



DEVELOPING A FRAMEWORK FOR ENHANCING INTERNATIONAL COLLABORATION BETWEEN MULTINATIONAL ENTERPRISES AND LOCAL PUBLIC CLIENTS IN ENERGY TRANSMISSION AND DISTRIBUTION PROJECTS

MASTER'S THESIS

Anya Pilipovich (5705517)
Construction Management & Engineering Master
Faculty of Civil Engineering & Geosciences

Developing a Framework for Enhancing International Collaboration between Multinational Enterprises and Local Public Clients in Energy Transmission and Distribution Projects

by

Anya Pilipovich

Master's Thesis in Construction Management and Engineering at Delft University of Technology

Chair:	Dr.ir. E. (Eleni) Papadonikolaki
First Supervisor:	Msc Ir. M. (Magchiel) van Os
Second Supervisor:	Dr. S.J. (Stefan) Pfenninger-Lee
Company Supervisor:	Ir. Frans-Jan Willemen
Project Duration:	January, 2025 - July, 2025
Faculty:	Civil Engineering and Geosciences, Delft

Preface

Working on this research has been the final step in an academic journey that began in 2018, when I started my bachelor's degree. Now, having completed my master's, I'm proud to present my Master's Thesis in Construction Management and Engineering. To me, this research is not only a reflection of who I am, but it also reflects new findings and insights that I will carry forward into my professional career.

I would like to sincerely thank the members of my Graduation Committee for their support throughout this journey. First, to my supervisors from TU Delft, Dr.ir. E. (Eleni) Papadonikolaki, Msc Ir. M. (Magchiel) van Os and Dr. S.J. (Stefan) Pfenninger-Lee. Thank you for your guidance, for challenging me to think critically, and for your valuable feedback that helped me improve my research every step of the way.

To my supervisor at WSP, Ir.Frans-Jan Willemen, thank you for giving me this opportunity and for your consistent support throughout the entire process. I also want to thank MSc.Menouschka Baldew for her ongoing involvement and support. Frans-Jan and Menouschka, your insights pushed me to think outside the box and made my experience at WSP truly memorable. As I conclude my graduation internship, I can confidently say I'm leaving with irreplaceable knowledge and experience that I will carry with me into the next chapter of my career.

I would like to thank my friends in Delft who made my master's experience both enjoyable and unforgettable. My dearest friends, Maša and Selin, you have been part of this journey from the very beginning, starting in Eindhoven and continuing in Delft. Your constant support and love helped me overcome challenges not only in my academic life but also in my personal life. To my best friends from Belgrade, Miona and Natalija, thank you for always cheering me on and being there when I needed it the most. Your support means the world to me.

Finally, and most importantly, my deepest thanks go to my family, my mom Svetlana, my dad Slobodan, and my younger brother Nikola. Thank you for your unconditional love and support. What I have achieved today would not have been possible without you. In moments of doubt and questioning myself, you were always there to remind me of the person I've become and that anything is possible if I set my mind to it. Even though I've moved away from home, our strong bond makes it feel like I've never left. Tuna, you hold a special place in my heart, and I'm incredibly grateful to have you in my life. Thank you for always believing in me and for challenging me, as you see my potential and never let me forget what I'm capable of.

I feel truly lucky to be surrounded by extraordinary people who believe in me. With that strength behind me, I'm more than ready to step into the next exciting chapter of my life.

*Anya Pilipovich
Delft, June 2025*

Executive Summary

Introduction

This research addresses how to improve collaboration between multinational enterprises (MNEs) and local public clients in transmission and distribution (TD) projects. These are critical in enabling Europe's energy transition, since at this moment, there is growing pressure on transmission and distribution infrastructure to support the energy transition process. Existing TD infrastructure is facing increased pressure due to line losses, voltage deviation (Gallegos et al., 2024), and is not built to support modern energy requirements (Kardaś, 2024). Due to the size and complexity of these projects, collaboration between organizations is necessary. Public and private sectors combine their capabilities and resources to achieve what otherwise would not be possible alone (Verweij and Satheesh, 2023) and contribute to a more sustainable future (Popescu et al., 2023). Even though the importance of this collaboration is stated, challenges are bound to arise. Therefore, the main research question is formed:

"How can collaboration between divisions within the same multinational enterprise and local public clients in the transmission and distribution projects be improved to accelerate energy transition?"

In order to answer the main research question, three subsequent questions are created to identify the characteristics of this collaboration, the key challenges, and the best practices.

1. What are the characteristics of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?
2. What are key challenges influencing the success of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?
3. What are the best practices to tackle challenges and improve this type of collaboration to stimulate greater organizational cooperation and accelerate energy transition?

Combining the results from all three subsequent questions, a framework with an applicable set of recommendations is developed.

Methodology

This research utilized literature review, semi-structured interviews to gather data, ensuring both theoretical depth and practical relevance, and a focus group to validate the findings. The literature review was conducted in order to define the characteristics of this collaboration, discover the challenges, and the best practices. Semi-structured interviews with professionals were used in order to identify the key challenges that occur in a collaboration between multinational enterprises and local public clients in transmission and distribution projects, as well as to define the best practices to address the challenges. Finally, the proposed set of recommendations was validated through a focus group, ensuring the applicability and relevance of the proposed framework to real-world TD projects.

The Key Findings

The research identified 36 collaboration challenges in total by combining insights from literature and interviews with nine main categories. Of these 36, 25 challenges across 8 categories were derived from the literature, while 11 new challenges and one additional category emerged through empirical study. However, only 27 were found to be relevant in TD context. Using a multi-criteria decision-making (MCDM) analysis, five key challenges were identified: conflicting working culture, expectation misalignment, language barriers, communication style, and different software/programs.

The best practices to address these challenges were found through literature review and interviews, then refined into a tailored framework of actionable recommendations. This framework, seen in Figure

1, outlines practical solutions and clearly assigns responsibilities to the relevant stakeholders, ensuring clarity and applicability in real-world project contexts.

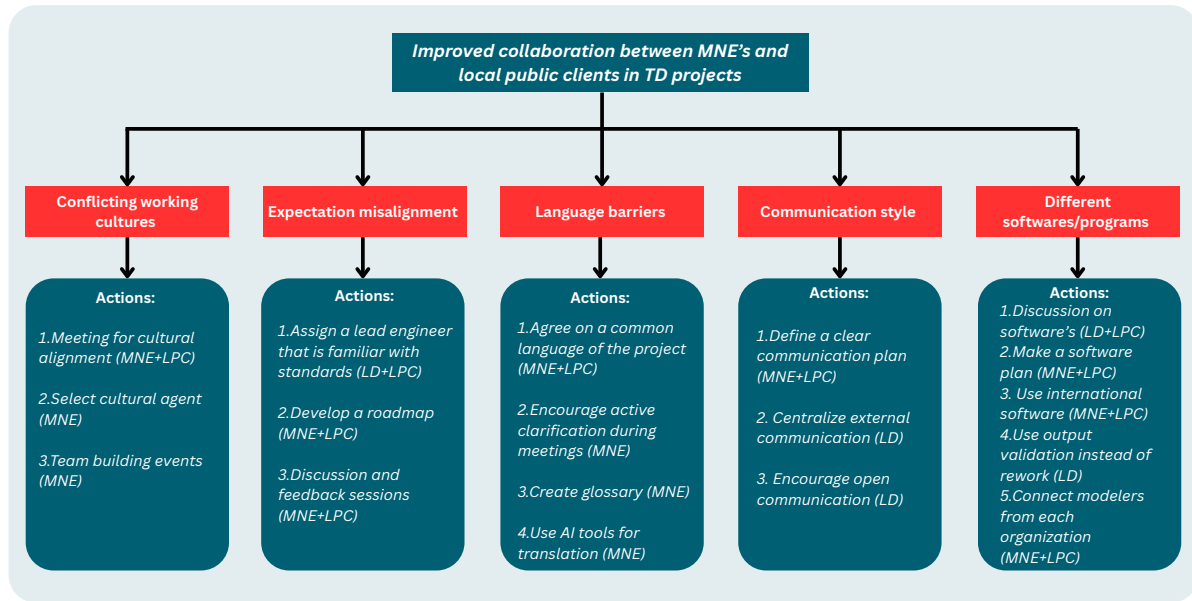


Figure 1: The proposed framework with actionable recommendations

Discussion and recommendations

While existing literature emphasizes the importance of TD projects and inter-organizational collaboration in the energy transition process, it does not identify the set of challenges that arise in the collaboration between MNEs and local public clients in TD projects. Moreover, it does not include the set of actionable recommendations. Therefore, this research addressed that gap by proposing a validated framework that integrates both empirical findings and theoretical insights into actionable advices tailored to the underexplored collaboration between MNEs and local public clients in TD projects, enhancing the literature and the practice. Moreover, although the empirical study was conducted with professionals in the TD sector, this research confirms that the challenges found are not unique to the TD sector. They also appear in other construction sectors. Finally, research also introduces a form of public-private partnership, which involves organizations like MNEs and local public clients that are crucial for TD projects.

The framework is designed to be directly applicable and testable in a real-world setting, since it provides concrete recommendations and clear explanations to address challenges arising between MNEs and public clients in TD projects. The aim of this framework is not only to enhance the collaboration, but also to encourage stakeholders to collaborate in future projects and strengthen their relationship. With more effective collaboration, TD infrastructure can be developed efficiently, which in turn has a direct impact on the energy transition by enabling transportation renewable energy to end users and accelerating the energy transition.

Contents

Preface	i
Summary	ii
Nomenclature	viii
1 Introduction	1
1.1 Market Context	2
1.2 Problem Statement	2
1.3 Research Gap	3
1.4 Research Relevance	3
1.5 Research Objective	4
1.6 Research Question	4
1.7 Methodology	4
1.7.1 Literature Review	4
1.7.2 Interviews	4
1.7.3 Focus group	5
1.7.4 Research Design Outline	5
2 Literature Review	7
2.1 Inter-organizational Collaboration	7
2.2 Multinational Enterprises	8
2.3 Connection between MNE and Public Clients	8
2.4 Collaboration Challenges	10
2.4.1 Cultural Challenges	10
2.4.2 Communication Challenges	11
2.4.3 Organizational Challenges	12
2.4.4 Leadership and Team-building Challenges	12
2.4.5 Legal and Regulatory Challenges	13
2.4.6 Financial Challenges	14
2.4.7 Skill and Competency Challenges	14
2.4.8 Data Sharing Challenges	15
2.5 Conceptual Framework	15
3 Interviews	17
3.1 Interview Procedure	17
3.1.1 Selection of Participants	18
3.1.2 Interview Protocol	18
3.1.3 Methodology for Interview Analysis	18
3.2 Interview Findings Analysis	19
3.2.1 Challenges Analysis	20
3.2.2 Identification of Occurrence of Challenges	30
3.2.3 Identification of Key Challenges	33
4 Best Practices	38
4.1 Conflicting Working Cultures Challenge	38
4.2 Expectation Misalignment Challenge	39
4.3 Language Barriers Challenge	39
4.4 Communication Style Challenge	40
4.5 Different Software and Programs Challenge	40

5 Framework	42
5.1 Framework Development	42
5.2 Framework Validation	45
5.2.1 Conflicting Working Culture	46
5.2.2 Expectation Misalignment	47
5.2.3 Language Barriers	48
5.2.4 Communication Style	49
5.2.5 Different Software and Programs	49
5.2.6 Updated Framework	50
6 Discussion	54
6.1 General Discussion of the Research	54
6.2 Summary of Findings and Connection to the Literature	55
6.2.1 Key Challenges	55
6.2.2 Recommendations for Actions and Framework	56
6.3 Practical Implications	57
7 Conclusion	58
7.1 Answering Research Questions	58
7.2 Recommendations	61
7.3 Research Limitation	61
7.4 Recommendations for Further Research	62
References	63
A Interview Protocol	66

List of Figures

1	The proposed framework with actionable recommendations	iii
1.1	Energy Infrastructure System	1
1.2	Research Design Outline	6
2.1	Collaboration between divisions and public client	9
2.2	Collaboration challenges	10
2.3	Cultural challenges	11
2.4	Communication challenges	11
2.5	Organizational challenges	12
2.6	Leadership and team-building challenges	13
2.7	Legal and regulatory challenges	13
2.8	Financial challenges	14
2.9	Skill and competency challenges	15
2.10	Data sharing challenges	15
2.11	Conceptual framework showing the outcome of two possible scenarios	16
3.1	Interview procedure	17
3.2	Interview analysis steps	19
3.3	New cultural challenges	20
3.4	Communication challenges	21
3.5	New organizational challenges	22
3.6	New leadership and team-building challenges	24
3.7	New legal and regulatory challenges	25
3.8	New financial challenges	26
3.9	Skill and competency challenges	28
3.10	Data sharing challenges	28
3.11	New group strategic challenges	29
3.12	Heatmap of participants mentioning the challenges	31
3.13	Heatmap of participants mentioning the challenges with the average of all parties	32
5.1	The Proposed Framework	45
5.2	Updated framework based on feedback after validation session	53
6.1	Type of public-private partnership	55

List of Tables

3.1	List of interviewees	18
3.2	Scoring conversion for frequency	35
3.3	Scoring conversion for importance	35
3.4	Scoring of challenges	36
3.5	The key challenges	37
5.1	Abbreviations used to identify the responsible party	42
5.2	Participants of the focus group	46
5.3	Ranked recommendations for conflicting working culture	46
5.4	Ranked recommendations for expectation misalignment	47
5.5	Ranked recommendations for language barriers	48
5.6	Ranked recommendations for communication style	49
5.7	Ranked recommendations for different software and programs	50

Nomenclature

In the table below abbreviations that are used in the report and their meaning can be found.

Abbreviations

Abbreviation	Definition
IOC	Inter-organizational collaboration
MNE	Multinational enterprise
TD projects	Transmission and distribution projects
MCDM	Multi-criteria decision-making
LD	Local division
LPC	Local public client

1

Introduction

Due to climate change, sustainability has become an important aspect of every industry, especially in the construction industry. To reduce greenhouse gas emissions, the Paris Agreement was formed on December 12, 2015, and entered into force on November 4, 2016 (Nations, n.d.). This is the first binding agreement that brings all nations together to tackle the challenges of climate change. Following the Paris Agreement, the European Green Deal was created to achieve climate neutrality by 2050. This deal was approved in 2020 and represents a set of policies established by the European Commission that EU countries can use to follow the path towards climate neutrality (Widuto and Service, 2023). Therefore, to achieve this goal, it is important that countries and construction companies collaborate.

There are different ways to reduce greenhouse gas emissions, and the use of sustainable energy resources is one of them. For example, countries are already investing in producing electrical power from renewable energy sources such as wind, solar, and hydrogen. To distribute electrical power generated from renewable sources to end users, there is a high demand for energy infrastructure, which consists of high/medium-voltage lines and substations. Furthermore, energy is first produced from more sustainable resources, then it is transmitted from large power generators to lower voltage distribution networks in cities and towns (see Figure 1.1). Currently, based on the Commission's European Grid Action Plan published in November 2023, statistics show that there will be an expected increase of 60% in electricity consumption, 40% of EU distribution grids are over 40 years old and 548 billion euros are needed to invest in European grids ("Trans-European networks for Energy", n.d.).

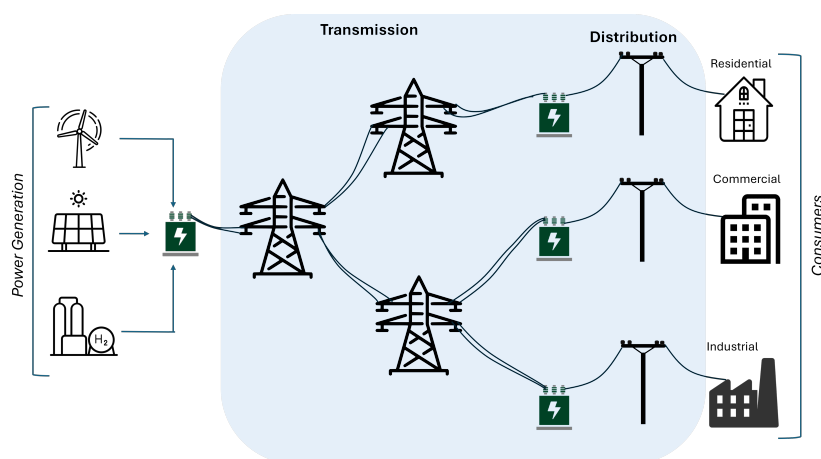


Figure 1.1: Energy Infrastructure System

1.1. Market Context

The main goal of the European Union is to ensure that all European countries have access to secure, clean, and affordable energy supplies. Therefore, the EU supports diverse and often cross-border energy infrastructure projects that produce, store, and distribute energy efficiently ("Energy infrastructure in the EU", n.d.). According to the Commission's European Grid Action Plan, published in November 2023, a total investment of 548 billion euros is needed by 2030 to meet the growing electricity demand ("Trans-European networks for Energy", n.d.). Due to these high demands that will only grow in the future, energy distribution lines experience line losses and voltage deviations (Gallegos et al., 2024). Additionally, existing European grids are not built with the energy transition in mind. Existing grids are too small and outdated, which not only creates inefficiency and capacity issues but also causes problems with connecting existing electrical grids to new sources of renewable energy (Kardaś, 2024). Therefore, by upgrading transmission and distribution networks, it will be ensured that power from more sustainable resources will be provided to the end user more efficiently and without energy losses. Problems with electrical grids in Europe start first on the national level.

