvoor van groot belang en we moeten goed monitoren wat nieuwe keuzes teweegbrengen. We kunnen niet altijd overzien wat er gebeurt op de lange termijn als we aanpassingen doen.

Binnen het IDST missen nog wel wat partijen in mijn mening. Daardoor is samen het gestelde doel bereiken niet altijd even makkelijk. Ik denk dat als we een keuze maken als IDST en dat geformaliseerd krijgen dat we ons daar dan 100% voor moeten inzetten. We kunnen bijsturen als nodig maar we moeten ons wel conformeren aan besluiten die zijn genomen. Mochten er te grote belangenverschillen in zitten dan moet dat volwassen worden geëscaleerd en komt zo de goede informatie op tafel.

Het IDST en de PD, met de andere partijen, moeten goed nadenken wat de beste balans is tussen snelheid en zorgvuldigheid in acht nemend dat alle partijen akkoord zijn met de genomen beslissingen.

Vanuit mijn rol denk ik niet dat snelheid het belangrijkste is. Het programma gaat nog even duren dus we moeten kritisch kijken naar het tijdspad dat we nodig vinden voor het maken van beslissingen.

Als je adaptief wil zijn, moet je wel nadenken over de tijd die je daaraan verbindt. Als je pas na 2 jaar keuzes maakt, is het beperkt adaptief. Er moet dus wel in je formalisering en besluitvormingsprocessen worden nagedacht om daar een zeker tijdscomponent aan te verbinden. Tijd is namelijk geld en daarom kunnen keuzes niet eeuwig op de plank blijven liggen.

Om het IDST goed te laten werken is het denk ik belangrijk om elkaar te vertrouwen en echt als team te werken. Je ziet dat tijd hier een belangrijke factor in is. We kunnen voor EKB nog genoeg tijd steken in het begrijpen van elkaars belangen en inzicht krijgen in elkaars werkwijze. Hierdoor zullen we op den duur echt als team kunnen functioneren om zo een werkend vervoersysteem neer te zetten op EKB. De randen voor EKB om de puzzel in te leggen zijn duidelijk.

Mijn rol is succesvol geweest in EKB als we als sector in dienst zijn gegaan en dat de spelers die erbij moesten zijn, erbij waren. Daarnaast moeten we ook als partijen nog steeds bestaansrecht hebben.

D.1.5. Interview 5

Geïnterviewde is betrokken bij het testen van treinen en zo ook bij de ombouw van de treinen nodig voor het in dienst stellen van EKB.

Bij het ombouwen van de treinen en het uitrollen van ERTMS wordt constant bijgestuurd. Het is een complex project en iets soortgelijks hebben we eigenlijk nog niet gedaan. Er wordt veel gaandeweg geleerd. De echte operationele activiteiten zijn nog niet begonnen maar nu al merk je dat bijsturen nodig is. We gaan dus zeker nog veel leren en wisselingen doormaken.

ERTMS uitrol is anders ten opzichte van reguliere trein updates vanwege de verschillende partijen die nodig zijn aan tafel. Het is een spel met alle spelers in de sector en tegelijkertijd ook de verschillende systeemleveranciers. De hoeveelheid partijen heeft ook effect op de planning en maakt de planning wellicht wat star.

De huidige uitrolstrategie met verschillende migratiestappen zorgt ervoor dat stukjes land langzaam worden gemigreerd. Hierdoor moeten we in de operatie kijken naar welke trein op welk stukje land kan rijden. Hierdoor krijg je een soort deelparken die in de praktijk voor complexe operationele processen zorgt. De huidige strategie is wellicht minder functioneel dan hoe we hem op papier hadden bedacht. En gaandeweg moeten we dat evalueren en kijken hoe we het gaan aanpakken.

In de testhoek zoeken we actief de samenwerking op tussen de verschillende benodigde partijen. We sparren hier zeker vaker over. We zetten daarin goede stappen maar vanwege de lange doorlooptijd weten we nog steeds niet helemaal zeker wat er nou op ons af gaat komen.

Integratie van systemen is vaak wat onderbelicht, vind ik. We kunnen simpelweg niet denken dat de systemen wel op elkaar aansluiten zoals voorheen en ook daar moet vroegtijdig naar worden gekeken. Je wil bij het testen van treinen voorkomen dat het als big-bang op de trein wordt geïmplementeerd en dat je daardoor slecht fouten kan ontdekken. Ook hier moet gefaseerd worden opgebouwd. De leveranciers leveren werkende en gecertificeerde systemen aan, maar je gaat er aan sleutelen om het aan te passen zodat het integreert op het huidige systeem. Tegelijkertijd moet je ervoor blijven waken dat het systeem blijft voldoen aan alle eisen en niet opnieuw door certificeringsprocessen moet. De verschillende leveranciers interpreteren wellicht TSIs anders en daarom is juist die testomgeving voor integratie zo cruciaal in de uitrol.

Er vindt op het gebied van integratie wel wat samenwerking plaats met andere partijen. Er wordt veel informatie uitgewisseld. Maar ook wordt er gemerkt dat beide partijen nog te ver uit elkaar liggen en dus dat niet elke vorm van samenwerking nuttig is. Het uitwisselen van uitdagingen wil je al wel vroegtijdig bespreken omdat je dat later met elkaar moet oplossen of in ieder geval wil weten dat de ander op de hoogte is. Als de partijen elkaar zo meer nodig hebben, is het goed als die samenwerking en dat contact al eerder is opgestart. Ook leveranciers moeten actief betrokken blijven bij de integratie. Daar wordt geprobeerd al afspraken over te maken.

De hoge doorlooptijd van verschillende aanpassingen zorgt ervoor dat je vroegtijdig wil detecteren als er fouten in zitten of dingen die je graag anders zou willen zien. Leveranciers moeten er vervolgens ook mee aan de slag gaan en niet stoppen bij het afleveren van hun gecertificeerde systeem.

Je ziet voor EKB dat partijen het tijdspad verschillend ervaren. Sommige zijn al wat verder en voor andere is het nog ver weg en merk je dat daar de focus iets minder op ligt vergeleken met andere partijen.

De PD is nodig in de uitrol van ERTMS en dus ook in het in dienst stellen van EKB om te zorgen dat partijen samen gaan werken. Ik denk dat samenwerking van onderaf meer gestimuleerd moet worden en moet worden opgestart. Samenwerking kan vanaf boven maar daar zit minder specialistische kennis. Ik denk daarom dat het belangrijk is dat de partijen elkaar al vroegtijdig opzoeken om te zorgen dat men van elkaar weet wat er speelt en dat zij elkaar tijdig weten te vinden als ze elkaar nodig hebben. Vanuit het testoogpunt wordt er nu nog veel vanuit eigen eilandjes gedacht. Men moet hier tijd voor maken.

Planning moet ook samen iteratief worden opgesteld als we wat intensiever samenwerken en meer richting realisatie gaan. De inhoud moet een grote factor spelen in deze planning.

D.1.6. Interview 6 and 7

Geïnterviewden zijn vertegenwoordigers van een vervoerder, die betrokken is bij het in dienst stellen van EKB. Een is de projectmanager en ook lid van het indienststellingsteam (IDST) en de ander houdt zich bezig met de operationele kant van het in dienst stellen van EKB.

De vervoerder heeft aan het begin een samenwerkingsovereenkomst gesloten met betrokken partijen om kaders vast te stellen voor de samenwerking. Doordat de vervoerder regionale diensten aanbiedt, is ook een provincie betrokken bij de samenwerking en niet alleen de staat der Nederlanden. De samenwerking focust zich vooral op het verkrijgen van financiële bijdragen en ondersteuning bij de transitie naar ERTMS van deze vervoerder. Het gaat in de samenwerkingsovereenkomst om de manier van samenwerken en de inspanningsverplichting, maar het laat ruimte over voor eigen invulling door de partijen.