Consequently, these problems will also have an impact on the international level. Transmission and Distribution (TD) projects are usually country level focused, however, these projects usually become a part of a large European network ("ENTSO-E confirms successful synchronization of the Continental European electricity system with the systems of the Baltic countries", 2025). For example, the focus of the Baltic Synchronization Project in the first phase of the project is the construction/reconstruction of lines in Latvia, Lithuania, and Estonia, followed by the second phase, which involves connecting and synchronizing them with the Central European Network (European Commission, 2023). Therefore, the first step towards energy transition is securing efficient transmission and distribution lines on a national level and finally scaling and connecting them on an international level with other countries. Moreover, using new and expanded energy infrastructure, it will be possible to supply end users with low-carbon and renewable energy solutions.

Due to the complexity of these kinds of projects, there is a high demand for collaboration among different organizations. This type of collaboration fosters better knowledge and experience transfer between organizations, which positively impacts project success (Grafius et al., 2020). Moreover, TD projects are done in collaboration with public clients, as they are part of infrastructure projects. By bringing together skills and resources from both the public and the private sectors, this collaborative approach contributes to a more sustainable future (Popescu et al., 2023).

Therefore, this research focuses on collaboration between different divisions from the same multinational enterprises and the local public client. This type of collaboration, between two different organizations, is also known as inter-organizational collaboration (IOC). First, it identifies the challenges that impact international collaboration between different organizations. Finally, this research proposes a framework to minimize these challenges and encourage organizations to collaborate more.

1.2. Problem Statement

Energy infrastructure projects are large and complex, involving various stakeholders. Nowadays, there is a growth of renewable electricity generation, however, this growth is affected by limitations in the current transmission infrastructure (Arcia-Garibaldi et al., 2018). Moreover, securing transportation of clean energy to end users is not possible without both public and private parties, due to the different skills and resources that both of these sectors possess. Therefore, the collaboration between various stakeholders is crucial (Dietrich et al., 2010).

Projects that contribute to energy transition goals would not be possible without multinational enterprises (MNE) since they possess expertise and resources that can foster projects that contribute to the development of a more sustainable future (Bass and Grøgaard, 2021). It is common for multinational enterprises to have multiple divisions in different countries, and they collaborate to help each other for several reasons. One of the reasons for this collaboration can be fostering knowledge transfer, which is important in order to bring the knowledge acquired by individuals, teams, or business units to the level of the entire organization (Schneckenberg et al., 2015). Therefore, collaboration among divisions is crucial. It is easier for one division to enter a foreign market if there is an existing division in the same country as the client. In the case of international inter-organizational collaboration, the local public

client will have to collaborate with both a local and a foreign division from the same company.

1.3. Research Gap

Collaboration in the construction industry is a common occurrence and a crucial aspect for ensuring the success of a project (Deep et al., 2020). The existing literature presents collaboration in various contexts and levels, such as between clients and contractors, countries and contractors, and subcontractors. For instance, Deep et al., 2020 discusses the barriers in subcontractor-contractor collaboration, while Hosseini et al., 2018 explores the hard and soft elements impacting such partnerships. Kokkonen and Vaagaasar, 2018 discusses the collaboration in multi-partner construction projects with heterogeneous team members. All three papers share a common focus on collaboration between two different organizations, also known as inter-organizational collaboration. Nezami et al., 2024 discusses the factors that impact inter-organizational collaboration in infrastructure projects in general, with a focus on a national level. Meanwhile, Jalali Sohi et al., 2021 explores how a co-creation approach fosters better inter-organizational collaboration in energy transition projects.

In the energy sector, collaboration is essential to accelerate the energy transition process. Research by Caldés et al., 2019 focuses on collaboration between Member States (MS) and the factors influencing the adoption of Cooperation Mechanisms introduced by the Renewable Energy Directive. Burghard et al., 2022 examines cross-border concentrated solar power projects and the barriers due to Cooperation Mechanisms. Therefore, this research focuses on collaboration between countries.

As can be seen, there is an existing literature on IOC in the construction industry. However, there is a lack of research on IOC between divisions of the same MNE and local public clients in TD projects. As mentioned before, MNEs are an important aspect of the energy transition, and securing clean energy contributes to this process. To ensure clean energy, old transmission and distribution lines need to be replaced with new ones. Therefore, in these large projects, both the private and public sectors need to collaborate to combine skills and resources. Hence, it is important to investigate the collaboration challenges that occur between MNEs and local public clients in TD projects. MNE refers to a company with multiple divisions from different countries that come together to collaborate, and a local public client refers to a public client from the same country as one of the MNE divisions. It is important to clarify that the local public clients are operating at a national level, rather than within a smaller region of the country.

1.4. Research Relevance

There are three different aspects of this research: academic, societal, and practical. Each of these aspects is explained in the text below.

Academic: There has already been research done on inter-organizational collaboration, however, it was focused on the construction sector in general. Therefore, most of the papers lacked specificity regarding the type of project. Moreover, there is a lack of research on collaboration across organizations from different countries in transmission and distribution (TD) infrastructure projects. Additionally, there is missing information on how to improve this type of collaboration.

Societal: International teams have diverse backgrounds, knowledge, and experience that can be shared between each other. Thus, if combined, this can lead to more sustainable and innovative solutions. Having people from different cultures and different backgrounds working on the same project will bring different insights. Therefore, fostering international collaboration can contribute to the energy transition process.

Practical: Nowadays, it is common for divisions within the same multinational enterprise to collaborate. There are various reasons for this collaboration, such as a lack of resources and time constraints. Moreover, the power and energy market is growing rapidly, which leads to a shortage of capacity, and it creates pressure to deliver projects at a much faster pace. Even though divisions are busy with their work in the country where they are located, why should they help divisions from other countries? They are aware that there might be some challenges, but are not yet aware of what those challenges are and how to overcome them. Thus, it is beneficial for them to explore these challenges and potential solutions.

1.5. Research Objective

This research aims to define the challenges that affect collaboration between divisions within the same MNE on one side and local public client on the other side in TD projects and to define best practices that can be used to address these challenges. Moreover, it seeks to provide a framework for multinational companies to improve international collaboration, which will impact the energy transition process and stimulate greater cooperation.

1.6. Research Question

Based on the research gap and problem statement, the following research question is formulated:

How can collaboration between divisions within the same multinational enterprise and local public clients in the transmission and distribution projects be improved to accelerate energy transition?

To answer a research question, three sub-questions are formulated:

1. What are *the characteristics* of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?
2. What are *key challenges* influencing the success of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?
3. What are the *best practices* to tackle challenges and improve this type of collaboration to stimulate greater organizational cooperation and accelerate energy transition?

1.7. Methodology

This research is conducted by using two different methods. Namely, those methods are literature review and empirical study in the form of a semi-structured interview. The literature review is used to gather theoretical information about the topic, while interviews are used to gather more practical information. Furthermore, in this research, the multinational enterprise WSP has been chosen as the case study, and interviews have been conducted with working professionals from the company. In the final stage of the research, data from all these research methodologies is used to create an improvement plan in the form of a framework. Finally, in order to validate the findings, a focus group session is organized.

1.7.1. Literature Review

Literature review is the first methodology that is used to collect theoretical data from different databases that are needed for this research. Literature review is used for:

1. Collection of information about the characteristics of collaboration among multinational enterprises and local public clients.
2. Searching for key challenges that impact this type of collaboration. Since there is missing information on TD projects specifically, challenges can be found in the literature that has already researched inter-organizational collaboration as well as collaboration in public-private partnerships in the infrastructure sector in general.
3. Finally, this method is used to research best practices that can be used in order to improve collaboration between divisions within the same multinational enterprises, on one side and the local public client on the other side, in TD projects.

1.7.2. Interviews

This is another research methodology that is used for gathering qualitative information. In interviews, the respondent provides the information while the interviewer directs the topic and in which way the conversation should go (Adler et al., 1995). Interviews allow participants to express themselves and to explain in their own words how do they see the world around them (Knott et al., 2022). There are three different types of interviews: unstructured/open interviews, semi-structured interviews, and structured interviews. Unstructured interviews are quite flexible and involve taking a narrative and free-flowing approach, structured interviews involve using an almost survey-like interview guide, while

semi-structured interviews are usually organized around a topic guide (Knott et al., 2022). This research is conducted by using semi-structured interviews.

Interviews are used to answer the second research question, which is to identify key challenges influencing the success of collaboration among multinational enterprises and local public clients in TD projects. Moreover, interviews are also used to define the best practices that can be used to tackle the challenges. Using semi-structured interviews, it is possible to discuss the challenges identified in the literature with working professionals and gather their perspective. It is important to mention that interviews are conducted with working professionals from the Netherlands as well as from other European countries in order to gain a broader understanding of international collaboration. Moreover, it is also important to include the public client side.

1.7.3. Focus group

To test the applicability of actionable recommendations, a focus group session is organized. This approach represents the type of group discussion that is guided by the group moderator (Sim and Waterfield, 2019). During this session, participants are asked to rank the recommendations according to their importance. Also, they are encouraged to engage in a discussion with other participants in order to share their perspectives. Once the insights and feedback are gathered, information is used to improve the framework.

1.7.4. Research Design Outline

This section focuses on explaining the research design outline in steps, and an overview can be seen in the Figure 1.2:

1. First step: Conducting a literature review to identify the characteristics of international collaboration between divisions within the same multinational enterprise on one side and the local public client on the other side in TD projects.
2. Second step: Identifying challenges affecting this type of collaboration and conducting interviews. Challenges are first defined through a literature review. Due to missing information on TD projects, challenges found in infrastructure IOC, and public-private partnership are taken. Then, questions are created and presented to working professionals who have experience in international collaboration and TD projects, and to the participants on the local public client side. The outcome of this step is defined collaboration challenges between multinational enterprises and local public client in TD projects.
3. Third step: Defining best practices used to enhance better collaboration. Since key challenges are identified in the second step, the next step is defining the best practices through interviews first, then checking the literature. The aim is to enrich the practices that are found during interviews with practices from the literature.
4. Fourth step: Creating a framework that can be used to improve this type of collaboration. The framework is formed based on findings and analysis of the third sub-question.
5. Fifth step: Validating the actionable set of recommendations proposed in the framework, to test their applicability in real life.

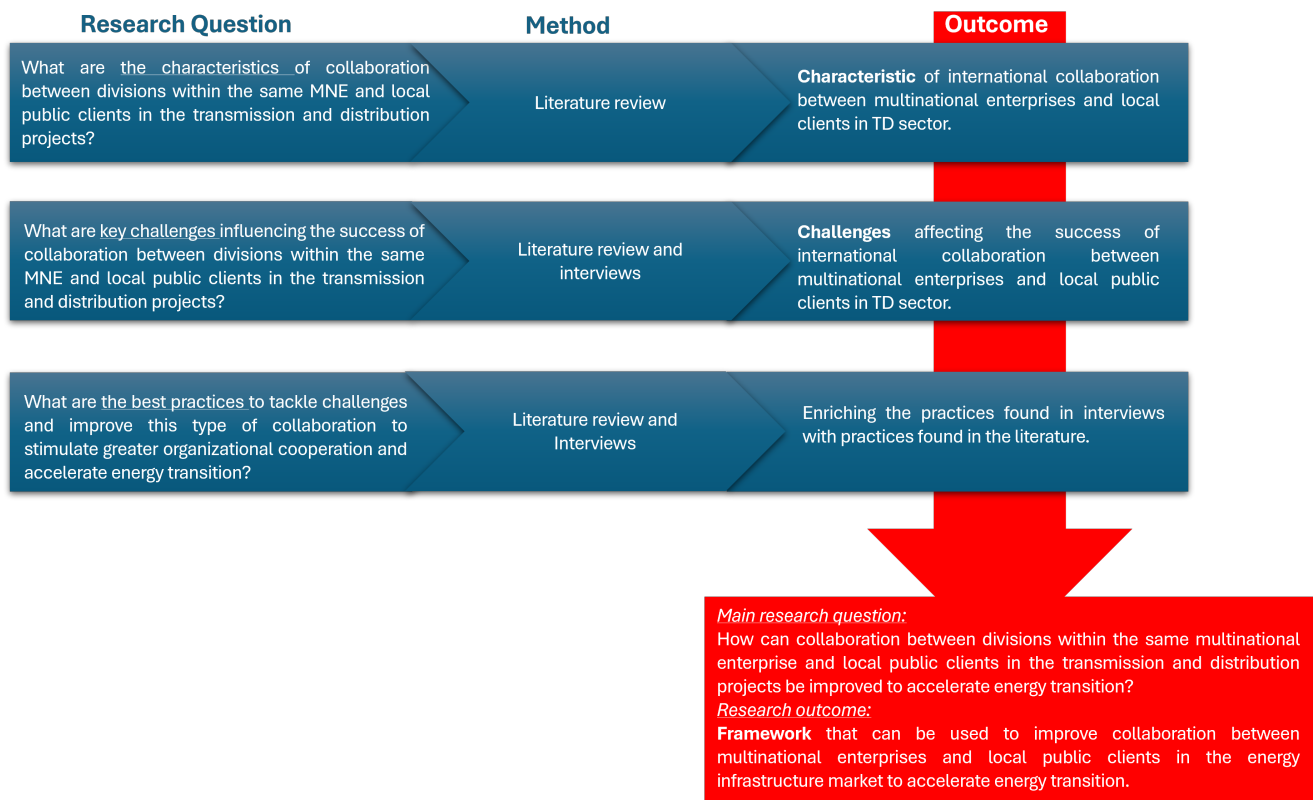


Figure 1.2: Research Design Outline

2

Literature Review

The aim of this section is to explain the two main concepts used in this research: inter-organizational collaboration and multinational enterprises. It is important to clarify the relation of these two concepts in order to address the first sub-question in this research, which is:

What are the characteristics of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?

A literature review is conducted on challenges that arise in IOC within infrastructure projects, public-private partnerships, and international collaboration. These identified challenges are later tested to observe their occurrence in practice, therefore addressing the second sub-question in the further chapters.

2.1. Inter-organizational Collaboration

Collaboration is a widely used and broad term that involves diverse levels and types (Saukko et al., 2020). It is a process where people or organizations work together in an intersection of common goals by sharing knowledge, learning, and building consensus (Dietrich et al., 2010; Bedwell et al., 2012). Thus, the nature of collaboration can vary depending on the context and objectives of the project. Nowadays, especially when working on large-scale projects, the need for collaboration between organizations has become increasingly crucial. This collaboration is also known as inter-organizational collaboration (IOC) (Dietrich et al., 2010). Therefore, this research will focus on collaboration between multinational enterprise and a local public client.

Inter-organizational collaboration (IOC) represents a process in which project members need to have the ability for collaborative learning as well as understanding each other's perspectives. Thus, in turn this will have a direct positive impact on project success (Manley and Chen, 2017) and by collaborating, it will be possible to gain new insights via different perspectives. This process is particularly important in interconnected infrastructure projects to tackle global challenges such as climate change (Nezami et al., 2024). It is important to mention that energy infrastructure projects, more specifically transmission and distribution projects, are part of interconnected infrastructure projects. Managing large projects is extremely challenging, requiring the coordination of tasks and the application of multidisciplinary knowledge and skills from different infrastructure owners (Grafius et al., 2020). Moreover, these projects become even more challenging when actors are not from the same country. Therefore, due to the complexity and size of a project, collaborating successfully becomes a crucial aspect that has an impact on the project success (Kokkonen and Vaagaasar, 2018). Collaboration between different actors involved in the energy infrastructure market, promises to optimize the efficiency of energy infrastructure construction projects (Nezami et al., 2024). Furthermore, the success of these projects depends on the quality of collaboration between the involved organizations (Kokkonen and Vaagaasar, 2018). In this research, the involved organizations are multinational enterprises, more specifically multinational

consulting engineering companies, and a local public client.

International IOC plays an important role in the energy transition process. Multiple actors must work together across organizational boundaries to combine their efforts, skills, and knowledge (Jalali Sohi et al., 2021) since the existing electrical grids need to be updated because they are not built for the energy transition process (Kardaś, 2024). Moreover, this collaboration is crucial for achieving the goals set by the Paris Agreement. By bringing different companies together, their differing strengths and points of view will be combined to craft innovative responses to pressing societal challenges (Eikelenboom and van Marrewijk, 2023), with energy transition being one of them. However, this type of collaboration does not come without challenges. For example, a factor that can influence this collaboration is communication between organizations. Ineffective communication can lead to misunderstanding and misalignment of project goals. Consequently, this will have an impact on project success (Saukko et al., 2020). Organizations can have different targets, and if these are not established at the beginning, it can lead to conflicts and inefficiencies.

Another example of a challenge is that the parties involved may not gain any valuable knowledge from their collaboration that they can use in the future. Usually, infrastructure projects are quite locally organized and conservative. Therefore, interaction between parties is limited to the necessary handovers required by contracts (Liu et al., 2021). Consequently, once the project is completed, involved parties will move on to new projects, resulting in the loss of valuable knowledge and experience that could be used in the future.

2.2. Multinational Enterprises

A Multinational Enterprise (MNE), also known as a multinational corporation, is an enterprise that produces goods or delivers services in more than one country ("Glossary:Multinational enterprise (MNE) - Statistics Explained - Eurostat", n.d.). An MNE usually has its management headquarters in one country, known as the home country, while also operating in other countries, known as host countries. These types of enterprises can be an asset for one firm and a liability for another (Reckendrees et al., 2022). For example, a division from country A and a division from country B unite to work on a project in country B. Division A can be an asset for Division B. However, it might represent a liability for a local client. Foreignness can be good because it can bring different perspectives, while on the other hand, there might be some challenges such as cultural differences, market misunderstanding and etc. These types of organizations are crucial in achieving the Sustainable Development Goals (SDGs), with energy transition being one of these goals, because MNEs are in a unique position to adapt to industry changes, innovate their business models, address energy accessibility issues, and seize opportunities for success in the renewable energy sector (van Zanten and van Tulder, 2018). In this case, WSP, as a multinational enterprise, aims to guide its clients through the energy transition with a conceptual and integral approach to planning, preparation, and design in Power and Energy projects (WSP, 2025b). These kinds of projects involve navigating a complex puzzle of technology, economy, environment, and administrative and social interests. WSP possesses the experience to integrate these elements and transition from strategy to tangible results, together with its clients. Additionally, this contributes to a better world in the future (WSP, 2025a). With that being said, it can be concluded that large enterprises possess the resources and expertise that can have a positive impact on achieving energy transition goals.

With these types of organizations, there is constant knowledge transfer, which can foster better collaboration and adaptation to changing competitive environments (Schneckenberg et al., 2015). Moreover, cross-departmental collaboration among colleagues in this type of organization is of crucial importance (Schneckenberg et al., 2015). Such, collaboration will bring together diverse perspectives and expertise that will be able to solve complex problems that occur in energy infrastructure projects.

2.3. Connection between MNE and Public Clients

As mentioned earlier, the focus of this research is collaboration between divisions within the same MNE on one side and local public clients on the other side, see Figure 2.1. Since TD projects are part of infrastructure projects, in Europe, infrastructure projects are built through public-private partnership (Koops et al., 2017), which is the case in this research. Collaboration between the public sector and

the private sector is important in delivering the project, since by bringing skills and resources of the public and private sectors, it is possible to contribute to a sustainable future (Popescu et al., 2023; Nezami et al., 2022). Moreover, the main idea is that public and private sectors unite and achieve performance that they alone or otherwise could not have achieved (Verweij and Satheesh, 2023). This can be especially true for large and complex projects like transmission and distribution projects, which first start on a national level and then scale up to an international level.

The organizational structure of this collaboration is such that, if we zoom in on an MNE, it is common for organizations to expand and have offices that operate in multiple countries. A significant advantage of multinational companies is their ability to pull resources and expertise across different divisions. If a particular division lacks the necessary expertise or resources, support can be found from another division in a different country, rather than relying on external companies. Collaboration among divisions fosters continuous knowledge transfer. By bringing together different perspectives and expertise, complex problems in TD projects can be solved.

In this context, there are two divisions, for example Spanish and Dutch divisions, namely the foreign and local divisions. The Dutch division decides to work with a public Dutch client, which is a local public client. However, it realizes that, for example, there is a lack of capacity. Consequently, Dutch division pulls resources from the Spanish division to complete the project for the Dutch public client (see Figure 2.1). This collaboration among divisions from the same company on one side and the local client on the other side is referred to as inter-organizational collaboration, which is also influenced by international factors.

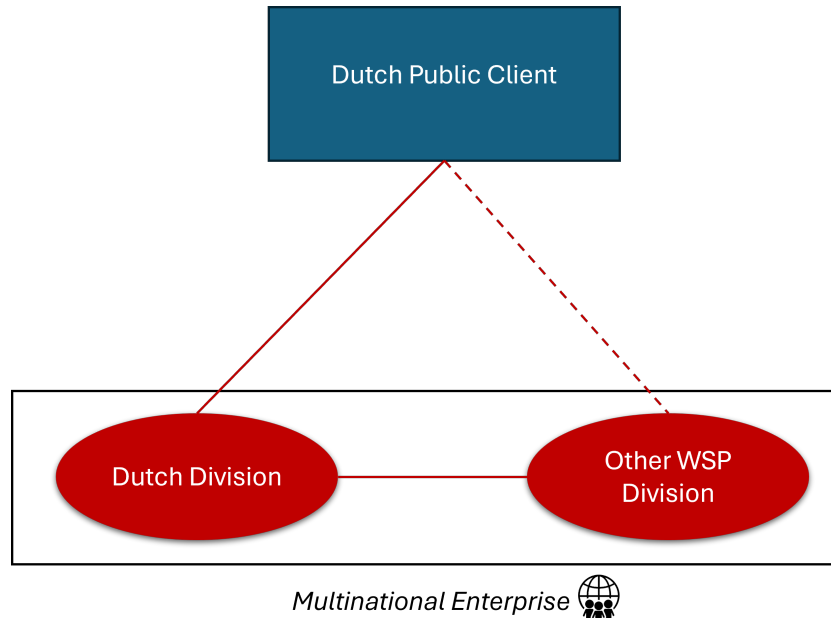


Figure 2.1: Collaboration between divisions and public client

2.4. Collaboration Challenges

The aim of this section is to present the challenges identified through a literature review. The challenges discussed are derived from literature focusing on infrastructure inter-organizational collaboration (IOC), public-private partnerships, and international collaboration. The primary reason for this approach is the lack of specific information on TD projects. Therefore, the challenges identified in the existing literature are used to test which ones are relevant to TD projects.

The identified challenges are grouped into eight categories. Each subsequent chapter represents one of these categories. Figure 2.2, represents a summary of all challenges found.



Figure 2.2: Collaboration challenges

2.4.1. Cultural Challenges

Culture is one of the significant challenges impacting projects involving different actors and effective collaboration among organizations. Research done by Aarseth et al., 2013 indicates that cultural challenges arise from having people with diverse cultural backgrounds involved in a project. These challenges are also found in projects where collaborating companies are located in different countries. This might be the case for MNE, where it is quite common to have people with diverse cultural backgrounds since the company operates in different countries around the world, and divisions collaborate with each other. Aarseth et al., 2013 also states that cultural differences are more frequently a source of conflict and can sometimes present nuisances.

Research done by Järvenpää et al., 2021 further suggests that cultural challenges can also arise from conservative industry culture, where organizations have their own norms, focus more on projects than process, and apply different practices. Organizations often do not respond well to adapting to new circumstances and are resistant to change. Moreover, this resistance to change can have an impact on interaction between people and lead to a lack of social bonding, which in turn affects collaboration (Khouja et al., 2021). Additionally, conservatism and inflexibility within organizational cultures can influence compromises and teamwork solutions, which has an impact on creativity and project outcomes (Järvenpää et al., 2021; Khouja et al., 2021). If creativity is not involved in a project, it can impact the development of innovative ideas that can help with the energy transition.

Another aspect of cultural challenges is the lack of learning culture, Erik Eriksson et al., 2008 explains. Inflexibility and conservatism within organizational cultures can hinder compromises and teamwork solutions, making it difficult to adapt to changing environments. In the construction industry a win-lose mentality negatively impacts collaboration, since actors see each other as opposition rather than cooperative partners (Erik Eriksson et al., 2008).

In conclusion, there are various aspects of cultural challenges. From the literature, the most common ones are related to cultural differences among people, conservative industry culture, and learning culture. See Figure 2.3.

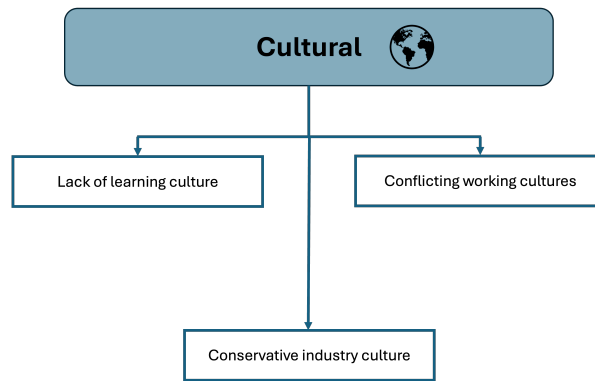


Figure 2.3: Cultural challenges

2.4.2. Communication Challenges

Effective communication is one of the critical factors impacting collaboration among different project actors. A major challenge in communication is language barriers (Järvenpää et al., 2021). Nowadays, companies from different countries that do not speak the same language are collaborating, and the language barrier can have a significant impact on their collaboration efficiency. In such collaborations, differences in language competence among project participants can lead to misunderstandings and errors. For example, while actors may know and understand English to some extent, not everyone feel comfortable or have enough capacity to use it in new contexts. Therefore, effective communication does not only rely on language skills but also on the ability to understand and navigate cultural contexts (Järvenpää et al., 2021).

Furthermore, ineffective communication can also be in the form of informal communication (Järvenpää et al., 2021). Informal communication focuses on day-to-day interactions between actors. This informal communication is important for fostering teamwork and mutual understanding. The reason for ineffective informal communication is not only due to language barriers, but it can also be due to a lack of meetings (Nezami et al., 2022).

Effective communication could significantly impact the energy transition. In order to create something new and innovative, there is a need for smooth collaboration between the involved parties, which in this case are MNE divisions and their public clients. They should be able to share ideas and outcomes with each other without any problems.

In conclusion, there are different aspects of communication challenges, and those are communication style, language barriers, and informal communication. See Figure 2.4.

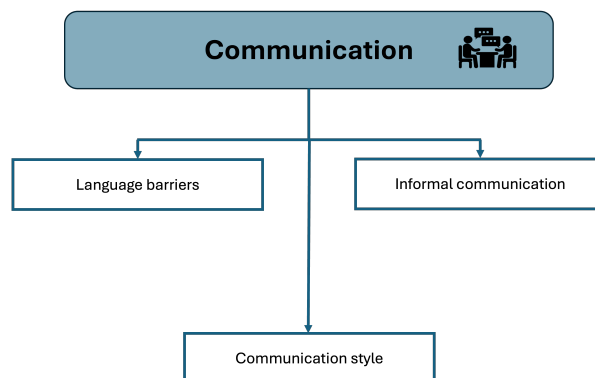


Figure 2.4: Communication challenges

2.4.3. Organizational Challenges

Organizational culture is one of the major organizational challenges. This includes a lack of knowledge in collaborative project management, maintain old project culture, and unclear common goals (Saukko et al., 2020). Another aspect of organizational challenge is non-aligned objectives (Khouja et al., 2021). This means that at the beginning of the collaboration, actors involved did not specify the objectives of their project goals or how the collaboration is going to look alike. These issues can happen because large projects are multidisciplinary, involving different teams with their own interests and requirements (Khouja et al., 2021; Gunduz and Abdi, 2020). Consequently, this can lead to multiple and contradictory interpretations of problems and can create an imbalance between the involved actors.

Resources, processes, and routines are also a part of organizational aspects (Erik Eriksson et al., 2008). Therefore, a lack of competence among actors within these areas can cause strained relationships. For that reason, both technical and managerial competences are essential for a successful collaboration (Erik Eriksson et al., 2008). To be on the same level and effectively participate in partnering projects, actors involved need to develop new competencies. Additionally, projects with multidisciplinary teams often deal with unclear roles and responsibilities, which can create confusion and affect effective teamwork (Aarseth et al., 2012).

In order for the energy transition to happen, there is a need for innovation and good coordination between teams. However, misaligned objectives, unclear roles, and responsibilities can negatively impact collaboration, which in turn affects projects focused on the energy transition. These challenges can also cause delays in project timelines, increase costs, and negatively impact the development of innovative energy solutions. Furthermore, it is important that all actors involved in the collaboration share the same sustainability goals.

In conclusion, organizational challenges like non-aligned objectives, lack of competence, and unclear roles and responsibilities can impact collaboration among different organizations. See Figure 2.5.

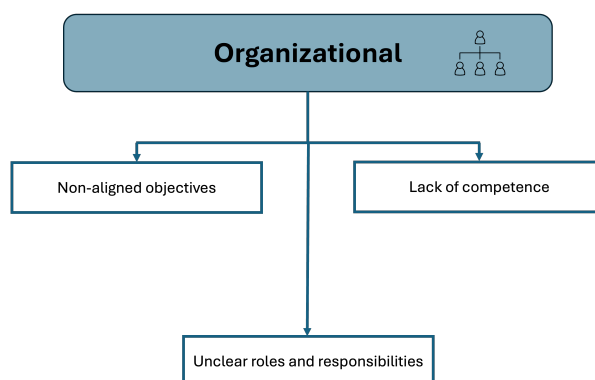


Figure 2.5: Organizational challenges

2.4.4. Leadership and Team-building Challenges

A global project involves organizations coming from different countries and cultures (Aarseth et al., 2013). In this context, it refers to collaboration between divisions from different countries on one side and the local public client on the other. In such projects, one of the primary leadership challenges is different management theories and practices that differ across national borders (Aarseth et al., 2013).

Leadership challenges also include a lack of strong leadership and unclear roles and responsibilities (Aarseth et al., 2012; Saukko et al., 2020). Therefore, without strong leadership, teams may struggle with direction and coordination, which can cause conflicts. Another aspect of leadership and team-building challenges is the creation of interpersonal relationships and the lack of social bonding (Saukko et al., 2020; Khouja et al., 2021; Erik Eriksson et al., 2008). It can be concluded that successful collaboration requires strong interpersonal relationships, however these might be hard to form in multicultural teams and teams that are located in different countries.

Strong leadership and the development of technical and managerial competences are important for success. MNE often engage in complex projects where challenges like misalignment of management

practices, fostering interpersonal relations and ensuring clear roles and responsibilities might occur. If these challenges arise, it is important to address them to drive successful outcomes for the project.

In conclusion, leadership challenges that have an impact on collaboration are different management theories and practices, a lack of strong leadership, and a lack of social bonding. See Figure 2.6.

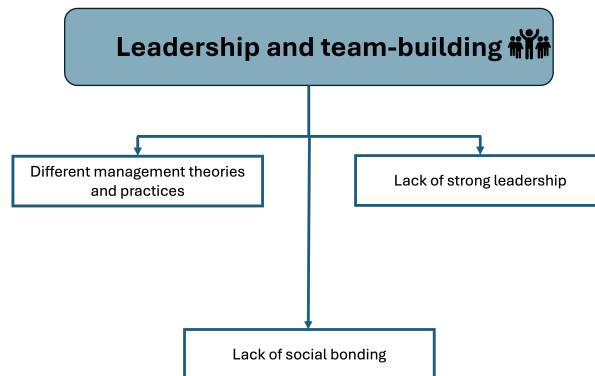


Figure 2.6: Leadership and team-building challenges

2.4.5. Legal and Regulatory Challenges

Legal and regulatory challenges often arise from non-compliance with statutory and regulatory requirements and breaches of contract by involved parties (Nabi et al., 2023). Moreover, these challenges are associated with the inability of parties to fulfill or understand regulations and requirements related to permitting, contractual obligations, bidding, and other areas. Government barriers are difficult to avoid and can present significant obstacles. For example, the use of standard contracts can cause a critical obstacle for collaboration (Erik Eriksson et al., 2008). While these contracts have a level of formality that can facilitate good relationships, they can also lead to the organization taking advantage of the strict rules for its own gain. For example, no sharing of risks and responsibilities (Erik Eriksson et al., 2008). Ensuring fair labor conditions is also important, according to (Busco et al., 2024), if these aspects are handled properly, it will be easier to maintain a positive relationship between actors.

Another aspect of legal and regulatory challenges involves delays in approvals and permits, which are mainly due to misalignment of plans with applicable codes and standards or inadequate project design plans (Nabi et al., 2023). A foreign organization might face challenges due to unfamiliarity with all important and relevant rules and regulations. These delays can impact the project, cause delays, and negatively impact collaboration.

If these kinds of challenges arise, it is important to address them as they can impact the implementation of energy transition projects. MNE engages in such projects and must ensure compliance with diverse legal and regulatory requirements. If these challenges are managed effectively, the projects will result in smoother execution and successful outcomes in the energy transition.

In conclusion, legal and regulatory challenges are related to unfamiliarity with rules and regulations, codes and standards, risk allocation/sharing, and fair labor conditions. See Figure 2.7.

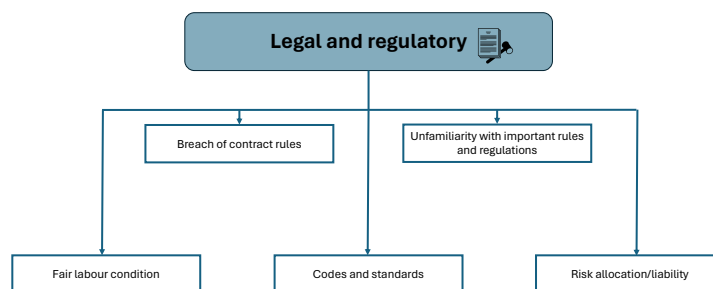


Figure 2.7: Legal and regulatory challenges

2.4.6. Financial Challenges

There are many different financial challenges that can occur in collaboration among different organizations. The first challenge is improper tax allocation. If tax allocation is not handled properly, this can lead to financial burdens and legal issues (Busco et al., 2024). Payment and financial issues are another major concern and can be one of the main reasons for legal disputes (Nabi et al., 2023). Causes can vary, however, the most common ones are inadequate cost estimation and funding allocation issues. Inadequate cost estimation can lead to budget overruns and financial shortfalls, while poor funding allocation can cause delays or insufficient resources for different project phases. Additionally, securing funding and resources for early project phases can be challenging, since funding bodies are more willing to allow funding for complete front-end plans (Saukko et al., 2020).