Door de jaren heen zijn er verschillende besluiten genomen die anders zijn dan eerder bedacht. In overleg met de verschillende betrokken partijen is een besluit tot stand gekomen om nieuwe treinen aan te schaffen in plaats van het ombouwen van de bestaande treinen. Dit is in overleg geweest met de programmadirectie en een provincie (vanwege de subsidieregeling voor regionale vervoerders). Voor de besluitvorming rondom de financiering, die de vervoerder in staat stelt over te gaan naar ERTMS, is de vervoerder afhankelijk van andere partijen. Zonder financiering is de vervoerder niet in staat de overgang te faciliteren vanwege de hoge kosten en geen mogelijkheid om die kosten terug te berekenen aan de klant. De keuze tot aanpassen van het initiële plan heeft dan ook voornamelijk te maken met de wens van de opdrachtgever die de financiën voor dit project beheert. Er heerst dus een sterke afhankelijkheid van de vervoerder tot de concessieverlener voor de participatie aan de transitie naar ERTMS.

Deze regeling voor het verkrijgen van subsidie is ingewikkeld. Dit heeft te maken met de doelen die gesteld zijn op nationaal niveau en ook impact hebben op regionaal niveau (bij de provincies) en de rechtelijke positie van vervoerders en het verlenen van concessies op het spoornet. De betrokken provincie is concessieverlener en krijgt de opdracht om mee te werken aan de wens van het ministerie om ERTMS aan te leggen. Vanwege de concurrentiepositie van verschillende vervoerders is het niet mogelijk om op nationaal niveau geld te verlenen aan de regionale vervoerders en daarom moet de financiële stroom verlopen via de concessieverlener. Dit betekent echter wel dat zij geld vrij moeten maken om de transitie naar ERTMS mogelijk te maken. De betrokken provincie heeft ook haar eigen ideeën over de uitgaven die zij doen.

Naast de samenwerkingsovereenkomst heeft de vervoerder geprobeerd op verschillende plekken in de organisatie van het programma ERTMS, vertegenwoordigers in overleggen te krijgen. Sommige keuzes die moeten worden gemaakt in het programma zijn partij overstijgend, maar kunnen toch groot effect hebben op de vervoerder. Er is daarom gevraagd om een extra clausule in het programma dat ervoor zorgt dat de vervoerder bij eventuele aangedane schade dat kan laten toetsen door een rechter en ook tegemoetkoming kan krijgen. Dit heeft eraan bijgedragen dat de vervoerder welwillend is in de samenwerking en zich ook inzet voor de juiste stappen om de transitie naar ERTMS mogelijk te maken.

De aanpassing in het besluit rondom EKB in dienst stellen voor deze vervoerder zorgt ervoor dat verschillende processen binnen de vervoerder ook anders worden ingedeeld. Dit gaat dan vooral over de operationele kant, zoals het opleiden van machinisten. Maar ook aan de kant van de infrastructuur zullen aanpassingen moeten worden gedaan, die met het initiële plan niet nodig waren. Zo wordt de samenwerking opgezocht met ProRail infra. Als vervoerder kijk je vooral naar wat voor jou nodig is en ProRail heeft daar een iets bredere blik op vanwege de verschillende werkzaamheden en beheertaken die zij uitvoeren. Voor het verlengen van de perrons en de keuze voor de opstellocatie is er ook een afhankelijkheid met een gemeente. Hun planologie en plannen voor de stadsontwikkeling beïnvloeden ook de mogelijkheden. Deze gesprekken zijn al gestart voordat de beslissing voor aanschaf van treinen definitief was. Juist omdat de perron verlenging en het opstelterrein essentieel waren voor de keuze die voorhand lag. Mochten daar al problemen voorzien worden, kon dat de keuze voor trein-aanschaf beïnvloeden.

Samen met ProRail infra is er gekeken naar mogelijke issues en hoe die samen te mitigeren vallen. Daar is gezamenlijk in opgetrokken om het beste plaatje te krijgen van de situatie en de mogelijkheden. Er wordt aangegeven dat ProRail infra zich in deze situatie zeer behulpzaam heeft opgesteld en dat zij echt hebben gekeken waar ze kunnen bijschieten en waar wat mogelijk was. Die samenwerking

wordt door de vervoerder ook als noodzakelijk gezien. In je eentje kan nou eenmaal niet de transitie plaatsvinden en daarom is het nodig om hoog over te kijken wat er nodig is en daarvoor de goede partijen aan elkaar te verbinden.

Vanwege de verschillende ontwerpfases is het niet mogelijk om constant te blijven veranderen. Wanneer een ontwerp eenmaal in de pijpleiding zit, kan je er niet veel meer aan veranderen vanwege het meerjarenproject dat wordt uitgerold om dit voor elkaar te krijgen. Het besluit tot aanschaf van treinen betekent dus ook dat er in zekere zin een point-of-no-return is bereikt. Alle partijen betrokken in het besluit hebben zich gecommitteerd aan deze beslissing en er moet dus ook worden voldaan aan die beloftes.

Vanwege de verschillende afhankelijkheden die nog gaan komen in de komende jaren tot in dienst stellen, is ervoor gekozen een knip in de bekostiging te zetten en daardoor beter op basis van zekerheden in te kunnen schatten wat de verschillende te doorlopen processen nog gaan kosten in tijd en geld. Dit stelt de vervoerder in staat om redelijk adaptief te handelen voor de indienststelling, zover nodig. Er kan worden bijgestuurd in de kosten die moeten worden gemaakt en de planning om zo te zorgen dat de verschillende processen correct op elkaar zijn afgestemd. Deze knip is dus gemaakt om zo onzekerheden af te wachten tot er meer zekerheid over is.

De vervoerder moet zorgen dat de treinen op tijd gereed zijn en dat er personeel is om deze te besturen. Andere taken zoals perronverlenging en het gereedmaken van de infrastructuur liggen bij ProRail. ProRail is in principe in de lead om deze taken te vervullen, maar de vervoerder blijft betrokken in de gesprekken met de gemeente en provincie om te waarborgen dat ook haar taken uitvoerbaar blijven en de belangen vertegenwoordigd zijn. Samen met deze partijen wordt er gekeken wat er nodig is om de treinen te kunnen laten rijden, en te voldoen aan andere eisen en belangen in de omgeving, en vervolgens moet ProRail dat gaan faciliteren.

Er wordt in het interview aangegeven dat er nog beperkt samenwerking is tussen de verschillende vervoerders die een soortgelijke taak hebben voor de transitie naar ERTMS op hun eigen baanvak. Wel is de verwachting dat dit later meer zal gaan plaatsvinden. De vervoerder kan ervaring opdoen met rijden met baseline 4 en dat kan ook waardevolle informatie zijn voor andere vervoerders in de toekomst. De vervoerder geeft aan welwillend te zijn om samen te werken met andere vervoerders om samen tot de beste resultaten te komen. De vervoerder vertrouwt er ook op dat deze hulpvraag andersom ook beantwoord zou worden door de andere vervoerders, zoals NS. Het wordt daarom gewaardeerd dat de partijen al deel uitmaken van het IDST en dus dat de eerste contacten al gelegd zijn om deze hulpvraag aan elkaar te kunnen stellen.

De persoon die namens de vervoerder lid is van het IDST geeft aan dat het prima is hoe het IDST nu is ingericht en dat de informatie op de goede plekken terecht komt. Bij vragen en informatie weet het lid dit goed door te geven en kan er binnen de vervoerdersorganisatie op gehandeld worden.

De vertegenwoordigers van het IDST zitten wel deels met verschillende doelen in het IDST. De vervoerder ziet de implementatie van ERTMS op het baanvak als mogelijkheid om de treindienst te verbeteren en ook om al te leren met ERTMS voor de ambitie om ook internationaal treinvervoer aan te bieden. Het geldt niet voor alle partijen dat die doelen duidelijk zijn, zoals voor goederenvervoer.

ERTMS is nieuw en daar horen onzekerheden bij. In zekere zin geldt voor de vervoerder dat het als pionier functioneert in dit veld. Issues die zijn opgetreden gedurende de verschillende processen hebben zij mee om moeten gaan en veel van kunnen leren. Alle stappen gaan door, ook al zijn dingen nog onzeker, en daarom moet er actief gekeken worden waar te leren valt en waarop moet worden ingespeeld. Stilstand zou anders een gevolg kunnen zijn en dat wil je voorkomen met een strakke planning.