Energy transition projects require significant investment to shift from fossil fuels to renewable energy sources. Moreover, most of the old electrical grids need to be updated or replaced to be able to transport electricity generated from more sustainable resources. If financial challenges occur in these kinds of projects, it is important for MNE to address them in order to facilitate the implementation of energy transition projects and contribute to a sustainable future.

In conclusion, financial challenges are related to ensuring proper tax allocation, inadequate cost estimation, funding allocation issues, and securing funding and resources for early project phases. See Figure 2.8.

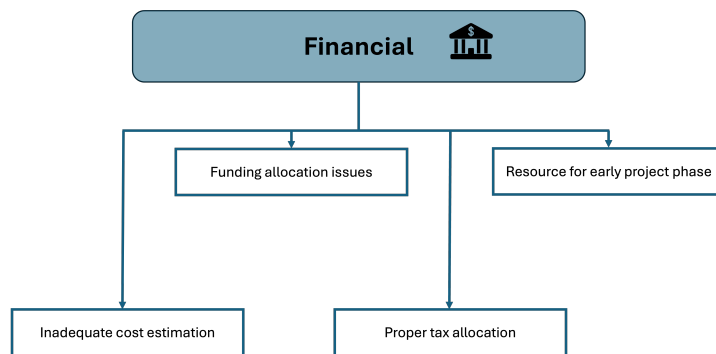


Figure 2.8: Financial challenges

2.4.7. Skill and Competency Challenges

Skill and competency challenges also have an impact on collaboration between different organizations. Two main aspects are the lack of appropriate design knowledge, which is connected with the lack of technical skills or knowledge (Gunduz and Abdi, 2020; Nabi et al., 2023). The absence of appropriate design knowledge can potentially lead to poor project planning and execution. When organizations do not possess the necessary design expertise, there is a possibility that creating effective and efficient plans becomes more difficult (Nabi et al., 2023). Furthermore, this can result in design flaws, increased costs, and delays. When it comes to a lack of technical skills or knowledge, this can hinder collaboration.

In projects that impact energy transition, it is important to have actors who can contribute to new solutions that enhance sustainability. Therefore, if MNE collaborates with an actor who does not possess enough knowledge, this can lead to poor project planning and execution, resulting in increased costs and delays.

In conclusion, skill and competency challenges included the lack of technical skills or needed knowledge among working professionals. See Figure 2.9.

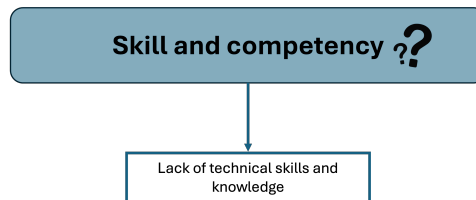


Figure 2.9: Skill and competency challenges

2.4.8. Data Sharing Challenges

One of the major challenges that arise from data sharing is the differences in data formats, standards, and policies (Nezami et al., 2022). Organizations might use different formats, making it difficult to integrate and interpret shared data. Additionally, when an organization is coming from another country, using a different format and software is quite common. This can lead to miscommunication, errors, and inefficiencies. Another challenge is unavailability or inaccessibility of data (Nezami et al., 2022), which can cause a dispute, rework, or delay as organizations try to gather the necessary data. Moreover, if parties do not share necessary documentation on a daily basis, there will be delays that impact project timelines and negatively impact collaboration (Saukko et al., 2020). Another challenge is related to the language of documentation and checking if documentation is in the language that everyone understands, otherwise, translation can be complicated (Järvenpää et al., 2021).

In conclusion, data sharing challenges are related to differences in software/programs, language of documentation, and unavailability of data. See Figure 2.10.

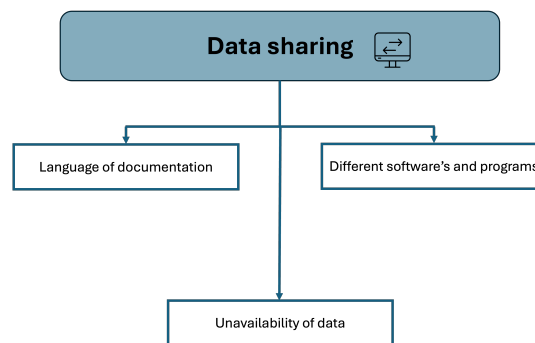


Figure 2.10: Data sharing challenges

2.5. Conceptual Framework

The theoretical framework is developed to combine and connect the literature review that has been conducted (see Figure 2.11). It represents the connection between the Paris Agreements, TD projects, the need for collaboration among different organizations, and the challenges that might occur. Everything starts with the Paris Agreement and the need to use more sustainable energy resources. To transport the electricity generated from these new sustainable resources, there is a need for TD lines. Existing lines already experience line losses and voltage deviations, and they are too old to be used for transporting electricity from more sustainable resources. Therefore, there is a high demand for upgrading old lines as well as building new ones.

Since these kinds of projects are large and complex, there is a need for collaboration among different organizations to share knowledge and experience. These organizations unite and combine their differing points of view and strategies to craft innovative solutions. In this kind of collaboration, some challenges are bound to happen. If these challenges are tackled effectively, the collaboration among actors will be successful, leading to successful project outcomes and positively impacting the energy transition and the goals set by the Paris Agreement. On the other hand, unsuccessful collaboration can lead to poor project outcomes.

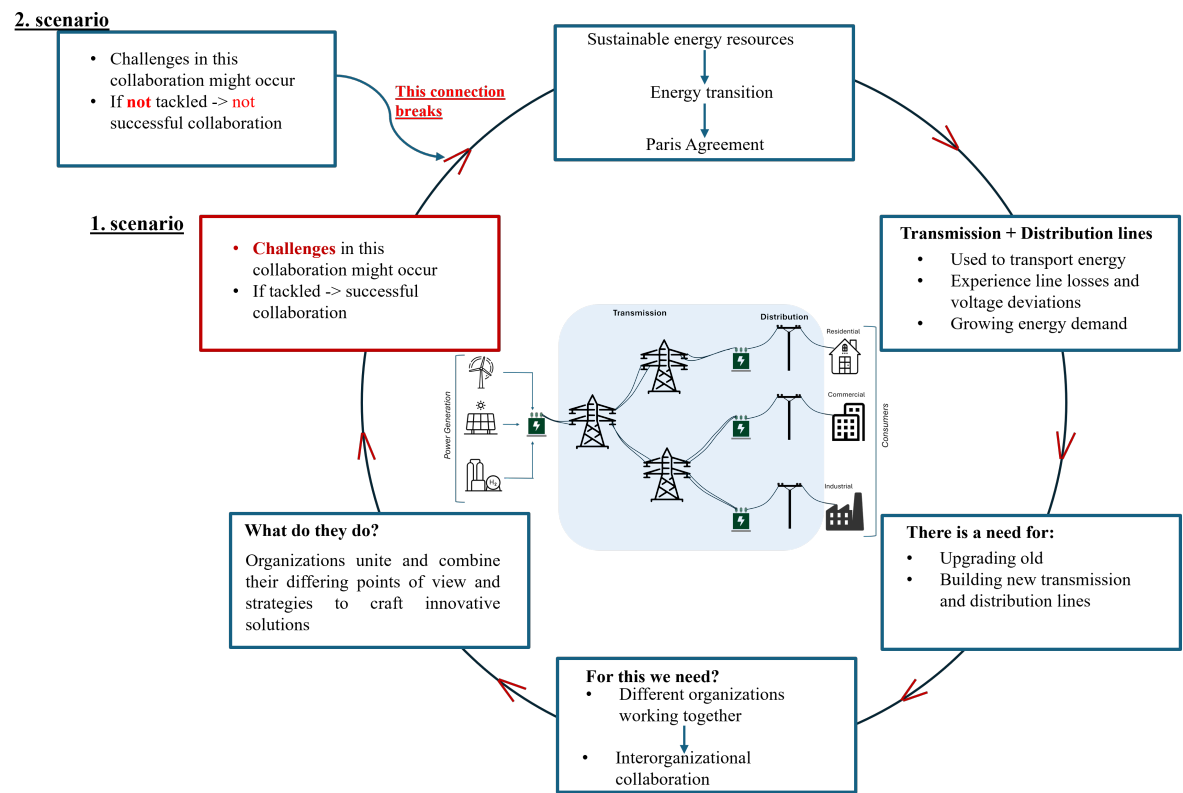


Figure 2.11: Conceptual framework showing the outcome of two possible scenarios

3

Interviews

The aim of this chapter is to identify the challenges that arise in the collaboration between multinational enterprises (MNEs) and local public clients within transmission and distribution (TD) projects. Conducting interviews with working professionals provides a more practical perspective on challenges that can arise in this particular type of collaboration and helps with the assessment of the challenges found in the literature in the TD projects context. Moreover, this chapter provides a detailed explanation of the entire interview procedure, as well as the selection of professionals who participate, the coding procedure used to analyze the interviews, and finally, a presentation of the results and their analysis. This chapter aims to offer valuable insights into the practical aspects of collaboration in this specific sector, highlighting both challenges and potential strategies for overcoming them.

3.1. Interview Procedure

The interview procedure consists of a few steps, see Figure 3.1. It starts with carefully selecting working professionals who are willing to participate, from both WSP and the client side. An interview protocol consisting of predefined questions provides some structure to the interviews while allowing flexibility for better exploration of the topics. Each interview is recorded, which allows the interviewer to fully focus on the interview and later make transcripts that will be analyzed. The final steps are coding the interviews, analyzing them, and making a conclusion based on the findings.

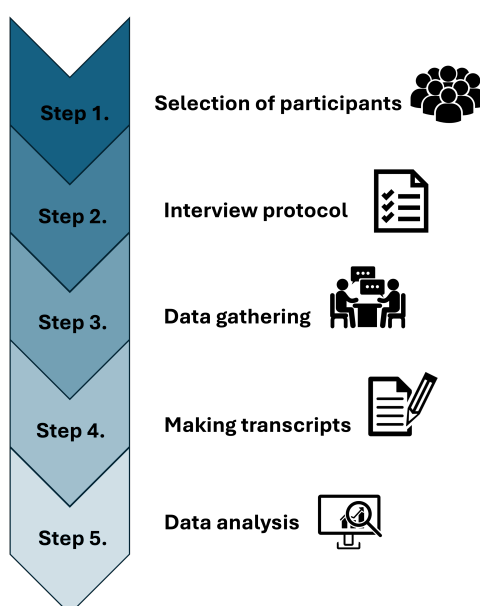


Figure 3.1: Interview procedure

3.1.1. Selection of Participants

For the interviews, it is important to select interviewees who are most relevant to this research in order to have a diverse range of perspectives on the collaboration challenges between multinational enterprises and local public clients in transmission and distribution energy projects. The interviewees are chosen from both the WSP side and the public client side, ensuring that both perspectives are taken into consideration. It is also important to mention that some of the interviewees have extensive experience, since they worked on both sides. Thus, when answering the questions, they considered their whole professional experience within both sides of TD projects. Moreover, to gather a broader understanding of international collaboration, working professionals from other European WSP offices are also participating. Having interviewees from other European country it is possible to understand how they perceive the entire collaboration process as well as the challenges they might encounter if they join forces with WSP Netherlands and work on the project with the Dutch public client.

In Table 3.1, the list of interviewees can be found, and in total there is 17 of them. From the Table 3.1, it can also be seen that the interviewees involved hold different positions within the company, which was important in order to gain a broader perspective.

Table 3.1: List of interviewees

Interviewee	Role	Year of working experience	Region
P1	Project Manager	>15	The Netherlands
P2	Engineer	20	The Netherlands
P3	Digital Construction Expert	>5	The Netherlands
P4	Commercial Operations	>20	The Netherlands
P5	Group Leader	>25	The Netherlands
P6	Group Leader	>35	The Netherlands
P7	Group Supervisor	>10	The Netherlands
P8	Engineer	>5	The Netherlands
P9	Operations Coordinator	>18	The Netherlands
P10	Operations Lead	>25	The United Kingdom
P11	Engineer	5	The United Kingdom
P12	Engineer	>20	Spain
P13	Group Leader	>20	Spain
P14	Technical Leader	20	Spain
P15	Energy Operations	20	Switzerland
P16	Commercial Operations (client)	>30	The Netherlands
P17	Commercial Operations (client)	>5	The Netherlands

3.1.2. Interview Protocol

For this type of research, semi-structured interviews are chosen as the most applicable approach. The main reason why this approach is used is that it allows the interviewer to explore topics in depth, ask follow-up questions, as well as explore new topics that emerge during the conversation, which leads to more detailed data. This is especially important since the goal is to identify if there are new challenges that are not mentioned in the literature. The type of questions asked to the interviewees are open-ended and covers all the necessary topics. The set of questions can be seen in the Appendix A. Moreover, open-ended questions encourage interviewees to think outside of the box and explain their feelings and opinions in a way that would not be possible with a more structured format. The conversation between the interviewer and interviewee ran smoothly, allowing the interviewer to ask questions when necessary. Overall, semi-structured interviews are a good combination of structure and flexibility, which allows the interviewer to gain more insights and a deeper understanding of the topics discussed.

3.1.3. Methodology for Interview Analysis

Interviews were held online due to the differing locations of the interviewer and interviewee. As shown in Table 3.1, many interviewees are from other countries. Therefore, Microsoft Teams was used, and interviews were recorded to allow the interviewer to focus on the conversation and later create transcripts. To protect interviewees' identities, all transcripts were anonymized, and sensitive data was

removed.

Once the transcripts are ready, they are uploaded to a program called Atlas.ti GmbH, 2023, which is a computer-assisted qualitative data analysis software that allows for the analysis of qualitative data. This program works on the principle of adding codes to interview transcripts. Coding represents a technique that does not have a specific formula to follow. The following steps are used for data analysis:

1.Preparation of transcripts: Once transcripts are made, it is important that names and other sensitive data are removed, which means that they are anonymized. The second step is ensuring that all transcripts have the same layout in order to have more structured data that will be easier to analyze. Then, the transcripts are uploaded to ATLAS.ti.

2.Coding procedure-challenges: The coding procedure is an iterative process, and interview analysis usually involves several rounds of coding (Saldaña, 2021). For this research, it is important to repeat the procedure multiple times. In total, there are four rounds of coding, three of which are abductive and used for the identification of challenges. This approach represents a mix of deductive and inductive coding (Tavory and Timmermans, 2014). Induction is the process of collecting new data, while deduction suggests hypotheses about specific observations that are already presented in the existing theory. The first cycle of coding involves adding challenges found in the literature, making it a deductive analysis. While applying codes for challenges found in the literature, new codes (challenges) emerged. The second cycle of coding introduces new challenges that are not mentioned in the literature but are highlighted by industry experts, representing inductive analysis. Once this is done, the third cycle of coding involves combining codes that have the same meaning to reduce repetition.

3.Coding procedure-best practices: This is the fourth round of coding. In this round, best practices for tackling certain challenges are identified. At the end of the interview, the researcher asked participants to highlight the most critical challenges and explain how they would address them. Therefore, in this round, solutions for the challenges are defined, and these answers are used to create a framework that will enhance this type of collaboration.

3.2. Interview Findings Analysis

The aim of this section is to present the findings from the interviews and analyze them. The goal of interviews is to define the key challenges that occur between MNEs and local public clients in international transmission and distribution energy projects. The first step is to explain each challenge based on interviewees' responses, while the second step is to investigate how frequently interviewees from each country and side mentioned each challenge. The third step is conducting MCDM (multi-criteria decision-making) analysis in order to define the key challenges. Figure 3.2 represents the analysis steps.

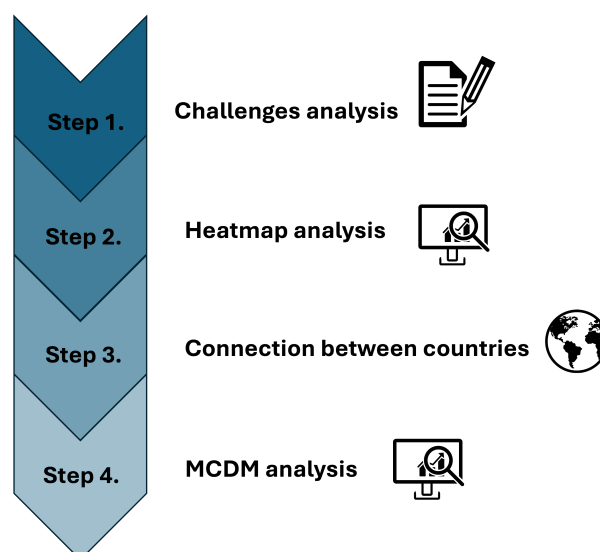


Figure 3.2: Interview analysis steps

3.2.1. Challenges Analysis

This subsection aims to provide an explanation of each challenge individually. The information is gathered from interviews. In total, 36 different challenges are identified. However, 9 of them are not explained. Since these are the challenges that were not mentioned at all during interviews, therefore they are considered as irrelevant. The irrelevant challenges are: breach of contract rules and regulations, conservative industry culture, fair labor conditions, lack of competence, lack of learning culture, lack of strong leadership, resources for the early project phase, unavailability of data and different management theories and practices. The identified challenges are explained in detail using quotes from interviewees.