De vervoerder geeft enerzijds aan dat het graag een goed functionerende operatie op de Merwedelingelijn als doel heeft, maar tegelijkertijd ook doelen nastreeft op macro-niveau wat betreft ERTMS. De vervoerder heeft eerder laten zien dat het innovatief is en daar ook vaker in investeert. Er wordt met deze investeringen veel kennis opgedaan om systemen later beter te laten functioneren. Het bedrijf wil dus graag meewerken aan innovaties en is zich bewust van het leergeld dat daar soms voor betaald moet worden. Dit weegt op tegen de vergaarde kennis die kan worden gebruikt om processen te verbeteren of om ook als pionier aan de slag te gaan in andere landen met dezelfde opgaven. De

vervoerder versterkt zijn concurrentiepositie als het veel kennis heeft in zijn operationele velden. Het toont aan dat zij in staat is grotere opgaven aan te kunnen wat vertrouwen schept richting de opdrachtgever. De vervoerder ziet ERTMS als mooie kans om aan ambities te werken en ziet zichzelf daarom ook als fijne samenwerkingspartner vanwege de welwillendheid richting deze transitie.

D.1.7. Interview 8

Geïnterviewde vertelt dat het zich bezighoudt met het implementeren van ERTMS binnen een betrokken vervoerder en zich primair focust op het in staat stellen van de machinisten en ander betrokken personeel om te gaan proefrijden voordat alle operaties van de vervoerder over kunnen naar ERTMS. Het ziet zijn rol als het samenbrengen van elementen vanuit de staande organisatie en programma om klaar te zijn voor de volgende stap betreffende de uitrol van ERTMS.

Voor EKB in dienst kan gaan, moeten de treinen en het personeel voldoende training en tests hebben doorlopen. Hiervoor wordt ook een proefbaanvak gecreëerd en zijn andere trajecten beschikbaar voor opleiding. Ook zullen er nog tests moeten plaatsvinden op het baanvak van EKB om te kijken of inderdaad alle elementen hetzelfde gedrag vertonen op de proefbaanvakken zodat het baanvak veilig in dienst kan gaan. Per trein verschilt de aanpassing zeer. Sommige vereisen een hele ombouw, andere enkel een software update. We sturen er bij het gereedmaken van de treinen zoveel mogelijk op om de gebruikersprocessen voor de machinist sterk vergelijkbaar te houden om extra opleidingsdagen en complexiteit voor treinbesturing te voorkomen. We weten deze uitwerking nog niet per materieeltype. De vervoerder kiest op basis van de huidige en toekomstige dienstregeling welk materieeltype eerst wordt omgebouwd en welke later.

Geïnterviewde geeft aan dat adaptiviteit zeker nodig is in een indienststellingsteam (IDST). Er komen nou eenmaal zaken naar boven die niet eerder verwacht waren. Je moet als organisatie in staat zijn met issues om te gaan en kleine veranderingen kunnen doorvoeren omdat we simpelweg gewoon nog niet weten hoe EKB werkt als het opgeleverd wordt. Met de proefbedrijven worden al kleine tests en aanpassingen gedaan en dat moet ook voor EKB zelf tegen de tijd dat het er klaar voor is. Hoe groot of klein de aanpassing dat kan je echt nog niet zeggen van tevoren.

Het programma werkt met verschillende uitgangspunten en er wordt getwijfeld hoe makkelijk je daaraan moet gaan sleutelen. Dat heeft ook te maken met dat de uitgangspunten zijn gekozen in afstemming met de verschillende betrokken partijen en dat aanpassingen daarin ook aparte effecten hebben voor die partijen dus niet altijd elke partij evenredig raakt. Adaptief zijn is dus heel afhankelijk van de grootte van de beslissing en de impact op de betrokkenen. Wij hebben als vervoerder al stappen gezet op basis van deze uitgangspunten en grote veranderingen daarin zouden voor ons tot gigantische effecten kunnen leiden en liggen daarom niet altijd voor de hand om adaptief in te willen zijn. De vraag is dus of je makkelijk kan omgaan met wijzigingen in deze strategischere keuzes en op welk niveau je als organisatie (of combinatie) adaptief wil kunnen handelen. De geïnterviewde lijkt te twijfelen of het wel slim is om op strategisch niveau te gaan sleutelen.

Het team van EKB zit nog niet heel lang samen en heeft daarom nog minder adaptief hoeven te zijn. EKB hoeft pas over een aantal jaar in dienst en het is nog te vroeg om dan adaptief te hoeven zijn geweest. Dilemma's waarvoor ik denk dat we adaptief willen zijn, komen wellicht wat meer in de uitvoering. Het is dan koppen bij elkaar om tot oplossingen te komen die de voortgang en kwaliteit van het proces ten goede komen. De vervoerder heeft in een ander team deze adaptiviteit wel al kunnen tonen en geprobeerd de voortgang zo goed mogelijk te bewaken en toen af te wijken van eerder gemaakte keuzes.

Binnen het IDST van EKB heeft geïnterviewde aan dat er goed naar elkaar geluisterd wordt en echt naar elkaars belangen wordt gekeken. Bij het duidelijk krijgen van elkaars belangen en beweegredenen is het mogelijk om vertrouwen op te bouwen. Met het IDST is goed gekeken naar de mogelijkheden en de risico's en toen is er een besluit gekomen waar iedereen achter stond. Ik heb ook extra inhoudelijke mensen toen gevraagd om mee te kijken zodat echt de goede informatie op tafel lag. Het IDST wil zich als team inzetten voor het samen in dienst stellen van EKB. Geïnterviewde geeft aan dat er een open sfeer is in het IDST. Alle partijen hebben te maken met een eigen geheimhouding, maar ook daar is met elkaar naar gekeken. Er heerst geen gevoel dat partijen informatie achterhouden. Niet elk detail hoeft ook gedeeld te worden, als maar processtappen duidelijk zijn en ook ik kijk zelf kritisch wat ik uit het IDST vertel aan mijn eigen organisatie. Om ook het vertrouwen met elkaar in stand te houden. Het wordt ook genoemd dat het altijd aanwezig zijn in de overleggen van belang is omdat je dan meer meekrijgt en de goede dingen oppikt die voor de eigen organisatie belangrijk zijn. Dat kan nog wel eens worden overgeslagen als je niet aanwezig bent in het overleg.

Het IDST is niet het team met alle verantwoordelijke inhoudsmanagers. Deze mensen moeten op een gegeven moment goed met elkaar communiceren en samenwerken. Nog twijfel of het IDST hiervoor de beste plek is. Vanuit de rol van de geïnterviewde worden nu mensen uitgenodigd waar nodig om de kennis te hebben nodig voor het zetten van de goede stappen. Wel is het zeker fijn dat de PD als onafhankelijk orgaan aanwezig is in het IDST. Ook de grotere programmadoelen moeten namelijk gewaarborgd en overzien worden.

Geïnterviewde ziet zichzelf als verantwoordelijke voor de informatie op de goede plek krijgen in de eigen organisatie. Vertragingen bij infra willen mijn mensen ook weten. Wij moeten dan ook opnieuw kijken naar de mogelijkheden en wat er te regelen valt. Het initiatief voor een nieuw plan op basis van de vertragingen ligt bij de geïnterviewde.

Het feit dat het IDST eigenlijk geen mogelijkheid heeft om zelf officiële besluiten te nemen is volgens de geïnterviewde niet een grote belemmering. Het kost wel extra tijd maar er wordt ook getwijfeld of de leden van het IDST ook de juiste mensen zijn om deze beslissingen zelf te kunnen maken. Ook vanuit objectiviteit is het goed dat andere mensen opnieuw naar de inhoud, die door ons is samengesteld, kijken. Het IDST kan niet alles overzien en dus ook niet wat de consequenties zijn van hun keuzes op andere teams of systeemelementen. Een andere partij kan dat beter en daarom is het ook oké dat wij niet de bevoegdheid hebben om al die keuzes te maken. Kleine aanpassingen die in lijn blijven met wat we eerder bedacht hadden, moeten we wellicht wel zelf kunnen doen. Maar aanpassingen die aan de uitgangspunten raken, moeten worden gecontroleerd bij de groep die deze punten heeft opgesteld en daar overzicht over houdt.

De mogelijkheden om aan te passen zijn sterk gekoppeld aan de uitgangspunten die je voor het team vaststelt. Je kan niet elke 3 jaar wat anders doen, dus sommige keuzes gaan we proberen niet meer aan te komen. Aan de voorkant is bijsturing dus wat beperkt. Eenmaal in de realisatie moeten issues simpelweg worden opgelost en ben je samen adaptief om te zorgen dat de issues verholpen worden.

Tussen de vervoerder is wel het een en ander aan samenwerking. Informatie wordt zeker uitgewisseld om elkaar verder te helpen. Geïnterviewde geeft aan dat in het IDST niet het gevoel heerst dat mensen vanwege concurrentiepositie van verschillende partijen niet alles op tafel durven te leggen. De informatie die in het team besproken wordt daarom ook niet zomaar in elke organisatie verder verspreid.

Het team voelt steeds meer als vertrouwde omgeving en alsof er als team wordt gewerkt aan een opdracht. Daarnaast is de frequentie nu goed. Deze frequentie draagt ook bij aan de teambuilding. Je ziet elkaar regelmatig en ook informele, niet ERTMS-onderwerpen, krijgen soms ook wat aandacht.

Adaptief betekent ook dat iets moet kunnen veranderen in een zeker tijdscomponent. De verwachting wordt uitgesproken dat zeker niet alle aanpassingen bij het IDST terecht komen en vaak ook gedurende de uitvoering worden opgelost door de specialisten die er actief aan werken in overeenstemming met elkaar. Als IDST ontvang je dan enkel korte updates over de voortgang. Het IDST wordt dan iets meer sturend dan nu. Echt buiten wil je dat de specialisten het oplossen en niet het IDST.

De rol van de geïnterviewde is voltooid als er enige tijd onder ERTMS wordt gereden op EKB en de dienstregeling kan worden uitgevoerd en dat er een evaluatie plaatsvindt met het vastleggen van geleerde lessen. Dan is de stap eigenlijk voltooid en kan je alles overdragen aan de staande organisatie.

Planningen van de vervoerder worden ook vaak omgegooid door nieuwe ontwikkelingen, zoals het voorbeeld van de vertragingen in de infra. Op basis van informatie uit het IDST wordt er in de organisatie gekeken wat de invloeden zijn en hoe dat wordt opgepakt. De vervoerder moet deze nieuwe planning dan weer door verschillende organen laten controleren voordat dit naar de PD wordt gecommuniceerd. Eerst alle hoepeltjes door in de eigen organisatie.

D.1.8. Interview 9

Geïnterviewde is voorzitter van het indienststellingsteam (IDST) van EKB en actief vanuit de programmadirectie ERTMS. De voorzitter heeft als taak het coördineren van de samenwerking tussen de verschillende partijen die uiteindelijk samen EKB moeten opleveren. Tot het coördineren kan worden verstaan dat het duidelijk moet zijn dat men weet wat de opdracht is en wat iedereens rol is binnen die opdracht. Als voorzitter is het dan belangrijk om oog te hebben voor waar de rollen en systemen elkaar raken, voornamelijk in tijd en integratie, en die samenwerking goed te coördineren.

Adaptiviteit in een programma zoals ERTMS is nodig. Er gaan veel dingen voorbijkomen waarbij wat we hadden bedacht toch minder werkt. Het is nodig dat er voor die adaptiviteit een basis is, op de planning, op de inhoud en/of op de sturing. In de aansturing en governance om te bepalen wie wat mag besluiten, moet mee geoefend worden om het team zo optimaal mogelijk te benutten. Een team dat niet adaptief is en gefrustreerd raakt door wijzigingen, zal zijn effectiviteit verliezen.

In het IDST worden we nu veel geconfronteerd met dat delen van onze planning sterk beïnvloed worden en dat daarom onze planning anders wordt. Je moet daar dan als team goed om kunnen organiseren. Daardoor moet er goed gekeken worden wat er mogelijk is op de inhoud. Kunnen we deze stappen blijven zetten en zijn die verstandig, gegeven dat de wereld om ons heen verandert? Dat moet echt met elkaar gebeuren en de partijen moeten elkaar daar niet uit het oog verliezen. De mogelijkheid om adaptief te zijn hangt ook af van het type mensen en hoe dicht ze bij het vuur zitten. De vertegenwoordigers in het team moeten ook de hele organisatie meekrijgen en dat is best ingewikkeld. Ook de organisatie moet dan akkoord zijn met de wijziging zonder dat dit te veel tot frustraties leidt. De grote achterban van vertegenwoordigers en verschillende belangen hebben daar invloed op. Wijzigingen hebben weleens negatieve impact op een van de partijen en daarom is het goed doorvoeren van de rationale uit het IDST belangrijk.

Het gevoel wordt uitgesproken dat in dit IDST alle leden allemaal bereid zijn om naar elkaar te luisteren en met elkaar problemen aan te pakken. Er worden verschillen gezien met andere IDSTs. Dat lijkt heel erg te zitten in de mensen die deel zijn van het IDST en niet zozeer de structuur die de teams aanhouden. Binnen EKB wordt gesproken van een groep die zich adaptief opstelt waar nodig. Luisteren zorgt ervoor dat gesprekken worden opgestart en vragen ter verduidelijking worden gesteld. De mogelijkheid tot stellen van vragen en serieuze antwoorden met informatieverstrekking waar nodig, maakt het voor de groep mogelijk om elkaar te leren vertrouwen. Begrip voor elkaars beweegredenen is van groot belang als je samen verder aan iets wil werken. Ook dat begrip is weer belangrijk voor vertegenwoordiging naar de achterban.

Het IDST heeft beperkte eigen mandaat. Deze structuur is op dit moment niet erg en heeft nu vooral voordelen. Wel wordt aangegeven dat naarmate we dichter bij de indienststellingsdatum komen, dat er sneller geschakeld moet kunnen worden en dat mandaat daar van belang bij is. Je moet dan met de inhoudsmanagers kunnen kijken wat het beste is en daar keuzes over kunnen maken. Op de hoogte stellen van andere besluitvormingslagen zou dan voldoende moeten zijn om niet te veel tijd te laten verstrijken per beslissing. Daarvoor is het handig als kaders worden opgesteld voor het IDST. Dan heb je duidelijk wanneer je zelf kan beslissen en wanneer andere stappen nodig zijn. Aangezien dit IDST maar een klein deel van het programma is, blijft het goed dat soms zeker het geheel bekeken blijft worden en hoe een aanpassing daar impact op heeft. Het vaststellen van die kaders moet de komende periode nog goed gebeuren om zo effectief aan de slag te kunnen gaan. Dat draagt bij aan de adaptiviteit van het team. Er zit een duidelijk tijdscomponent aan adaptief. Verschillend per besluit en de impact, kan het tijdscomponent anders zijn, maar je bent alleen adaptief als dat binnen bepaalde tijd kan. Er wordt aangegeven dat je alleen adaptief bent geweest als er geen stilstand is opgetreden.

Als voorzitter is het belangrijk om te zorgen dat de mensen aan tafel geen interne strijd voeren over de mogelijk strijdige belangen. Iedereen aan tafel moet het belang goed kunnen neerleggen en samen met elkaar bespreken wat dan het beste is voor het vervoersysteem met zo min mogelijk schade aan de belangen. Er moet een open gesprek kunnen worden gevoerd. Samen kijken naar wat het beste is, ook al zijn er belangen die met elkaar conflicteren. Vanwege de verschillende niveaus van de issues die spelen, moeten ook de belangen per niveau in acht genomen worden. Als iedereen met

deze mindset in het team zit en ervoor werkt, moet het IDST slagen. Ik denk dat dat op dit moment behoorlijk gelukt is. Dit vertrouwen heerst binnen dit IDST. Hier moet je ook heel voorzichtig mee om gaan omdat dit terugwinnen heel moeilijk gaat worden. Men moet vertellen om dezelfde informatie te hebben en samen verder te kunnen. Voorkom een belangenstrijd maar heb tegelijkertijd ook oog voor alle belangen. Dat is toch best moeilijk.