All challenges are organized in 9 different groups, initially there were 8 groups, however during interviews new group merged. This group is called strategic challenges.

Cultural Challenges

Cultural challenges represent a group of challenges that are found in the literature, however, new challenges emerged during interviews. In the Figure 3.3, the new challenge is marked with the red color.

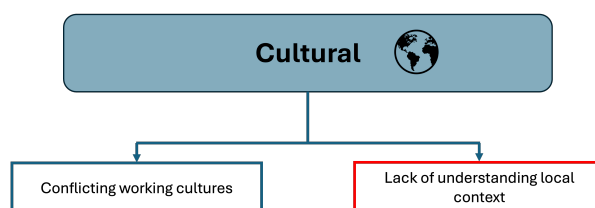


Figure 3.3: New cultural challenges

1. Conflicting working cultures

In international collaboration, cultural differences can present both benefits and challenges. In a continent like Europe, where many different cultures are present, it is common for companies involved in international collaboration to come across cultural challenges that have an impact on the project.

People perceive culture in different ways. For example, some interviewees mentioned that the perception of workload and availability do change per country. In some countries, professionals feel the need to, while others do not encourage this. For example P9 explains:

"...people are pushing 100% and working overtime, while in countries like the Netherlands this is not really encouraged."

Another example is the way people participate in meetings. In some countries, it is encouraged to speak up and share your opinion, while in others, that might not be the case. For example P6 explains:

"You want to make sure that everyone is listening and is able to give a comment. While in other countries, people would only speak only when they are asked something directly."

Cultural differences also influence how people perceive certain behaviors, and what is considered polite or appropriate can vary across cultures. For example P15 and P11 explain:

"What is considered polite or appropriate in decision-making for one culture may not be the same of another."

"...some members only communicate via phone, which often seems like they're socializing. We can sometimes be too focused on facts and figures, neglecting the small talk."

2. Lack of understanding local context

A lack of understanding of local context and practices is related to the ability to interpret local expectations and read in between the lines. It is important to understand how things are done in a local setting, as companies working in foreign countries often encounter these challenges. Moreover, the working culture in such projects is dictated by the client. For example P1 and P3 explain:

"Ultimately, the end client's location dictates the working culture...you need to invest time in understanding their way of working and follow it."

"...clients want to see things done in a local way."

Communication Challenges

Communication challenges represent a group of challenges that are found through a literature review. However, during interviews, no new challenges emerged, therefore challenges that fall under communication challenges can be seen in the Figure 3.4:

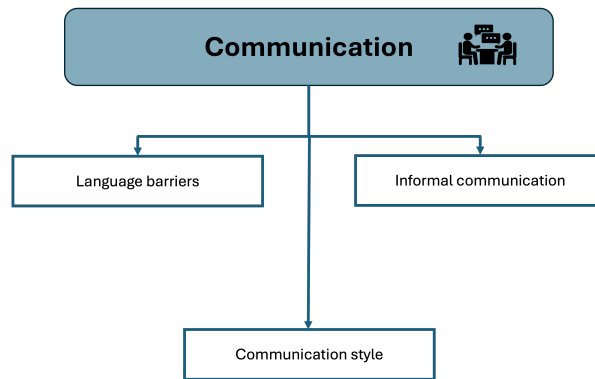


Figure 3.4: Communication challenges

1. Communication style

Communication style challenge is closely connected to cultural challenge. Usually it is the most underestimated challenge, since people perceive it as something simple and straightforward. However, if not considered properly, it can create problems between stakeholders, which in this case are two different divisions and the local public client. This challenge arises from the differing styles of communication people use. A good example of this is the difference in the level of openness in communication between the involved parties. In some countries it is believed that open communication leads to honesty and clarity. However, in other countries this openness might be perceived as inappropriate. For example P1 and P6 explain:

"...communication expectations differ significantly."

"The way sometimes we communicate can really upset other people. So it is important to be aware of the differences in an international setting, and it is about communication."

Additionally, communication style has to do with how people communicate, whether in person or, for example via Microsoft Teams. Some individuals prefer face-to-face meetings, however this is often difficult due to geographical distance between teams. For example P9 explains:

"They believe in sitting in front of somebody because they can see their body language also when talking online, time becomes very short and you have a short time to explain what needs to be done."

2. Language competence/barrier

Nowadays, English is the language that people from different countries use in order to communicate with one another. However, while most of the working professionals who work on the transmission and distribution energy projects can speak English, problems with expression and the use of technical terms can cause misunderstandings. Even though people do speak English, they often translate from their native language, which can result in miscommunication. For example P4 explains:

"We might speak English, but what we want to say must be translated to English, and sometimes things get lost in the translation."

Technical English differs from everyday English that people use, since it involves the use of specific structural and electrical terminology. Since these projects are executed in the Netherlands, the official language of the project is Dutch, thus, the technical terms are also in Dutch. For example P5 states:

"It is crucial to ensure everyone understands technical English, poor English skills can lead to misunderstandings."

3. Day-to-day/informal communication

Day-to-day informal communication fosters constant information sharing, which prevents misunderstandings between different divisions and the client. In an international setting, day-to-day communication can sometimes be challenging due to the overloaded schedule of working professionals as well as due to geographical distances. For example P11 states:

"Internal and constant meetings are crucial to ensure that everyone is on the same page and share common goals."

Organizational Challenges

Organizational challenges represent one of the groups of challenges that are found in the literature. However, during the interviews 4 new challenges emerged, those challenges are marked in red, in the Figure 3.5.

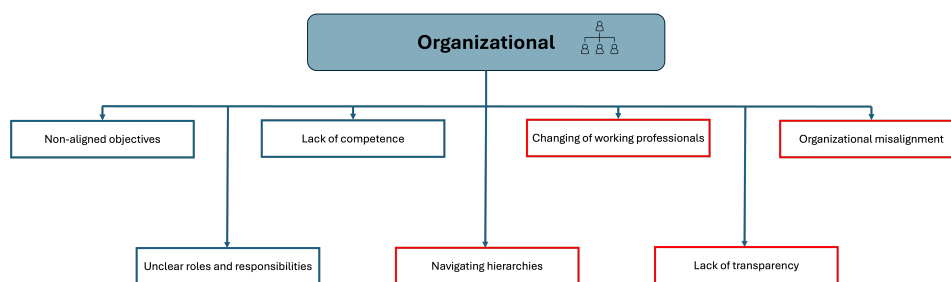


Figure 3.5: New organizational challenges

1. Navigating hierarchies

One of the organizational challenges that international transmission and distribution projects face is the differences in how the participating organizations are structured. In countries like the Netherlands, organizational structure is flatter, meanwhile in other countries, a more traditional hierarchical structure is common. These differences can lead to problems in the projects. For example P6 and P1 explain:

"In Dutch meetings, there is no hierarchy and everyone is equal at the table. We go in circles and we discuss ideas and solutions, and then we make a decision."

"In some countries hierarchical structure is evident in the meetings."

This hierarchy structure also has an impact on the decision-making process. It is important to clearly identify who is responsible for making decisions. In more hierarchical organized companies, this responsibility usually belongs to a senior professional in a high-ranking position. Not knowing who is responsible for the decision-making can cause delays in the project. For example P4 explains:

"You might expect someone to make a decision, but they may not be authorized to do so. A project manager might need to get approval from someone on the higher position, which can delay decision-making."

2. Changing of working professionals

When working with different divisions and a client, it is quite common for working professionals to change. Such changes can have an impact on the collaboration, since mutual trust between people needs to be rebuilt. Therefore, this challenge is closely connected with the challenge of mutual trust on a personal level. Moreover, this will also have an impact on the relationship between organizations. For example P13 and P15 explain:

"A significant challenge we face is the frequent changes within the teams, as people often move within the company or leave. This issue affects not only the transmission and energy sectors but all areas."

"The relation and mutual trust are important. If in a company, the top level changes every two to three years, it is really difficult to build a relation."

3. Lack of transparency

For collaboration between multiple divisions and a client to be successful, a high level of transparency between organizations is important. This transparency is related to the financial stability of involved stakeholders and their business practices. In some countries, being open and transparent about a company's financial status is common, while in other countries the situation might be different. If there is not enough transparency this can create tensions between companies and negatively affect collaboration. For example P15 explains:

"Sometimes there is a lack of transparency regarding the financial stability, and that plays an important role."

4. Organizational misalignment

One of the primary reasons for the collaboration between two different divisions in transmission and distribution projects, is due to the lack of specific skills or capacity. Therefore, the main challenge is aligning project demands with the available expertise. Working professionals are already busy with the ongoing projects in their own country. Therefore, finding a working professional who is able to fully focus on a project in a different country can be challenging. For example P13 and P14 explain:

"The main difficulty is that collaboration isn't always possible. If one team needs a lot of support from another, but the other team is already overloaded due to other commitments."

"One of the biggest challenges is matching the demand for skills with the available supply."

5. Unclear roles and responsibilities

In international transmission and distribution energy projects, not clearly defined roles and responsibilities between different divisions and public client can become an issue. Not defining the roles and responsibilities in advance can lead to project delays and may require additional work to be done. For example P3 and P6 explain:

"A proper assessment of who is joining and what areas they develop is important because this can deteriorate the quality."

"You can't expect that people understand from the start. You need to go through a learning curve at the beginning."

Additionally, if roles and responsibilities are not defined properly it can lead to individuals finish their task without understanding how they connect with other tasks. It is important to understand that all parts of the project are interconnected, and everyone should be involved until the end of the project.

6. Non-aligned objectives

Non-aligned objectives occur when stakeholders that are involved have different goals and priorities, namely, those stakeholders are MNE local division, MNE foreign division, and the local public client. Problems arise when involved stakeholders do not communicate effectively with each other about the purpose and goals of the collaboration. For example P11 explains:

"Sometimes, my goals differed from those of my sister company in another country, so we needed to ensure that everyone was aware of and aligned with the common goals."

In large scale projects like transmission and distribution energy projects, many teams are involved. Therefore, making sure that everyone shares a common end goal is important, in order to make project successful and collaboration as enjoyable as possible.

Leadership and Team-building Challenges

Leadership and team-building challenges are found in the literature. However, new challenges emerged during interviews. Figure 3.6 presents leadership and team-building challenges, and challenges colored in red are found in the interviews.

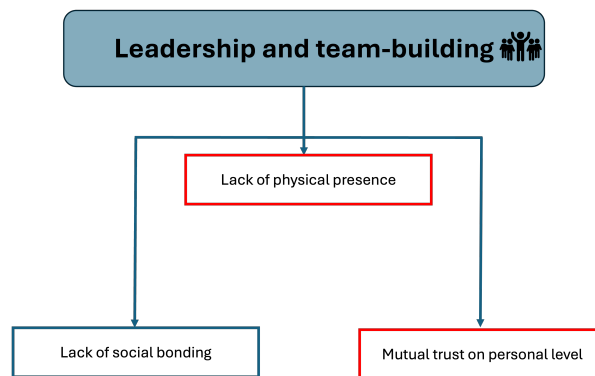


Figure 3.6: New leadership and team-building challenges

1. Lack of physical presence

In international collaborations, teams from different divisions are often located in different countries. Therefore, there is a lack of physical presence. Due to the scale of the of transmission and distribution energy projects, the work can be intense. Working teams that are not present on site often struggle to fully understand the intensity of the project. For example P1 explains:

"The further you are from the site, the less connected you feel to the project. While you can participate in Teams meetings, the physical distance reduces your sense of urgency."

Not being able to meet and work together in person often means that you do not know the people you are working with. For a project to be successful, it is important to know your colleagues both on a personal and professional level, since this can foster better collaboration between working professionals. P12 explains:

"I think the most important thing is to have face-to-face meetings with the people you work with and for. This type of collaboration cannot be effectively done at a distance...Conversations held face-to-face are different from those held over Teams, and I am sure of this."

2. Lack of social bonding

A lack of social bonding is a challenge often influenced by the lack of physical presence. As mentioned earlier, it is important to know the people you collaborate with not only on a professional level but also on a personal one. This becomes even more crucial in long-term projects. Investing in social bonding can benefit the project, as stronger personal connections make collaboration more effective. For example P5 and P8 explain:

"Investing in travel and social events helps build stronger team bonds, which benefits the project in the long run."

"I do think that interpersonal relationships are important, especially since some projects can take more than a year."

Transmission and distribution energy projects are considered complex projects, and this complexity increases when international factors are added. This makes it highly possible that certain challenges will arise. Therefore, maintaining a strong relationship between the teams is important. For example P12 mentions:

"If we start the project with just a list of issues, a schedule, and no communication, the project will likely face problems. However, if we maintain continuous relationships with our colleagues, we can solve all the problems."

3. Mutual trust on personal level

Mutual trust on a personal level is closely linked to the lack of social bonding challenge. Meaning that a lack of social bonding can lead to difficulties in building trust. For a project to be successful, it is crucial that team members trust each other, as they all share the same ultimate goal, which is delivering a successful project. In case of disputes, mutual trust and personal relationship can contribute to finding the solution to the problem faster, if this is not the case, delays might occur. P15 explains:

"It's very important to have a foundation of personal relations, so when discussions about content arise, there's always a good relationship to fall back on."

Legal and Regulatory Challenges

Legal and regulatory challenges represent another group of challenges that are found in the literature. However, during the interviews, new challenges emerged and they were added to the group. These challenges can be seen in the Figure 3.7, and the challenge that is marked red is new.

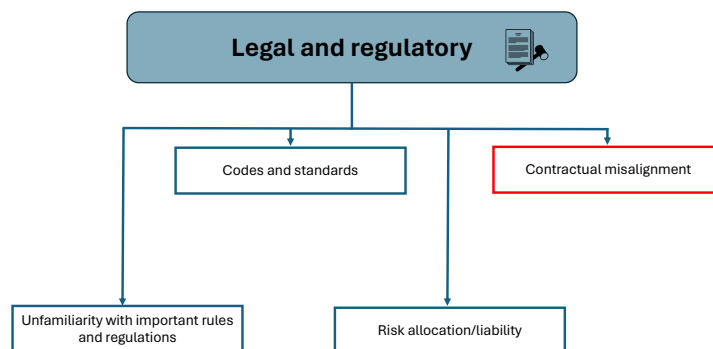


Figure 3.7: New legal and regulatory challenges

1. Codes and standards

In transmission and distribution energy projects, codes and standards are essential to ensure safety and quality of the design. Therefore, engineers are required to follow codes and standards specific to the country in which the project is being carried out. Since codes and standards are country-specific, in international collaboration, this can cause some challenges. For example, in Europe, the common standard is Eurocode, but each country adapts it according to specific needs. Thus, usually national annexes are used in projects. This presents a challenge for any foreign division collaborating with the local division on a project in the Netherlands. P13 explains:

"You can use different software to achieve the same result, but cannot change the codes and standards...they are legally regulated."

Additionally, problems arise when codes and standards tailored to the country-specific needs are not properly translated or are poorly understood. This can lead to a loss of context, which will directly have an impact on the safety and quality of the designs. For example P4 and P16 explain:

"You always keep a standard in Europe, and then you have these local amendments...sometimes not even translated to English. It looks the same but it is not, and that can be tricky."

"The expertise on national specific points might be lost in translation."

2. Contractual misalignment

In this collaboration, there are 3 different parties involved: the local division, the foreign division, and the local public client. Thus, separate contracts are used between these parties. Contractual misalignment refers to a misunderstanding of these contracts, which can lead to confusion and, in some extreme cases, even to disputes between parties involved. This misunderstanding might arise from not setting the right expectations from the beginning or from a lack of clarity. Additionally, this misalignment can also arise from a poor understanding of the project scope that is set down in the contract. P10 explains:

"They were delivering design based on their own standards, not what was specified in the contract. It was not technically wrong, it just was not what it was expected."

Additionally, it is common for different countries to use different types of contracts. This can lead to misunderstanding and confusion between the involved parties.

3. Unfamiliarity with important rules and regulations

In international collaboration, unfamiliarity with important rules and regulations represents a challenge for teams working in a foreign country. Rules and regulations defer per country, since each country has different and its own law system. Therefore, foreign teams must carefully navigate the rules and regulations that are specific to the country. In addition the confusion also arises from misunderstanding the law. For example P4 explains:

"However, on the other hand when you start dealing with legal thing, that is where it gets complicated. The way of understanding is different."

4. Risk allocation and liability

Transmission and distribution energy projects are large and complex projects, and therefore come with certain risks. In the cases where local and foreign divisions are on one side and a public client on the other side, it is crucial to allocate risks properly. Equal-risk sharing would be the ideal situation, however that is not always the case. P1 and P10 explain:

"Make sure the type of risks you carry are the same as those the other party is supposed to carry."

"If we are delivering the project together, we need to decide who owns the risk. Do we share it 50/50, or do we own it for the parts we are delivering?"

Financial Challenges

Financial challenges are also found in the literature. However, a new challenge emerged during the interview process. Therefore, in the Figure 3.8, you can find all the financial challenges as well as the new challenge, which is marked red.