In het IDST is vertrouwen gecreëerd door aan het begin veel vragen aan elkaar te stellen en elkaars standpunten goed te doorgronden. Men probeerde zoveel mogelijk informatie boven tafel te krijgen en te laten zien waarom een standpunt zo was ingenomen. Dat kost veel tijd maar langzamerhand gingen mensen meer van elkaar overnemen en daarmee werd er vertrouwen opgebouwd. Inmiddels zie je dat dingen in het IDST vaak voor waarheid, en voldoende onderzocht, worden aangenomen als mensen informatie delen en dat vragen vooral ter verduidelijking zijn. Niet zozeer omdat er twijfel is of dit niet is wat het beste is voor het team. De belangen zijn te groot en soms te verschillend om niet op basis van dit vertrouwen te kunnen werken. Dit is dus fundamenteel voor het goed functioneren van het team. Dit betekent dat op het moment dat iemand het team verlaat en er iemand bij komt, dat er opnieuw aan dit vertrouwen gewerkt moet worden. De kaders die moeten worden gezet, zouden daar ook bij helpen en maken het makkelijker voor iemand om deel te worden van het team met de daar bijhorende bevoegdheden. Maar we moeten als team dan weer werken om de modus operandi staande te houden.

De leden van het IDST werken goed samen aan het zetten van stappen richting de indienststelling. Toch hebben we niet altijd alle informatie die nodig is. Het is belangrijk dat de leden de goede informatie kunnen doorgeven en daarom de vraag goed kunnen uitzetten in de organisatie. Inhoudsdeskundigen kunnen aansluiten als een lid van het team dat als nuttig ziet om voldoende detail te hebben. Naarmate we verder in de operatie komen, denk ik dat het goed is als inhoudsmanagers vaker aansluiten / permanent deel worden van het team om directere informatiestromen te hebben en snel met elkaar te kunnen schakelen. Dat stelt het team in staat om adaptiever te werk te gaan. Als je nu al deze inhoudsmanagers al laat aansluiten, lijkt dat tijd- en energieverspilling. Het uitgangspunt is nu een kernteam die vragen kunnen stellen in de eigen organisatie en mensen uitnodiging als er verdieping nodig is. Meer mensen aan tafel zou ook tot meer conflict kunnen gaan leiden. De huidige samenstelling zorgt er ook voor dat elke organisatie even duidelijk vertegenwoordigd is en geen partij een grotere stem heeft in het gesprek. Dit zorgt voor effectieve samenwerking. Contacten in de tweede laag in de organisaties zijn gelegd en overleggen zijn gestart. Ook zij kunnen elkaar op deze manier snel vinden en gemakkelijk met elkaar tot overeenstemming komen.

De frequentie van vergaderen zorgt nu ook voor teamvorming waarbij er niet alleen tijd is voor de inhoud maar ook voor de gezellige praat. Te weinig met elkaar zitten, zorgt voor een vermindering in het vertrouwen en de samenwerking is de verwachting. Op momenten dat belangrijke beslissingen voor de deur staan, wordt de frequentie opgeschaald om te zorgen dat dan snel gehandeld kan worden op nieuwe informatie.

Ik ben blij als we EKB in dienst stellen op een goede manier met elkaar bereikt heb. Als er veel scherven achtergelaten worden met elkaar denk ik niet dat het geslaagd is vanuit mijn rol als voorzitter. Maar ook als we niet in dienst gaan, en daar is een goede reden voor die voor iedereen helder is waarom iets niet is gelukt of gedaan, kan ik ook tevreden zijn. Succes van een project zit niet altijd in het eindresultaat maar ook in de weg ernaartoe.

D.1.9. Interview 10

Geïnterviewde houdt zich bezig met de planning binnen het programma en sluit vanuit die rol ook aan bij het indienststellingsteam (IDST) EKB. Deze rol houdt zich bezig met de coördinatie en samenbrengen van tijdscomponenten tussen de partijen en de raakvlakken.

De verschillende betrokken partijen geven input voor de masterplanning die wordt gebruikt in de formele lijn. Om deze input te verkrijgen zijn er verschillende mogelijkheden. Er wordt informatie gegeven bij het IDST maar ook kan de geïnterviewde zelf contact zoeken met de desbetreffende project planner bij de betrokken partij op dat project. Dit is niet per se een geformaliseerde manier van informatie ophalen, maar de gebruikte werkwijze van de geïnterviewde. Geïnterviewde probeert anderen op de hoogte te stellen als contact wordt gezocht om de informatiestroom te versnellen. Directe informatie is vaak handiger dan informatie uit tweedehands en zorgt voor een volledige informatiestroom. Rechtstreekse communicatie heeft dus de voorkeur van de geïnterviewde om informatie op te halen.

Bij het uitvragen van extra informatie probeert de geïnterviewde anderen op de hoogte te stellen om te voorkomen dat mensen verrast zijn. Het doel van deze extra informatie is vaak om de informatie directer te ontvangen met minder ruis. Dit wordt ook gedaan om te laten zien dat er wederzijds respect is voor elkaars positie en dat men elkaar serieus neemt. Als men elkaar niet informeert kan dat gewoon frustraties opleveren en dat wil je voorkomen. In kleine teams is het gemakkelijker om kort op de kar te zitten, en nu moet je dat actief onderhouden. Meer mensen in een team betekent dat dat er steeds meer lijntjes komen en dat dus ook de complexiteit verhoogd wordt. Het is dus belangrijk om te investeren in relaties als je goed met elkaar wil kunnen werken. Het blijft mensenwerk.

Ik ga er van uit dat de vertegenwoordigers in het IDST goed geïnformeerd zijn. Zij zijn uiteindelijk verantwoordelijk voor hetgeen waar ze voor staan. Je kan vaak ook wel beetje toetsen of die informatie klopt met wat jij zelf als planner hebt gehoord. Mocht hier een delta in zijn, wil je daar vragen over stellen of een moment bij stil staan. We kijken dan naar hoe recent de informatie is van beide partijen en kijken hoe de wisselwerking tussen organisaties en communicatielijnen leidt tot deze delta.

Met EKB ben je heel erg afhankelijk van de andere migratiestappen die nog lopend zijn. We sturen dus ook op die informatie. We hebben wel wat mijlpalen voor EKB in de tijd gezet en moeten zo dus bijvoorbeeld aan verschillende aanbestedingen beginnen. Er wordt weinig veranderd in de planning voor deze mijlpalen omdat er veel onzekerheid boven hangt vanwege de voorgaande migratiestappen. Op basis van de informatie beschikbaar maken we de beste keuzes en dus ook plannen we de stappen. Als er meer zekerheid is over de stappen voorafgaand aan EKB kunnen we ook voor EKB meer sturen op de goede data en planning.

We proberen planningen aan te passen als we meer zekerheden hebben. Er moet kunnen worden bijgestuurd in de planning wanneer dat nodig is en wanneer deze zekerheden andere informatie bieden die eerder anders is ingeschat. Toch blijf je altijd onzekerheid houden in de planning op dit moment in het programma.

Men blijft sturen op de afgesproken planning totdat anders gecommuniceerd wordt. Als er veranderingen komen, wordt dit gezamenlijk besloten en zal iedereen ook op IO niveau de planning moeten aanpassen. Aangezien de masterplanning wordt gevoed met input van de IOs wordt dat automatisch verwerkt. Men moet dan ook zeggen dat ze voor deze planning gaan en hiervoor aan de slag gaan.

Adaptief zijn is nodig in een IDST van EKB om de energie erin te houden. Dit ligt ook heel erg aan het team en de personen in het team. Ik denk dat je als team in een veranderende omgeving zeker mee moet kunnen bewegen binnen de kaders die gezet zijn. De personen in het team zijn natuurlijk allemaal verschillend en daarmee ook bepalend voor de groepsdynamiek. Binnen de teams moet je dus een zekere balans vinden om om te gaan met die adaptiviteit.

Adaptiviteit is gewenst op verschillende niveaus en is afhankelijk van het vraagstuk. Je hebt als team een soort kader nodig waar je binnen werkt. Hiermee kan je bepalen waar je op moet sturen, waar je op moet rapporteren. De vraag is bijvoorbeeld of je inderdaad moet tornen aan het hoofddoel van zo'n IDST. Daar moet je als team afvragen of je dat wil. Binnen de kaders van het team moet je als team ervoor kunnen gaan en dan in die context en omstandigheden weer adaptief zijn waar nodig. Het IDST moet ruimte krijgen om binnen de kaders aanpassingen door te voeren maar je wil ook voorkomen dat een IDST van alles is en daarmee te veel vrijheid krijgt.