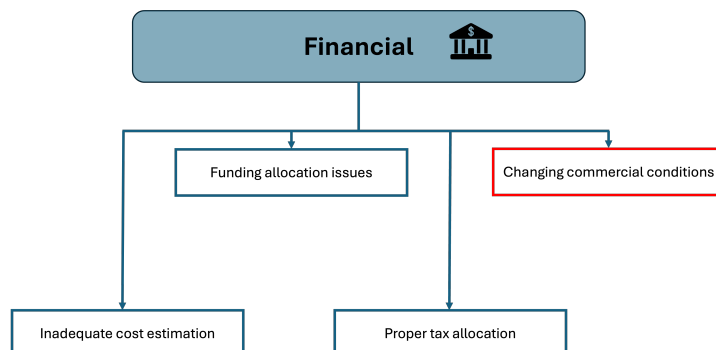


Figure 3.8: New financial challenges

1. Changing commercial conditions

Changing commercial conditions refers to different hourly rates between countries, changes of currency, changing client expectations that cause changes to the project scope and willingness of a client to pay for extra work.

Divisions located in other European countries have different hourly rates compared to those in the Netherlands. These differences, for the same roles, can vary drastically. Thus, this has an impact on project funding. Additionally, this influences the decision-making process related to choosing a skilled professional from different divisions. If the rates are notably higher than the rates in the Netherlands, it may affect if a particular expert should be included in the project. P7 explains:

"Commercially, we have to assess each time if we can make it work due to the significant differences in hourly rates...within Europe, this becomes more complex."

Another challenge is changes in exchange rates during the project's life cycle. This becomes even more complex if the contract is written in one currency while expenditures are in another currency. P4 explains:

"If you have to pay in pounds but the contract is in euros, you need to account for fluctuations. Will the exchange rate be fixed for the duration of a two year project, or will there be an adjustment halfway through?"

Changing commercial conditions also include additional costs that occur due to changes to the project scope outlined in the contract. It is common for the scope to change during projects' life cycle, however if this is not documented and communicated properly the problems can arise. These processes are not always straightforward and often depend on many different factors. For example, the client's willingness to pay for the extra work. For example P12 explains:

"We would prepare an extra work statement and specify the additional hours required. If the client agrees to the extra work, we provide them with associated costs."

2.Funding allocation issues

One of the causes of funding allocation issues can be a misunderstanding of the project scope and budget during the execution phase. If the project scope is misunderstood by one of the involved parties, unplanned tasks are likely to arise, which will directly have an impact on project costs. For example, one party might assume that the detailed design is included in the project scope, while others may consider it as an additional service. P5 explains:

"If there is a mismatch in scope interpretation, it can lead to financial discussions and budget overruns."

Issues and tensions between partners can also arise due to delayed payments. Such delays can negatively impact the success of the project and as well as impact the trust and relationship with the partners.

3.Proper tax allocation

When working in foreign countries, tax laws usually differ from those in your home country. In the context of international collaboration in transmission and distribution energy projects, it is important to carefully plan whether the foreign team will relocate to the project's host country or work remotely. For example P4 explains:

" For example, if you work on a project in Belgium for an extended period, you may need to pay taxes in Belgium. This applies to both companies and employees."

Additionally, issues can arise if the tax application procedure is not carried out properly. For example, in international collaborations, it can be confusing to decide which country's tax rules apply.

4.Inadequate cost estimation

Inadequate cost estimation refers to forecasting the project cost in the early stages of the project. This can lead to increased costs in the project and directly impact the relationship between the parties involved. P1 explains:

"This inconsistency can lead to significant issues, especially if the project starts to incur losses. I have experienced this, and the misunderstanding about the budget caused problems."

Skill and Competency Challenges

This challenge is related to the skills and competency of the working professionals who are coming from different countries, see Figure 3.9.

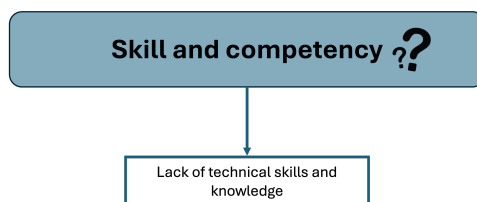


Figure 3.9: Skill and competency challenges

1. Lack of technical skills and knowledge

In international collaboration, it is common for teams from different countries to be unfamiliar with each other. Sometimes, the person hired from another country does not possess the suitable and necessary knowledge. Additionally, the job title explanation, like junior, senior, or lead engineer, can differ per country. For example, someone considered a junior in the Netherlands might be a senior in other countries. For example P6 explains:

"What you see in other countries is that there is quite a difference between what we understand as junior, senior, or lead engineer."

Data Sharing Challenges

Data sharing challenges are also found in the literature, and each challenge is explained separately. For the overview of challenges that belong to this group, see Figure 3.10.

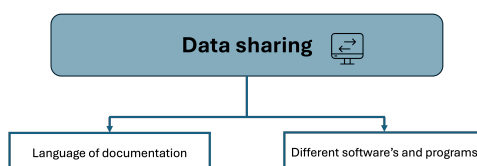


Figure 3.10: Data sharing challenges

1. Different software and programs

In international collaboration on transmission and distribution projects, it is common for stakeholders to use different software tools for both structural and electrical calculations. It is possible that not only the local division and the local public client use different tools, but it can also happen that divisions from the same MNE also use different tools. Using different tools can lead to many issues. One major problem is that different software programs may produce different results for the same calculation. P1 explained:

"Different software can produce varying answers to the same calculation, which can cause discrepancies."

A second problem is that different software and programs may not be compatible in terms of native files. Therefore, data cannot be shared between divisions. P3 explains:

"Different software fo not work together in terms of native files."

A third problem arises when the client requires the use of specific software. If the project team is not familiar with a certain software, this will negatively impact the project. P12 explains:

"We use certain tools for calculation, for example, Tekla, while other countries use different ones. If clients mandate the use of a specific tool, it becomes a problem because we are not familiar with it."

2. Language of documentation

In transmission and distribution energy projects in the Netherlands, the language that is used most of the time during projects is Dutch. Additionally, all the documentation is required to be in Dutch as well. This can create some nuisance for foreign divisions working on a project in the Netherlands. Translating

the technical documentation is complex and can lead to misunderstanding or misinterpretation of the context. For example P2 and P9 explain:

"We are working on a project in which the communication is done in English. However, documentation preparation has to be in Dutch."

"Reports are written in English, then translated to Dutch. That process introduces high risks of losing information."

Strategic Challenges

Strategic challenges, see Figure 3.11, are the new group that emerged from interviews and the related to the challenges that are closely related to the project's goal.

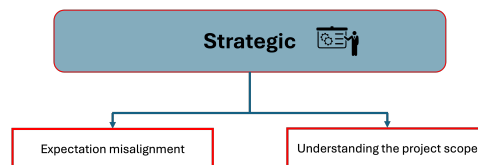


Figure 3.11: New group strategic challenges

1. Expectation misalignment

Expectation misalignment is a challenge that often arises from communication issues. For example, it can occur when there is no clear description of what includes preliminary, detailed, or final design of the project, or there is no explanation on the documentation style that should be used. The difference between definitions is not only between two different divisions, but it can also be between a local division and a local public client. P5 explains:

"Everyone has their own perception of what these terms mean. Our clients have their own definitions, and even within the company, colleagues have different views."

Expectation misalignment can also arise from differing interpretations of specifications of the TD projects. This is common in the international setting, since English is used as the primary language of communication, even though it is not the first language for most participants. P9:

"If somebody doesn't understand what they need to deliver and they deliver what they believe what was needed, it creates the discomfort."

Expectation misalignment has a negative impact on a project's timeline, costs, and quality. Moreover, it can also negatively impact interpersonal relationships between working professionals. For example P9 explains:

"Expectation misalignment was just not being controlled, and it led to poor quality of work, time delays, and cost delays. It can even lead to losing trust in a team member or discipline."

2. Understanding the project scope

A lack of understanding of the project scope in transmission and distribution energy projects can lead to problems during the project and negatively impact collaboration between different actors. This often stems from not understanding the contract properly. For example P10 explains:

"Our colleagues hadn't read the contract thoroughly and were delivering a design based on their own standards, not what is specified in the contract."

Additionally, a lack of understanding of the project scope can also arise when only project managers are fully aware of it and understand it, while other working professionals understand it only partly. It is crucial that everyone is aware of the project's scope and size. P1 explains:

"They need to grasp the project's size and what's important to ensure cohesive teamwork and a successful outcome."

3.2.2. Identification of Occurrence of Challenges

As mentioned previously, there are three cycles of coding in total. The first cycle involves identifying challenges derived from the literature. The second cycle introduces new challenges that emerged during the interviews. Once all challenges are entered into ATLAS.ti and appropriately marked in the transcripts next step is to analyze the frequency of how many interviewees mentioned each challenge.

To visualize the frequency of how many interviewees mentioned each challenge, a heatmap is created, see Figure 3.12. It is important to mention that the heatmap is not used for identifying the key challenges. It is used to explore the relations between countries and the local public client. A heatmap is a two-dimensional matrix that helps with presenting numerical values by using colors (Gu, 2022). It is developed in Microsoft Excel, and it illustrates how many interviewees identified each topic as a challenge. In total, there are 5 different columns, and each one of them represents a different stakeholder. Additionally, the Netherlands column represents the local division, while Spain, Switzerland, and the United Kingdom represent different foreign divisions. Finally, there is a Dutch public client column, which represents a local public client.

Steps for creating heatmap:

1. Inserting all the challenges and five different groups: Challenges that are found in the literature and challenges that emerged from the interviews are added to the table on the y-axis. Five different stakeholders are added on the x-axis. Namely, those five stakeholders are people from WSP Netherlands (9), WSP Spain (3), WSP Switzerland (1), WSP United Kingdom (2), and the Dutch public client (2).

2. Adding the number of interviewees: Each cell represents the number of interviewees who mentioned a certain challenge. For example, a conflicting working culture is mentioned by 7 Dutch interviewees out of 9.

3. Normalize to percentages: Due to different sample sizes in the each category it is necessary to normalize and to convert the number of interviewees to percentages, and for that, Equation 3.1 is used. Even though by doing this it is possible to compare the percentages, however it is hard to define the key challenges in this step, since the sample size of the groups like WSP Switzerland, WSP the United Kingdom, and the Dutch public client is small. Therefore, this method is used more to analyze what does each stakeholder think about challenges that appear in the international collaboration between the MNEs and Dutch public clients in the transmission and distribution energy projects, see Figure 3.12.

$$\text{Percentage} = \left(\frac{\text{Number of people who mentioned the challenge}}{\text{Total interviewees from the group}} \right) \times 100 \quad (3.1)$$

Challenges	The Netherlands (9)	Spain (3)	Switzerland (1)	The United Kingdom (2)	Dutch Public Client (2)
Conflicting working cultures	78	33	100	100	50
Language barriers	78	33	100	50	50
Different softwares/programs	89	67	0	100	50
Codes and standards	78	67	0	100	50
Expectation misalignment	67	67	0	50	100
Contractual misalignment/misunderstanding	44	0	100	100	0
Communication style	67	67	0	50	50
Lack of physical presence	33	100	0	50	50
Language of documentation	67	33	0	0	100
Lack of understanding local context and practices	33	67	0	0	100
Lack of technical skills or knowledge	56	33	100	0	0
Changing commercial conditions	33	100	0	0	50
Non-aligned objectives	67	0	0	100	0
Funding allocation issues	22	33	0	50	50
Unclear roles and responsibilities	33	67	0	50	0
Lack of social bonding	22	67	0	0	50
Risk allocation/liability	22	0	0	50	50
Understanding the project scope	67	0	0	50	0
Navigating hierarchies	67	0	0	0	50
Unfamiliarity with important rules and regulations	56	0	0	0	50
Informal communication (day-to-day)	0	0	0	50	50
Mutual trust	0	0	0	0	100
Changing working professionals	0	33	0	0	50
Proper tax allocation	22	0	0	50	0
Organizational misalignment	0	67	0	0	0
Lack of transparency	0	0	0	0	50
Inadequate cost estimation	11	0	0	0	0
Conservative industry culture	0	0	0	0	0
Different management theories and practices	0	0	0	0	0
Breach of contract rules and regulations	0	0	0	0	0
Lack of learning culture	0	0	0	0	0
Unavailability of data	0	0	0	0	0
Resources for early project phase	0	0	0	0	0
Lack of strong leadership	0	0	0	0	0
Fair labour conditions	0	0	0	0	0
Lack of competence	0	0	0	0	0

Figure 3.12: Heatmap of participants mentioning the challenges

Results from the heatmap

First step is to check the percentages of the challenges per each country category:

1. The Netherlands: In this category, there are in total 9 interviewees. Most of them have different roles, and each person plays a different role in the projects. Most of the working professionals from Dutch division mentioned these challenges:

1. Different software and programs (89%)
2. Conflicting working cultures (78%)
3. Language barriers (78%)
4. Codes and standards (78%)
5. Communication style (67%)
6. Expectation misalignment (67%)
7. Language of documentation (67%)

2. Spain: In this category, there are in total 3 interviewees, and all of them have different roles in the company for the same reason as mentioned in the first point. Therefore, most of the working professionals from Spanish division mentioned these challenges:

1. Lack of physical presence (100%)
2. Changing commercial conditions (100%)
3. Lack of social bonding (67%)
4. Codes and standards (67%)
5. Expectation misalignment (67%)
6. Communication style (67%)

3. Switzerland: In this category, there is only 1 interviewee, thus the challenge is either 0% as not mentioned at all or 100% as mentioned. Therefore, the challenges mentioned by the Swiss division are:

1. Conflicting working cultures (100%)
2. Language barriers (100%)
3. Contractual misalignment (100%)
4. Lack of technical skills or knowledge (100%)
5. Changing commercial conditions (100%)

4. The United Kingdom: In this category, there are 2 interviewees, and both of them have different roles for the same reason, like in the first and second point. Therefore, the most mentioned challenges by the working professionals from British division:

1. Different software and programs (100%)
2. Codes and standards (100%)
3. Conflicting working cultures (100%)
4. Non-aligned objectives (100%)

5. The Dutch Public client: In this category, there are 2 interviewees that are from different companies, representing the local public client. Therefore, the most mentioned challenges by the working professionals coming from the Dutch public client are:

1. Expectation misalignment (100%)
2. Mutual trust (100%)

Analysis of the results from the heatmap

Looking at the percentages from each country, it can be concluded and seen that people from different countries have diverse points of view. Therefore, the next step is to average all the percentages, which is done by using the AVERAGE function in Microsoft Excel, in order to combine all the answers and see which challenges have a high impact and will score the highest percentage based on the total number of interviewees. Thus, the result can be seen in the Figure 3.13.

Challenges	The Netherlands (9)	Spain (3)	Switzerland (1)	The United Kingdom (2)	Dutch Public Client (2)	Average of All Parties
Conflicting working cultures	78	33	100	100	50	72
Language barriers	78	33	100	50	50	62
Different softwares/programs	89	67	0	100	50	61
Codes and standards	78	67	0	100	50	59
Expectation misalignment	67	67	0	50	100	57
Contractual misalignment/misunderstanding	44	0	100	100	0	49
Communication style	67	67	0	50	50	47
Lack of physical presence	33	100	0	50	50	47
Language of documentation	67	33	0	0	100	40
Lack of understanding local context and practices	33	67	0	0	100	40
Lack of technical skills or knowledge	56	33	100	0	0	38
Changing commercial conditions	33	100	0	0	50	37
Non-aligned objectives	67	0	0	100	0	33
Funding allocation issues	22	33	0	50	50	31
Unclear roles and responsibilities	33	67	0	50	0	30
Lack of social bonding	22	67	0	0	50	28
Risk allocation/liability	22	0	0	50	50	24
Understanding the project scope	67	0	0	50	0	23
Navigating hierarchies	67	0	0	0	50	23
Unfamiliarity with important rules and regulations	56	0	0	0	50	21
Informal communication (day-to-day)	0	0	0	50	50	20
Mutual trust	0	0	0	0	100	20
Changing working professionals	0	33	0	0	50	17
Proper tax allocation	22	0	0	50	0	14
Organizational misalignment	0	67	0	0	0	13
Lack of transparency	0	0	0	0	50	10
Inadequate cost estimation	11	0	0	0	0	2
Conservative industry culture	0	0	0	0	0	0
Different management theories and practices	0	0	0	0	0	0
Breach of contract rules and regulations	0	0	0	0	0	0
Lack of learning culture	0	0	0	0	0	0
Unavailability of data	0	0	0	0	0	0
Resources for early project phase	0	0	0	0	0	0
Lack of strong leadership	0	0	0	0	0	0
Fair labour conditions	0	0	0	0	0	0
Lack of competence	0	0	0	0	0	0

Figure 3.13: Heatmap of participants mentioning the challenges with the average of all parties

In the Figure 3.13, the top 5 challenges are the challenges that scored the highest average percentage based on the percentage of the total number of interviewees and are marked with red color, which in

the heatmap stands for high impact. It is interesting to see how the opinions of the Dutch division, other foreign divisions, and the Dutch public client overlap or do not overlap.

1.Conflicting working cultures

Looking at this challenge it can be seen that the Netherlands, Switzerland, and the United Kingdom share the opinion. They believe that when working with different countries, conflicts can arise due to different working cultures. On the other hand, the Spanish division and Dutch public client do not see that as an alarming obstacle in transmission and distribution projects. Overall, this challenge is the most mentioned one by the interviewees, most likely since they are coming from different European countries, and in Europe, there are many different cultures.

2.Language barriers

For the language barriers challenge, the Netherlands and Switzerland scored the highest, while others think that it can cause problems, but not as severe.

3.Different software and programs

The Netherlands and the United Kingdom raise their concerns about different software and programs, followed by Spain and the Dutch public client. While, Switzerland does not raise any concern about this challenge.