Afwijken van een planning kan, maar vereist goede onderbouwing. Ook moeten er oplossingen

of mitigerende maatregelen worden uitgedacht als je inderdaad afwijkt van de planning. De ervaring is dat gegeven tijd wordt gebruikt en daarom moet er bij afwijkingen van de op dat moment gebruikte planning worden gekeken hoeveel tijd echt nodig is. We willen ook als PD meer hierin gaan sturen om te zorgen dat we iets meer met elkaar werken aan de afspraken die we als programma ERTMS samen hebben gemaakt. Iedereen zet in principe zijn naam onder de gemaakte planning en maakt zich hier hard voor. Commitment van de stakeholders is daarin essentieel.

We moeten zorgen dat elke partij en elk project een integraal onderdeel zijn van de planning. Dus ook partijen die wellicht nu minder vertegenwoordigd zijn moeten gelijk terugkomen in de planning. Als niet elke partij even goed integraal onderdeel is, zal je zien dat er wat extra moeilijkheden ontstaan om EKB op te leveren als werkend vervoersysteem.

De PD krijgt vaak de meest verse informatie en daarmee kan je de directe voortgang monitoren. Soms hebben wij zelfs recentere informatie dan de IOs zelf en we kijken nu ook hoe dat precies in elkaar zit dat dit gebeurt.

In het IDST zitten de projectmanagers die met elkaar kunnen overleggen. Wij hebben ook een projectplanners overleg. Ik denk dat vanwege de beperkte interactie tussen de verschillende werkstromen, die veelal onafhankelijk kunnen werken, dat het ook niet nodig is om meer te sturen op bottom-up communicatie. Ze werken redelijk onafhankelijk totdat de raakvlakken in zicht komen. Daar moeten wij dan de tijdscomponenten samenbrengen. Wij moeten dus met die partijen zitten om constant af te stemmen of alles nog goed loopt en we zitten strak op de communicatie wanneer er raakvlakken komen. We toetsen constant of alles nog in de pas loopt. Maar op dit moment weinig interactie tussen de partijen onderling naar mijn inzicht.

De IOs zijn verantwoordelijk voor hun eigen voortgang, maar tegelijkertijd voel ik ook een gezamenlijke verantwoordelijkheid. We willen als PD betrokken zijn en verantwoordelijkheid nemen waar. We willen dat de IO zijn eigen verantwoordelijkheid neemt, maar tegelijkertijd ook niet de IOs laten zwemmen als wij een helpende hand ter beschikking hebben. Het programma wordt alleen een succes als we gezamenlijk met deze uitdagingen aan de slag gaan. Als je als team wil werken, moet je ook je best doen om als team te functioneren en dat je je dus ook inzet voor elkaar.

De faciliterende rol van de geïnterviewde focust zich op het verstrekken van de juiste inzichten rondom tijd. Het team moet op basis van mijn aangeleverde informatie goede keuzes en besluiten kunnen maken. Ik heb het gevoel van meerwaarde dat wat ik doe iets bijdraagt aan het team op gebied van inzicht, sturing en rapportage. Mijn taak is geslaagd als die meerwaarde gevoeld is en het team verder kan met de aangeleverde informatie en andere aspecten op het gebied van tijd en beheersaspecten.

D.1.10. Interview 11

Geïnterviewde houdt zich bezig met het rijdend personeel gereed krijgen voor ERTMS en daarmee ook voor het baanvak EKB. In totaal moeten er 3500 machinisten worden opgeleid om onder ERTMS te kunnen rijden.

Voor het opleidingstraject zijn verschillende gebruikersprocessen gedefinieerd, die zich focussen op de samenwerking tussen de machinist en verkeersleiding. In een vroeg stadium is bepaald dat voor EKB dat er 2400 machinisten nodig zijn. Vanwege de programmabeslissing om ERTMS only uit te rollen, moet je als machinist al volledig opgeleid zijn want je kan niet op het baanvak meer rijden als je niet ERTMS bevoegd bent. Per vervoerder verschilt het in hoeverre alle processen gekoppeld zijn en dus hoeveel unieke kilometers er per machinist worden gereden. Daarnaast gaat EKB extra gebruikersprocessen introduceren. Zo kunnen we hier ook testen of onze processen goed zijn ingedeeld om veilig over overwegen te gaan en de opstelterreinen te bereiken. Die processen kunnen we nog niet eerder testen in de bestaande (of aankomende) proefbaanvakken. Dit volgt uit de programmabeslissing om opbouwend complexiteit toe te voegen en dus langzaam een stukje toe te voegen en te testen op functioneren. Het laatste stukje van de opleiding wordt dus ook hier getest en of die goed aangeleerd is. Er zal een additionele training volgen voor overwegen zodra we weten hoe dat gebruikersproces precies ingedeeld moet worden.

Geïnterviewde geeft aan dat nog veel dingen onzeker zijn voor de implementatie van ERTMS only in Nederland. Voor de gebruikersprocessen proberen we daarom zoveel mogelijk te testen in simulaties en later ook buiten in het veld. Hier moet worden gekeken naar verificatie en validatie. Op papier kan alles goed werken, maar dat moet het daarbuiten ook doen. Daarnaast moeten we ook kijken wat de menselijke maat als invloed heeft op deze processen. Er moet worden beproefd en begrepen. Samenwerking wordt opgezocht met verschillende disciplines om tot een goed resultaat te komen. We moeten in zekere zin de techniek gebruiken om het aangenamer te maken voor de reizigers en rijdend personeel maar dan ook echt zorgen dat de techniek geschikt is voor de operatie voor ogen.

In de opleiding is gestuurd op standaard processen. Hier worden naast machinisten opleidingen andere elementen in het systeem op afgesteld zoals infra en materieel ombouw. Specifieke afwijkingen in de infra of materiaal kunnen ook aanpassingen in de opleiding tot gevolg hebben. Die afwijkingen moet je zo vroeg mogelijk constateren om nog te kunnen aanpassen. Hiervoor is harmonisatie van alle gebruikersprocessen van groot belang. Daar wordt ook door de PD ERTMS op gestuurd. Alleen bij specifieke aanpassingen bij een baanvak, wordt daar in detail aandacht aan gegeven.

Om dit te stroomlijnen geeft geïnterviewde aan dat er veel moeite is gedaan om de gebruikers vroeg in het proces van ontwikkeling en testen te betrekken. Ze zijn betrokken bij het stellen van eisen rondom ombouwmateriaal om grote verschillen te voorkomen. Als je per IDST weer gaat afwijken van de voorgeschreven standaarden, krijg je hele andere processen per baanvak en dat is wat we willen voorkomen. Machinisten ondergaan echt een hele transitie en zullen hun manier van denken moeten aanpassen en dat verschilt per persoon in hoeverre daarvoor open wordt gestaan. Er is gekozen voor een olievlek strategie om machinisten langzaam te laten wennen aan de transitie naar ERTMS. Early adopters kunnen zich al verder verdiepen en zo langzaam anderen aansporen dat dit de toekomst is en gaaf. Er is vroeg gestart met dit traject om mensen de tijd te geven om eraan te wennen. Dit levert positieve geluiden op binnen de organisatie.

Geïnterviewde geeft aan dat de vervoerder een eigen leercentrum heeft voor de ERTMS opleiding. Gebruikersprocessen zijn afgestemd met de infrastructuur beheerder en vanuit die basis is de opleiding gebouwd. Sector-brede aanpassingen zullen ook de opleiding laten veranderen en soms moeten mensen voor een stukje herintroductie komen. Het opleiden kan de vervoerder onafhankelijk doen.

Toch moet er ook samenwerking worden gezocht. Voor het maken van opleidingen is het goed om zoveel mogelijk samen te doen. We zijn immers allemaal afhankelijk van nieuwe Europese richtlijnen dus hebben er ook wat aan om daarin samen op te trekken. Uiteindelijk is het gewoon belangrijk dat op alle lijnen de machinisten en verkeersleiding min of meer samenwerken en dat er geen grote verschillen tussen de opleidingen zitten, in het teken van harmonisatie.

Het includeren van human factors in het testen en ontwerp van de processen is volgens geïnterviewde een cruciaal onderdeel van succesvolle uitrol van ERTMS in Nederland. Daarnaast moeten aangetroffen problemen zoveel mogelijk worden opgelost in de techniek en moet er niet altijd worden gekeken

naar hoe de machinist het anders kan doen. Het trainen van machinisten van tijdelijke workaround is heel kostbaar en daarom wordt er aangegeven dat er meer gekeken moet worden om problemen op te lossen in de infra of in de techniek. Dit vergt een cultuurverandering wordt aangegeven door de geïnterviewde. Het is een technisch systeem met mensen erin en die mensen zijn van te groot belang om ze buiten de formule te laten.

Als er goed samen gewerkt wordt, kan er in de techniek ook nog meer. Als je als gebruiker mee wordt genomen in dat proces, kan dat ook van toegevoegde waarde zijn en het eindresultaat positief beïnvloeden. In de simulator hebben we kunnen laten zien hoe de techniek er voor ons uit ziet en hoe dat de operatie beïnvloedt. Deze informatie-uitwisseling kan beide partijen verder helpen. Daardoor kan je ook samen adaptiever zijn.

Het grootste probleem dat wordt gezien in het opleidingstraject is dat we mensen niet kunnen opleiden om toe te kunnen passen. Er is op dit moment te weinig mogelijkheid om mensen te laten blijven oefenen met ERTMS en dat ze voldoende met het nieuwe systeem in aanraking komen. Als je mensen opleidt en ze vervolgens loslaat en geen ERTMS laat rijden, zullen dingen van de opleiding wegzakken. Op het moment van opleiden, moet er dus een stukje routine in worden gebouwd. Dat is nu eigenlijk niet mogelijk met de huidige ERTMS baanvakken en simulatieprojecten. Er wordt daarom gekeken of de eerst gemaakte inschatting voor opgeleide machinisten anders kan. De geïnterviewde geeft aan dat machinisten zich veilig moeten voelen en dat ze kwaliteit moeten kunnen leveren. We moeten blijven garanderen dat deze twee taken vervuld zijn en daar moeten we op blijven monitoren.

Geïnterviewde ziet zijn rol als voltooid wanneer alle machinisten opgeleid zijn en er voldoende ritten gereden worden, zodat iedereen zijn rooster kan rijden en met vertrouwen kwaliteit geleverd kan worden. Als je een punt bereikt dat je hem echt terug kan geven aan de lijn, is denk ik mijn rol vervuld. Tot die tijd geloof ik echt dat ik vanuit mijn rol er boven op moeten zitten. Testen, testen, testen met oog voor de menselijke maat. Daarnaast moet de sector leren omgaan met de snelle veranderende omgeving. ERTMS zal veel software-updates met zich mee brengen en daarvoor moeten er om de 4/5 jaar aanpassingen worden doorgevoerd en daar moet de sector voor open gaan staan, om zo alle baten van ERTMS te kunnen behalen.

D.1.11. Interview 12

Geïnterviewde houdt zich bezig met dienstregelingen en planningen rondom materieelinzet en personeel bij een vervoerder.

Alle aspecten op dit gebied hangen sterk met elkaar samen. Het ombouwen van treinen hangt af van de dienstregeling en de materieelinzet op deze trajecten. Ook het personeel aanwezig in de trein moet getraind zijn om de trein te kunnen opereren. De tijdslijn van deze stappen hangt van meer af dan hoe het er voor EKB uit moet zijn, maar is ook sterk afhankelijk van alle stappen ervoor en die erna nog zullen volgen.

Een voorbeeld van deze samenhang is dat er in een besluit gekozen is voor de ombouw van specifieke treintypes en dat dit een impact heeft op dienstregeling. Hierdoor moeten er treinen worden verplaatst en worden op andere trajecten ook veranderingen doorgevoerd. Een keuze voorafgaand aan EKB brengt meer teweeg dan enkel wat er voor dat baanvak nodig is.

Gedurende de afgelopen jaren is gebleken dat het ombouwen van treinen weerbarstiger is dan gedacht en daarom zijn verschillende mijlpalen lastig haalbaar. Het is een nieuw systeem en we moeten het implementeren in oude treinen en systemen en dat kost meer tijd en moeite dan eerder voorspeld. Er wordt heel geleerd maar het kost ook meer tijd.

In eerste instantie was het plan om alle treinen omgebouwd te hebben voordat er iets in dienst zou gaan met ERTMS, maar dat is niet haalbaar. Hierdoor is de complexiteit voor de dienstregeling toegenomen. Nu moet er worden gekeken welke treinen waar kunnen worden ingezet en hoe dat ook met personeel wordt afgestemd. Het is nog wel de vraag of, als de tijdslijn anders was geweest vanaf het begin, of je dan eerder was gaan ombouwen.

Geïnterviewde geeft aan dat adaptief zijn heel belangrijk is voor een programma als ERTMS. Het is een traject dat je niet exact kan plannen omdat het een nieuwe uitdaging is. Je leert door het programma heen erg veel. Als je dan de kaders heel strak neerzet en per se binnen tijd en geld wil opereren, gaat de kwaliteit daaronder lijden. Het is dus nodig om af en toe in de tijd te kunnen aanpassen om te zorgen dat de kwaliteit voldoende blijft. Ook omdat je afhankelijk bent van heel veel partijen, moet je adaptief kunnen omgaan met dingen die op je pad komen.

Het is belangrijk voor de geïnterviewde om te streven naar bijsturen waar de reizigers zo min mogelijk direct last van hebben. Daar wil je dus adaptief voor zijn: voorkomen dat de reziger er last van heeft dat plannen niet gehaald zijn zoals in eerste instantie besproken. Hier zijn ook wel gradaties in. Op sommige vlakken kan er gericht worden bijgestuurd, maar op sommige aspecten is dat ook minder makkelijk. Je wil dus proberen dat binnen de gestelde kaders waarin je adaptief moet zijn, de reiziger centraal staat en zo min mogelijk hinder ondervindt.

Plannen die in tijd naar achteren verplaatsen, kan op gestuurd worden. Dingen die sneller af moeten ligt iets ingewikkelder. Als er iets gaat schuiven, moet het systeem van dienstregelingen maken meer of minder inzetbeperkingen aankunnen. Er wordt van tevoren over nagedacht welke mogelijke verschuivingen gaan plaatsvinden. Maar als dat meer afwijkt van wat eerder bedacht is, dan moeten er meer aanpassingen gebeuren en dat kan niet altijd meer.

Oorspronkelijke planning moet robuust zijn en ruimte over laten voor vertragingen. Bij mogelijke aanpassingen wordt er eerst intern gekeken om zo adaptief aan de slag te gaan. We moeten er wel rekening mee houden dat onze aanpassingen wellicht ook gevolgen hebben voor een ander. Gegeven de onzekerheden die we kennen, bereiden we daar ons op voor en zorgen we dat er nog handelingsperspectief is. Dat is niet in elke fase mogelijk.

Er bestaat direct en indirect contact tussen de vervoerder en andere betrokken partijen. Sommige processen zijn onderdeel van vaste processen, maar zijn uitgebreid op vraag van de vervoerder vanwege de nieuwe uitdagingen die ERTMS aandraagt. Hier wordt dus geprobeerd om de samenwerking te verstevigen en goed naar elkaar te kijken vanaf de eerste stappen. Omdat het een uitbreiding is van de bestaande processen, waren de contacten al gelegd en gold er al een vorm van samenwerking die nu uitgebreid kon worden. Deze verdieping van het proces is ook een gevolg van gesprekken in het IDST. Je wil als elke partij die mogelijk geraakt worden op tijd op de hoogte zijn en eventueel invloed hebben op deze besluiten.

Door de jaren heen zijn er al meerdere dingen onverwachts gebeurd. Nu merken we dat vanwege meerdere vertragingen, steeds minder ruimte overblijft. Problemen op een baanvak zonder ERTMS kunnen ook deze planning beïnvloeden en daarom blijven we als vervoerder onderhevig aan onzekerheden en de mogelijkheden om daarmee om te gaan.