4.Codes and standards

The Netherlands and the United Kingdom also raise concerns about this challenge, while Spain and the Dutch public client has less concern. Moreover, Switzerland believes that this would not be an issue in international transmission and distribution energy projects.

5.Expectation misalignment

From the percentages, it can be seen that all parties agree that this can be the issue. However, Dutch public client are most sensitive to this.

Interesting finding is the percentage that is not on this list due to the low average score. However, it did receive 100% by one of the parties is mutual trust. Interviewees from the Dutch public client are the only ones who mentioned this challenge.

Conclusion on the heatmap

From the heatmap, it can be concluded that working professionals from different European divisions and the Dutch public client share the opinion on the challenges that are mentioned the most by interviewees. Therefore, there are some overlapping challenges that are causing problems in this type of collaboration in transmission and distribution projects. Moreover, as it can be seen interviewees from the Swiss division do not share the same opinion as other parties. However, that can be due to the sample size, which is only one person. There are more interviewees from other divisions and the Dutch public client. Therefore, there is more balance. Interesting fact is that interviewees who are on the Dutch public client side are the only one who mentioned mutual trust on a personal level as an important challenge. Thus, mutual trust between the MNEs and public clients in transmission and distribution energy projects is an important challenge that should be considered while collaborating.

Initially, through the literature review, 25 challenges were defined. However, during the empirical study, new challenges emerged, bringing the total to 36 challenges. Once the analysis was completed, 9 challenges were considered irrelevant, since they were not mentioned by any interviewees. These challenges can be seen in the heatmap, and they are marked with 0. With this, it can be said that most of the challenges from the literature with different industry context are applicable within TD projects, yet there are also unique new challenges that TD project experts face.

3.2.3. Identification of Key Challenges

As mentioned earlier heatmap is used in order to analyze and check the number of participant mentions for each challenge, and if there is an overlap of challenges between the 4 different divisions and the Dutch public client. Even though this does prove that there is a connection, this is not enough to filter the key challenges that appear in this type of collaboration in TD projects. Therefore, the aim of this

chapter is to define the key challenges that occur during the collaboration between MNEs and local public clients in transmission and distribution energy projects, by using Multi Criteria Decision Making (MCDM) analysis.

Steps for MCDM Analysis

1. Deciding on criteria for evaluation:

MCDM is one of the most accurate methods that can be used for decision-making (Taherdoost and Madanchian, 2023). This method consists of both qualitative and quantitative criteria (Taherdoost and Madanchian, 2023), which in this case are needed in order to define the key collaborating challenges. Therefore, there are two criteria that MCDM is based on. The first criteria is the frequency of how many times each challenge is mentioned by all 17 interviewees. This category is important since the type of questions that are asked to the interviewees are open-ended question and they have the freedom to form the answer in whichever direction they believe is important. Moreover, this gives them the freedom to explain and mention the challenges based on the experience they had during projects. In the end, if we look at the amount of times a challenge was mentioned, it can be assumed that challenges that were mentioned more often are crucial. The second criteria presents whether certain challenges are mentioned as most important, as interviewees were asked to define the most important challenges. This category is important since during the interviews, many different challenges are covered, and it is important to distinguish out of all challenges that are mentioned which ones are considered the most important.

2. Deciding on the weight of each criterion :

When deciding on the criteria, it is also important to decide the weight of each criterion. There are two different ways of determining weights, and those are objective and subjective (Ponhan and Sureeyatanapas, 2022). In this case, the chosen method to use is a subjective approach, more specifically, direct ranking (Ponhan and Sureeyatanapas, 2022). This approach is developed in order to determine the level of importance of the criteria based on experts' judgments. Thus, the weights must be argued due to the influence on subjective opinions (Ponhan and Sureeyatanapas, 2022). The weight of the Frequency of the mentions is 55%, while the weight of the number of interviewees that mentioned a certain challenge as most important is 45%, see the Formula 3.2. The difference between the weights is 10% because both criteria are important, but a distinction is still necessary for several reasons. The first reason why frequency has a higher weight is that it reflects how many times a certain challenge was explained during the conversation over different interviews. If the challenge is mentioned frequently, that means that more people share the same experience. Moreover, if a challenge is frequently mentioned by more people, that means that there is a pattern, and it is a challenge that professionals have experienced in different projects. The second reason is that the challenge may be perceived as most important due to subjective feelings and the negative impact that the challenge had on a working professional. The third reason is that challenges faced by many interviewees can be more important than a challenge that is highlighted as most important by a few interviewees. For example if 10 out of 17 interviewees mentioned the same challenge 20 times and only 4 interviewees mentioned it as the most important.

$$\text{Score} = 0.55 \times \text{Frequency of Mentions} + 0.45 \times \text{Most Important Mentions} \quad (3.2)$$

To conclude, both criteria are important and should be included in the MCDM. However, by giving higher weight to frequency criteria, it is possible to put an emphasis on the challenges that appear in collaboration between MNEs and local public clients in transmission and distribution projects, while still including how differently working individuals perceive their importance. The weights are determined as 55% and 45% empirically, as long as the frequency criteria has higher weight, changing the weights does not influence the order significantly.

3. Scoring each criteria:

To score the criteria first, the data is added. Challenges that are found in the literature and challenges that emerged from the interviews are added to the table on the y-axis. The criteria are added on the x-axis. The frequency of mention is ranging from 0 to 37. While the number of interviewers naming the most important is ranging from 0 to 5. To use these in the analysis, they need to be converted into scores to be weighted.

The frequency criterion reflects how often each challenge is mentioned across all conducted interviews. The data for this is skewed, where only a few challenges are mentioned very often, while many others are not mentioned, so a traditional normalization would have given outliers and an unfair advantage.

To address this and keep the meaningful differentiation among highly frequent challenges while avoiding over-clustering at the lower end, a custom binning system is implemented to convert frequencies into a 0–5 scale. The bins are designed in order to reflect meaningful thresholds in the data, which are around the range of 25–65%, while maintaining comparability across the range of responses. The applied frequency scoring is shown in Table 3.2.

Table 3.2: Scoring conversion for frequency

Frequency of mention	Score
0	0
1 to 9	1
10 to 14	2
15 to 19	3
20 to 24	4
>25	5

With this distribution, higher-frequency challenges receive higher scores while avoiding distortion from the long tail of low-frequency entries. The different ranges are tested, and as long as the scores 2,3,4 are distributed evenly while the 0,1, and 5 have a large range, it does not affect the order significantly.

The second criterion, which is the importance criterion, is measured by the number of interviewees who identified each challenge as the most important according to their experience. The data for this criterion is distributed evenly, so different bins are used for scores. The raw values for importance ranged from 0 to 5, so a direct value-based scoring approach was enough for scoring, as seen in Table 3.3. This method preserves the full variation of the importance data and allows those challenges with stronger perceived priority to meaningfully influence the final result.

Table 3.3: Scoring conversion for importance

Number of participants naming as key	Score
0	0
1	1
2	2
3	3
4	4
5	5

MCDM results

Once the weights of the criteria and scores are decided, the final scores are given, and this can be seen in the Table 3.4. The minimum value that each challenge can score is 0, while the maximum is 5. Based on the score it is possible to make a conclusion about which challenges are the most critical in collaboration between the MNEs and local public clients in transmission and distribution projects.

Table 3.4: Scoring of challenges

Challenge	Category	Frequency Score	Number of interviews that named it as most important	Score
Conflicting working cultures	Cultural	5	5	5
Expectation misalignment	Strategic	5	4	4,55
Language barriers	Communication	4	4	4
Communication style	Communication	3	5	3,9
Different softwares/programs	Data sharing	5	2	3,65
Non-aligned objectives	Organizational	2	4	2,9
Codes and standards	Legal & regulatory	3	2	2,55
Understanding the project scope	Strategic	2	3	2,45
Lack of understanding local context and practices	Cultural	3	0	1,65
Changing commercial conditions	Financial	2	1	1,55
Contractual misalignment/misunderstanding	Legal & regulatory	2	1	1,55
Lack of physical presence	Leadership & team building	2	1	1,55
Language of documentation	Data sharing	2	1	1,55
Changing working professionals	Organizational	1	2	1,45
Informal communication (day-to-day)	Communication	1	2	1,45
Navigating hierarchies	Organizational	2	0	1,1
Fuding allocation issues	Financial	1	1	1
Mutual trust	Leadership & team building	1	1	1
Risk allocation/liability	Legal & regulatory	1	1	1
Unclear roles and responsibilities	Organizational	1	1	1
Inadequate cost estimation	Financial	1	0	0,55
Lack of social bonding	Leadership & team building	1	0	0,55
Lack of technical skills or knowledge	Technical	1	0	0,55
Lack of transparency	Organizational	1	0	0,55
Organizational misalignment	Organizational	1	0	0,55
Proper tax allocation	Financial	1	0	0,55
Unfamiliarity with important rules and regulations	Legal & regulatory	1	0	0,55
Different management theories and practices	Leadership & team building	0	0	0
Breach of contract rules and regulations	Legal & regulatory	0	0	0
Conservative industry culture	Cultural	0	0	0
Fair labour conditions	Legal & regulatory	0	0	0
Lack of competence	Organizational	0	0	0
Lack of learning culture	Cultural	0	0	0
Lack of strong leadership	Leadership & team building	0	0	0
Resources for early project phase	Financial	0	0	0
Unavailability of data	Data sharing	0	0	0

Conclusion on MCDM: Key challenges

Zooming in on the Table 3.5, it can be concluded that the top 5 challenges scored the highest scores and therefore they are taken as the key challenges. Moreover, it is possible to answer the second research question:

What are *key challenges* influencing the success of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?

- *Conflicting working culture*: This challenge scored the maximum score, which is 5. Therefore, it is considered the most important and belongs to the group of cultural challenges.
- *Expectation misalignment*: This challenge scored 4,55 out of 5. Therefore, it is the second most important challenge, and it belongs to the group of strategic challenges.
- *Language barriers*: This challenge scored 4 out of 5. Therefore, it is the third most important challenge, and it belongs to the group of communication challenges.
- *Communication style*: This challenge scored 3,9 out of 5. Therefore, it is the fourth most important challenge, and it also belongs to the communication challenges group.
- *Different software and programs*: This challenge scored 3,65 out of 5. Therefore, this is the fifth most important challenge, and it belongs to the data sharing challenges group.

Table 3.5: The key challenges

Challenge	Category	Frequency Score	Number of interviews that named it as most important	Score
Conflicting working cultures	Cultural	5	5	5
Expectation misalignment	Strategic	5	4	4,55
Language barriers	Communication	4	4	4
Communication style	Communication	3	5	3,9
Different softwares/programs	Data sharing	5	2	3,65

These are the key challenges, and the top 5 are chosen due to their score being above 3. Moreover, there is a jump in scoring since the next challenge, which is non-aligned objectives, is scored with 2,9. It can be seen that out of 5 challenges, 2 belong to the communication challenges, 1 to cultural challenges, 1 to strategic challenges, and 1 to data sharing challenges. These challenges are used in order to create a framework with advices that can be used by MNEs and local public clients to enhance the collaboration in transmission and distribution energy projects that accelerate the energy transition process.

4

Best Practices

This chapter aims to define the best practices that can be used in order to tackle the five key challenges. These practices are a combination of suggestions from working professionals mentioned during interviews and the literature. Practices from the literature are applied in the construction industry in general, and they are tailored according to what interviewees mentioned as best practice. These practices are essential for navigating the collaboration between MNEs and local public clients in TD projects. Moreover, successful collaboration can have a direct impact on project outcomes, which in turn influences the overall energy transition process. Therefore, by defining the best practices third sub-question can be answered, which is:

What are the *best practices* to tackle challenges and improve this type of collaboration to stimulate greater organizational cooperation and accelerate energy transition?

4.1. Conflicting Working Cultures Challenge

Best practices from interviews: These practices are defined by professionals with experience in this type of collaboration and who are working on transmission and distribution projects. Therefore, those practices are:

- *Meetings for cultural alignment:* A meeting with all stakeholders should be organized before the start of the project. During this meeting stakeholders should discuss their differences and explain their "way of working". P4 explains:

"Present on certain topics what is normal for you. Where do you expect us to have differences, point that out."

- *Select cultural agent:* Cultural agent should be selected by each stakeholder. This should be someone who is aware of the cultural differences among people. Their role should be to oversee the collaboration and make sure that participants are open-minded and free from judgment. P14 explains:

"All leaders must be open-minded and culturally sensitive. They need to understand that they are working in different environments. Addressing cultural challenges is straightforward: you need to be open-minded and avoid judging others."

- *Organize team-building activities:* Organizing and hosting informal team-building activities would encourage people to socialize and form deeper connections. However, organizing a team-building event can be challenging due to the diverse geographical locations of certain team members. Therefore, by selecting specific dates, it is possible to ensure that teams from different countries will be able to join. P16 explains:

"To foster collaboration and build team spirit, it's important to create opportunities for interaction, such as going bowling together and getting to know each other better."

Best practices from the literature: There is limited literature on addressing cultural challenges, as it includes a broad definition and many different aspects. Therefore, it was challenging to find the practices in the literature.

4.2. Expectation Misalignment Challenge

Best practices from interviews: These are the practices that emerged during interview session with professionals:

- *Assign a lead engineer who is familiar with standards:* TD projects are done in collaboration with the public client, thus understanding the client's expectations is crucial. To ensure that, a lead engineer from the local division should be assigned. This person has the ability to understand the client's expectations and share them with the foreign division. P7 explains:

"We should let the other team members do the work, with the lead engineer providing guidance on what the client expects and where to find the requirements."

- *Use a roadmap to align the goals:* A roadmap can be used to outline the specifications of the projects in detail. Also, it should contain visual goals that will motivate teams to collaborate more efficiently. P16 explains:

"When working on projects, it is important to create roadmaps to ensure everyone is on the same page... This approach ensures that everyone understands the goals and can contribute effectively."

- *Discussion sessions:* These sessions can be organized to ensure that stakeholders are aligned. Moreover, during these sessions, participants should be encouraged to ask questions if necessary. P12 explains:

"We need to create a time for a meetings to discuss quality standards. This is the most important thing. Additionally, we should make a list of questions and answers that should be discussed."

Best practices from literature: Research conducted by Lau and Rowlinson, 2009 and Chan and Oppong, 2017 emphasizes the importance of managing the clients expectations. According to Lau and Rowlinson, 2009, client expectations include factors such as timeliness, aesthetics, functionality, safety, and overall project quality. By defining these factors in the early stages of the project, expectation misalignment in the later stages can be avoided. Moreover, the paper states that constant clients involvement during the design and construction phase is necessary. Lau and Rowlinson, 2009 also highlights the importance of frequent communication between the client and contractor, in order to receive feedback on the process and ensure that expectations are meet.

Chan and Oppong, 2017 states that contractors should map out the client's expectations to specific project deliverables. Additionally, it is emphasized that client involvement during the whole project is needed and should not wait until the end of the project for evaluation. This study also mentions that frequent and transparent communication between the client and the contractor is necessary.

4.3. Language Barriers Challenge

Best practices from interviews: These are the practices that emerged during interviews:

- *Agree on a project language:* In order to make sure that working professionals from foreign division are as involved in the project as working professionals from local division, it is important to establish the language of the project at the beginning. P9 explains:

"I would determine a common language, so I know working in the Netherlands, everybody kind of speaks English. I would mandate that the majority of the languages is in English."

- *Encourage active clarification in the meeting:* During the meetings, it could be beneficial to assign a responsible person who will ensure that everything is understood properly by everyone. P4 explains:

"Take time during meetings to understand each other, that is number one. Double-check if you have the same understanding like I do. Rework is much more painful than sparing some time to

discuss thing upfront."

Best practices from the literature: Jinfang, 2023 emphasizes the need for a professional translator in international construction projects. It also explains that these translators are not only bilingual, but they also possess the knowledge and understanding of the jargon. Therefore, this can help working professionals to fully understand the context of the conversation. On the other hand, Aichhorn and Puck, 2017 explains how continuous interaction can help in bridging the gap caused by language barriers. By engaging in continuous interaction, team members would feel less anxious during meetings, and uncertainty would be reduced.

4.4. Communication Style Challenge

Best practices from interviews: These are the best practices, defined by professionals:

- *Define communication protocol:* This collaboration includes interaction between 3 stakeholders. Due to the size of teams, a communication protocol must be defined, and it should include clarification on who communicates what to whom and how often. P2 explains:

"You need to communicate at the same level and hierarchy, working together as one cohesive team. "

- *External communication should be centralized:* Identify the person who is going to be the primary point of contact. The role of this person is to communicate with external stakeholders. Thus, communication is structured, and there is no loss of information. P3 explains:

"Effective communication is crucial to avoid overlaps and errors. It's important to define who communicates with the client and ensure that communication is funneled through the design lead."

- *Encourage open communication:* Coaching sessions about open communication should be organized for foreign teams. Moreover, these teams should be encouraged to openly share their perspectives on project-related topics. Moreover, it is important to state that open communication should be done in a respectful manner. P1 explains:

"Recognizing these cultural differences is crucial. It means understanding why you're sitting in a particular spot or adopting a certain attitude to align with local practices."