Bij de afdeling wordt gewerkt met een toekomstplanning die flexibel mag zijn en juist nog veranderingen aan kan. Er wordt gehanteerd om 2 jaar van tevoren een zo stabiel mogelijk plan te hebben. Vanwege personeelsopleidingen en materieelinzet is deze 2 jaar gekozen als doorlooptijd.

Binnen de vervoerder heeft geïnterviewde in verschillende gesprekken de ERTMS-pet op, omdat alle werknemers ook doorgaan met de reguliere werkzaamheden. Om te zorgen dat er in wijzigingen ook oog is voor hoe dat de ERTMS-planning beïnvloedt, is daarom die ERTMS-pet belangrijk. Men ziet sommige voorwaarden die bij ERTMS komen kijken, enkel als extra voorwaarden en kan niet het hele systeem en haar effect inzien. Communicatie voor aanpassingen of grote risico's moet tijdig gebeuren en naar de correcte stakeholders. We moeten waarschuwen als we dingen voorzien, tegelijkertijd hoeft ook niet elk detail doorgegeven te worden.

Geïnterviewde is tevreden als bij de indienststelling beheerst is gewerkt en de reizigers zo min mogelijk last hebben gehad. Ik ben continu aan het signaleren wat en wanneer er handelingsperspectief is: risico's in kaart brengen en bijsturen waar nodig.

Bij EKB deelt men de informatie die nodig is. Er wordt binnen de kaders van concurrentiegevoelige data gecommuniceerd. Er heerst een gevoel dat men het goede gesprek wil voeren. Je moet met elkaar blijven werken aan dat vertrouwen en goede sfeer. Het is echter wel lastig om altijd de goede mensen rond de tafel te krijgen. Aversie van afwijken van reguliere processen wordt aangeduid als mogelijke oorzaak van dit probleem. Efficiënt werken binnen de processen die bekend zijn voert wellicht af en toe de boventoon in plaats van sturen op risico's.

Om adaptief te zijn heerst er een zekere noodzaak om dat binnen een bepaalde tijd te doen. Deze specifieke tijd verschilt per issue. Soms moet je echt snel kunnen schakelen en dan moeten de besluitvormingsprocessen daar wel op aansluiten. Het is in mijn mening vooral van belang om snel te analyseren wat de gebeurtenis tot gevolg heeft, om zo te bepalen op welke termijn er aan de slag moet worden gegaan met de issue. Kijken naar de effecten en de impact. Als die eerste analyse heel snel en goed gebeurt, weet men waar het aan toe is en kan het verder. Analyse kan dan inzicht geven in de tijdscomponent waarbinnen iets met het issue gedaan moet worden.

E

Overview of consulted documents for the desk research on the case: ERTMS program

This appendix consists of a table with consulted documents to explain the context of the case study and thus provide more detail on the ERTMS program and the migration step of EKB. The documents are presented alphabetically. These documents are all publicly available.

Document name	**Date of publication**
18e Voortgangsrapportage van het programma ERTMS	03-31-2023
19e Voortgangsrapportage van het programma ERTMS	06-30-2023
20e Voortgangsrapportage van het programma ERTMS	04-18-2024
Dossier Programmabeslissing	02-04-2019
Implementatie van ERTMS in het spoorgoederenvervoer	12-02-2021
Management reactie Second Opinion	09-27-2023
Second opinion on prognose ERTMS eindstand	10-24-2023
Statenvoorstel: vervanging treinen merwedelinelijn	10-04-2022

Table E.1: Overview of the consulted documents in the desk research for chapter 6 and 7

F

Coding for the interviews

The interviews were coded for the inductive thematic analysis of the data as stated in chapter 2. The coding is done to structure the large amounts of qualitative data and identify recurring patterns and/or system elements. The coding process is supported by the qualitative data analysis tool Atlas.ti. These system elements and relations are later on used to formulate success factors and thus the coding is highly determining for the perception of these factors. The coding of qualitative data and identification of patterns requires different steps. This appendix chapter will provide an overview of all steps taken and intermediate results.

F.1. Structuring and familiarising with the data

First, the interview data was structured and the researcher familiarised itself with the data. The researcher has gone in open-minded for the inductive thematic analysis and coded important aspects in the interview summaries. This was a very extensive list and therefore, the researcher has summarised similar codes and established a list of initial codes. Table F.1 is the result of this summarising step and provides the initial codes used in later steps of the coding processes. As the interviews were held in Dutch and the analysis and provided results are in Dutch as well. The codes are sorted on alphabetical order.

F.2. Recognition of patterns for sub-elements

During analysis, the initial codes were summarized into different new codes that determine the sub-elements. This step, to collate codes, is the next step for identification of the success factors. The sub-elements show different intersections. These intersections show what effects of sub-elements on each other should be kept in mind when designing a strategy for cooperation and are considered as relationships. The following table F.2 provides an overview on the initial codes being assigned to a sub-element, step 3 of the coding process. Not all initial codes were summarised into a sub-element but are considered as a sub-element itself. Table F.3 shows the definitions of the different sub-elements.

F.3. Identification of system elements

The final step is to assign the different sub-elements to identified system elements. These sub-elements are represented by this overarching theme. With the identification of these system elements, the three most important aspects for the cooperation strategy to be adaptive are shown. However, when searching for success factors and possible alterations more detail is required and the sub-elements and their relationships are again considered. Table F.4 shows the different sub-elements assigned to the elements and this structure is also used to explain what happens in the CT in Chapter 7.

The coding process has now been finalised and the system elements, their sub-elements and relationships between the sub-elements have been identified. With this information, different success factors can be perceived that consider the influential relationships between the sub-elements.

Open code	Frequency of occurrence
Adaptief	13
Adaptief handelen	21
Afhankelijkheden in de plannning	12
Afhankelijkheden van anderen	21
Belangen	15
Doelen	20
Formele structuur	8
Individuele doelen	9
Informatie delen voor vertrouwen	5
Informatiestromen	11
Inhoud van de informatie	11
Kijk op adaptief	27
Mandaat	17
Onzekerheden	11
Processen	12
Rol van de PD	4
Rollen	21
Vertegenwoordiging	14
Vertrouwen	17
Werkwijze	28

Table F.1: Codes for structuring interviews

Sub-element → **Initial code ↓**	**SE 1**	**SE 2**	**SE 3**	**SE 4**	**SE 5**	**SE 6**	**SE 7**	**SE 8**	**SE 9**	**SE 10**	**SE 11**
Adaptief						X					
Adaptief handelen						X	X		X		
Afhankelijkheden in de planning	X										
Afhankelijkheden van anderen	X						X				
Belangen		X	X				X				
Doelen		X									
Formele structuur										X	
Individuele doelen		X		X							
Informatie delen voor vertrouwen				X							
Informatiestromen			X								
Inhoud van de informatie			X								
Kijk op adaptief						X					
Mandaat										X	
Onzekerheden	X										
Processen									X	X	
Rol van de PD											X
Rollen					X				X		X
Vertegenwoordiging									X		
Vertrouwen				X				X			
Werkwijze		X	X		X			X			

Table F.2: Initial codes and sub-elements

Sub-element number	Sub element
SE 1	Uncertainty and dependency
SE 2	Content, interests and goals
SE 3	Information flows through the organisations and in the CT
SE 4	Information sharing for trust
SE 5	Working method
SE 6	View on adaptivity
SE 7	Dependencies from other parties
SE 8	Trust culture
SE 9	Members, roles and knowledge in the CT
SE 10	Formal position and mandate
SE 11	Role of the PD in the CT

Table F.3: Sub-elements

Elements $\rightarrow$ **Sub-elements** $\downarrow$	Information	Culture	Organisational structure
Uncertainty and dependency	X		
Content, interests and goals	X		
Information flows through the organisations and in the CT	X		
Information sharing for trust	X		
View on adaptivity		X	
Working method		X	
Dependencies from other parties		X	
Trust culture		X	
Members, roles and knowledge in the CT			X
Formal position and mandate			X
Role of the PD in the CT			X

Table F.4: Sub-elements fitting the elements