Best practices from literature: Effective communication in international and multi-stakeholder projects is crucial to ensure project success. Therefore, developing a proper communication plan is essential (Gamage, 2022; Setiawan et al., 2021). This plan should include points such as the type of information that will be shared, appropriate communication methods, and clearly defined responsibilities (Gamage, 2022). Moreover, it is important to choose the most appropriate communication method which can be: interactive, push, or pull (Gamage, 2022). Interactive method includes organized meetings between parties, the push method includes the communication via email, and the pull method includes programs that can be used for sharing information (Gamage, 2022). In international collaboration, team members should be educated on cultural differences in order to foster mutual understanding and respectful interaction (Gamage, 2022). Therefore, organizing working sessions in which people will have the opportunity to connect on a more personal level is crucial.

4.5. Different Software and Programs Challenge

Best practices from interviews: These are the best practices defined by professionals:

- *Using international software:* In TD projects, organizations tend to use different software and programs for structural and electrical calculations. There is also a possibility that one of the organizations is using software that was developed by them. In order to avoid this in international collaboration, it is suggested to use an international software that exists in multiple countries. Furthermore, discussions on which software and programs are going to be utilized in the project should be done before the start of the project. P4 explains:

"While many international programs are widely used, local programs can also be utilized, which can complicate matters. You need to validate whether these local programs are acceptable in

other countries...Using international standard programs can simplify this process significantly."

- *Use output validation instead of rework:* Since different software can not work together due to differences in file formats. Team from a local division can use an output created by the foreign team in order to validate the result. P7 explains:

"I made a decision to let them work in their own software and let me check it here in the Netherlands, not by making the calculation again, but just look at the output of that software because for structural analysis like the output can give you a lot of knowledge about of how a model is built up and for now, that works like pretty good"

- *Connect modelers from each organization:* Different software and programs challenges can also be addressed by connecting modelers from each organization. Modelers should start collaborating early in the project in order to outline and minimize the differences. P12 explains:

"We should set up the project with one modeler from each team working together. Our modeler has to learn from his modeler. We need to reduce the learning curve and accept that in this project, we will probably have higher costs."

Best practices from literature: Due to the lack of literature on how to address this challenge, a similar approach used for practices on the communication style challenge can be utilized. Namely, creating a software plan could be beneficial. This plan should include an explanation of the differences between the software that organizations are using and defined responsibilities. Moreover, this plan should be created and communicated before the project begins.

5

Framework

The aim of this chapter is to provide a framework that can be used by MNEs and local public client in order to improve their collaboration in transmission and distribution projects. The goal of the framework is to stimulate multinational enterprises and local public clients to collaborate more efficiently, unite, and work towards the same goal. Moreover, the aim of this chapter is also to validate a framework with professionals in order to inspect its applicability in the collaboration between MNE and local public clients in TD projects. Finally, the framework is updated based on the suggestions proposed by working professionals during the validation session.

5.1. Framework Development

The framework is developed based on the key challenges identified through the analysis of interviews with working professionals who have experience in this type of collaboration in transmission and distribution projects. These challenges highlight the problems that working professionals encounter during collaboration. Hence, the best practices are also identified through interviews as well as from existing literature. Therefore, the framework represents the set of applicable recommendations tailored based on the best practices. In order to ensure its applicability in real life, it is essential to distinguish which practices should be implemented by each stakeholder. Namely, the stakeholders are the local division, the foreign division, and the local public client. This will be marked next to each recommendation, and Table 5.1 represents the explanation of abbreviations used.

Table 5.1: Abbreviations used to identify the responsible party

Abbreviation	Responsible Party
LD	should be applied by local division
MNE	should be applied by both divisions
MNE+LPC	should be applied by both divisions and local public client
LD+LPC	should be applied by the local division and the local public client

Conflicting working cultures

Explanation of a problem: Even though teams from different divisions work for the same multinational enterprise, differences still exist. Thus, challenges arise regarding how teams understand the workload expectations, behavior during meetings, and what is considered polite and appropriate in the country where the project is happening. For example, in some countries it is common to communicate openly in order to avoid misunderstanding, while in other countries one might perceive this openness as rudeness. To bridge these differences, there is a set of recommendations that should be applied.

Recommendation for an action:

1. Meetings for cultural alignment (LD+LPC):

- Local division and public client should organize a meeting in which the foreign division will also participate. The goal of this meeting is to meet each other and discuss differences, and explain their "way of working".

2. *Select cultural agent (MNE):*

- Point out a representative from each side. Namely, there should be a representative from the local division and the foreign division.
- This person should ensure that cultural differences are respected between teams during the collaboration and try to include everyone in the discussion during meetings.

3. *Organize team building events (MNE)*

- Create team-building events, in which people will be able to spend time together outside of the project and get to know each other on a more personal level. These events can also include games in teams in order to foster better collaboration.

Expectation misalignment

Explanation of a problem: This challenge is a common issue that occurs during the collaboration between two different divisions on one side and a local public client on the other. Each stakeholder might have a different perception on what is expected and how the project should be executed. Moreover, this challenge arises when the foreign division is less familiar, compared to the local division, with the standards established by the local public client. Furthermore, problems occur when the foreign division is unaware of the required level of design details, documentation style, and quality of the design that is expected from them.

Recommendation for an action:

1. *Assign a lead engineer who is familiar with standards (LD+LPC):*

- The first step is for the lead engineer from the local division to meet with the local public client to define and translate the client's expectations related to documentation, design expectations, and quality expectations. Moreover, this leader should understand the differences between the standards in the two countries.
- The second step is for lead engineering from the local division to communicate this information with a foreign team.

2. *Develop a roadmap (MNE+LPC):*

- The first step is to develop a visual, like a roadmap, that can be used to capture the client's expectations, key milestones, and technical specifications from the start. Roadmap should include: what are the goals related to design and documentation, timeline, and explanation of how will this be achieved. Moreover, it is important to make sure that this is understood by all parties.
- The second step is to share the roadmap with the client, in order to ensure mutual understanding of previously mentioned points. Moreover, if necessary the roadmap should be assessed and improved by the local public client during project's life cycle.

3. *Discussion and feedback sessions (MNE+LPC):*

- The first step is to schedule a discussion and feedback sessions, especially during the design and construction phase. It is encouraged and recommended for the client to be involved in these sessions.
- The second step is to create a document that will contain all the questions and answers.

Language barriers challenges

Explanation of a problem: Language barriers can lead to misunderstanding in transmission and distribution projects when teams from different countries collaborate. These types of projects involve an extensive technical terminology that varies per country. Additionally, it is in a human's nature to translate everything from a mother tongue language to English, which can lead to a loss of information in translation.

Recommendation for an action:**1. Use a professional translator (MNE):**

- Professional translators can be used in order to bridge the language differences. These translators also possess knowledge of jargon. Therefore, they have the ability to fully understand the context of the conversation.

2. Agree on a common language of the project (MNE+LPC):

- Before the project begins, agree on the common language of the project. This means that not only should communication be done in English, but also documentation should be written in English as well.

3. Encourage active clarification during meetings (MNE):

- The first step is to appoint a person who will ensure mutual understanding between teams and preferably this should be someone from a local division.
- The second step is to encourage members from the foreign team to seek clarification if needed.

Communication style

Explanation of a problem: Communication style challenge is closely linked to cultural challenges, since individuals from different countries often have different communication styles. In this context, local division and local public client are coming from the same country, and most likely, they will not encounter issues. However, when a foreign division joins the project, challenges might arise. For example, in some cultures, open communication is encouraged, while in others it is not. These differences can lead to misunderstandings.

Recommendation for an action:**1. Define a clear communication plan (MNE+LPC):**

- The first step is to identify stakeholders involved and map the flow of the communication between them. Stakeholders are: the local division, the foreign division, and the local public client.
- The second step is to clarify who communicates what to whom and how often.
- Communication plan should include points such as: type of information that should be shared, responsibilities, frequency of communication, and type of channels that will be used.

2. Centralize external communication (LD):

- The first step is to define a primary point of contact. Communication with external stakeholders, should be done by the person who is appointed as the primary point of contact.
- The second step is to use push and interactive communication methods. Push communication methods are emails, while interactive communication methods are meetings.
- The third step is to use a pull communication method, which includes platforms on which all necessary information can be accessed by MNE divisions and public clients to ensure the continuous flow of information.

3. Encourage open communication (LD):

- The first step is to provide a coaching session on cultural differences between stakeholders.
- The second step is to encourage open communication, which involves speaking clearly, defining needs, and avoiding vagueness. However, it is important to emphasize that this should be done in a respectful manner.

Different software and programs

Explanation of a problem: When multiple stakeholders are involved in the TD projects, it is common for them to utilize different software for structural and electrical calculations and analysis. Consequently, sharing files and information between organizations becomes difficult, almost impossible.

Recommendation for an action:**1. Make a software plan (MNE+LPC):**

- The first step is to identify programs used by the other organizations.
 - The second step is to clarify who is responsible for it.
 - The third step is to understand the differences between programs and how the information will be exchanged between the organizations.
2. *Using international software (MNE+LPC):*
- The first step is to discover which software is used, however, this should be done at the early stages of the collaboration.
 - The second step, if programs are not compatible or they are developed by organizations, is to propose adopting a program that is used internationally for TD projects.
3. *Use output validation instead of rework (LD):*
- Validation can be done on the results by the team from the local division. Therefore, there is no need for them to repeat the calculations that are already completed by the foreign division.
4. *Connect modelers from each organizations (MNE+LPC):*
- If programs that are used are different, first connect modelers from both the local and foreign division. By starting to collaborate early it is possible to identify the differences and determine how to tackle them in order to minimize extra work during the project.

Figure 5.1, represents the overview of the framework, which includes actionable recommendations for the local and foreign divisions, as well as the local public client. Moreover, by looking at the framework stakeholders can identify their responsibilities.

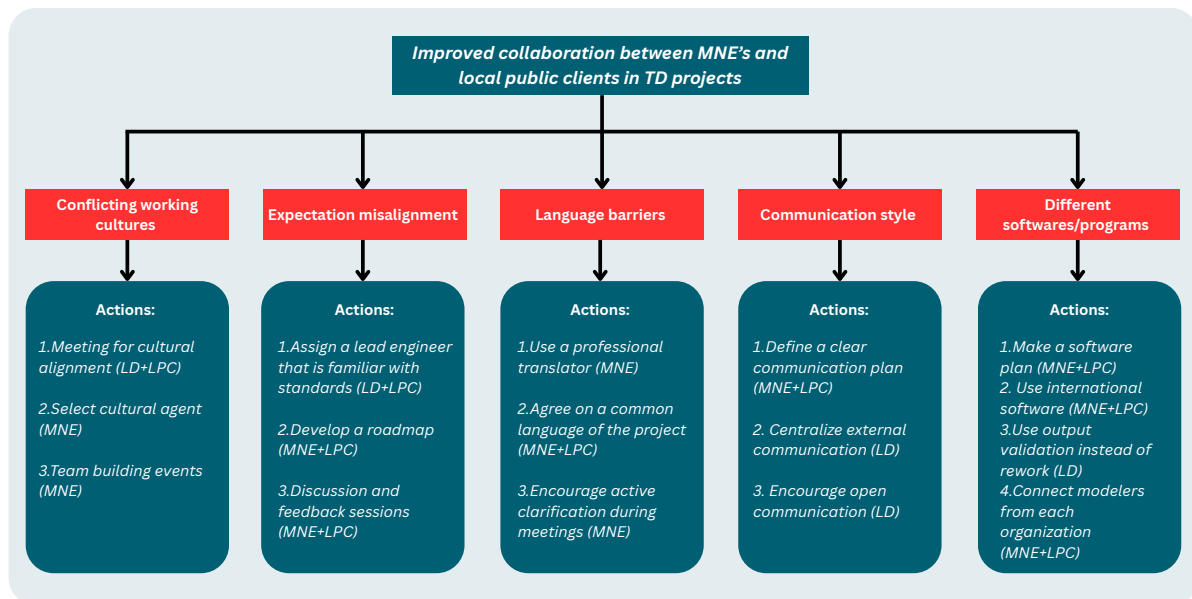


Figure 5.1: The Proposed Framework

5.2. Framework Validation

To test the applicability of the framework in real-life settings, validation is required. Therefore, the methodology used for validation is a focus group. This approach is a type of group discussions that is guided by the group moderator (Sim and Waterfield, 2019). The session was organized online and it included six professionals. Since this collaboration involves multiple stakeholders, it was important to include professionals from both a foreign division and the public client side. The list of participants can be found in Table 5.2.

Table 5.2: Participants of the focus group

Participant	Role	Country
FG1	Group Leader	The Netherlands
FG2	Group Supervisor	The Netherlands
FG3	Commercial Operations	The Netherlands
FG4	Group Leader	The Netherlands
FG5	Commercial Operations	Spain
FG6	Commercial Operations (client)	The Netherlands

The focus group session is organized to allow sufficient time to cover all 5 challenges and their recommendations on how to tackle them. The aim of this session was to assess which recommendations are considered important and applicable for enhancing collaboration between MNEs and local public clients in TD projects. During the session, participants were encouraged to engage in discussion on the framework. Additionally, participants were asked to rank the recommendations based on their judgment on importance. Their input is valuable for this research, since recommendations are updated according to their feedback, which validates the findings and makes this framework more applicable for real-life scenarios.

Findings are discussed in the upcoming subsections, and each subsection represents a challenge.

5.2.1. Conflicting Working Culture

The set of recommendations is given to the participants, who were then asked to rank them from highest to lowest priority. The recommendations are: meetings for cultural alignment (LD+LPC), select a cultural agent (MNE), and organize team-building events (MNE). It is important to note that before the ranking took place, each practice is explained by the moderator. Table 5.3 represents their rankings.

Table 5.3: Ranked recommendations for conflicting working culture

Participant number	1st	2nd	3rd
1.	Select cultural agent (MNE)	Meetings for cultural alignment (LD+LPC)	Organize team-building events (MNE)
2.	Select cultural agent (MNE)	Meetings for cultural alignment (LD+LPC)	Organize team-building events (MNE)
3.	Meetings for cultural alignment (LD+LPC)	Select cultural agent (MNE)	Organize team-building events (MNE)
4.	Select cultural agent (MNE)	Organize team-building events (MNE)	Meetings for cultural alignment (LD+LPC)
5.	Meetings for cultural alignment (LD+LPC)	Select cultural agent (MNE)	Organize team-building events (MNE)
6.	Select cultural agent (MNE)	Organize team-building events (MNE)	Meetings for cultural alignment (LD+LPC)

As shown in the table, four out of six participants emphasized the importance of selecting a cultural agent from both the local and foreign divisions. The remaining two participants identified meetings for cultural alignment as the most important recommendation. Furthermore, organizing the team-building events is ranked as the least important. Therefore, to tackle challenges that arise due to conflicting working cultures, the main focus should be on selecting the cultural representative, followed by organizing meetings for cultural alignment, and finally, organizing team-building events.

A discussion was created among the participants to gain a deeper understanding of the proposed recommendations. The upcoming paragraphs present and explain their remarks.

FG1 and FG4 stated that meetings for cultural alignment should be held between the foreign and local divisions, rather than between the local division and the local public client. The initial idea was for the local division and the local public client to organize a meeting for a foreign division, during which they

could present their "way of working". However, one participant proposed this recommendation as a two-step approach. The first step would be to organize a meeting between the local and foreign divisions to discuss cultural differences and provide an introduction. The second step would be organizing a kick-off meeting before the project begins. This meeting should be held between all three stakeholders, and it should include a discussion on the differences and an agreement on how they intend to collaborate. FG1 and FG4 explain:

"So I would rather set this meeting up for a cultural alignment in between two offices, so the Dutch and foreign office. However, when it comes to clients, we can organize kick-offs, which is a separate meeting. During kick-off, we can also discuss cultural differences and how we want to work together. So I see it as a two-step approach."

"So let's have a meeting between clients and all offices involved. If the client is open to it, it would definitely help to have a mutual understanding of how we work and how to avoid hurdles that are real."

Participants also mentioned that selecting a cultural agent is important if you do not know each other upfront. However, a cultural agent should be an individual who understands the culture and language very well. Moreover, another participant expressed that it is beneficial to define the differences first internally, so between the two divisions, before engaging with the client. FG6 and FG4 explain:

"First of all, I do think it is important to put a national representative if you do not know each other up front. This person knows the culture and also knows the pitfalls of a culture, and that must be someone who speaks the language."

"I think if you first sort out internally how you're organized and who talks to whom before you expose our foreign colleagues to a client."

5.2.2. Expectation Misalignment

Recommendations that can be applied in order to tackle the expectation misalignment challenges were presented to the participants, and they are: assigning a lead engineer who is familiar with standards (LD+LPC), developing a roadmap (MNE+LPC), and organizing discussion and feedback sessions (MNE+LPC). Once these recommendations were explained in detail, participants were asked to rank them. The results are represented in Table 5.4.

Table 5.4: Ranked recommendations for expectation misalignment

Participant number	1st	2nd	3rd
1.	Develop a roadmap (MNE+LPC)	Assign a lead engineer that is familiar with standards (LD+LPC)	Discussion and feedback sessions (MNE+LPC)
2.	Assign a lead engineer that is familiar with standards (LD+LPC)	Develop a roadmap (MNE+LPC)	Discussion and feedback sessions (MNE+LPC)
3.	Assign a lead engineer that is familiar with standards (LD+LPC)	Develop a roadmap (MNE+LPC)	Discussion and feedback sessions (MNE+LPC)
4.	Assign a lead engineer that is familiar with standards (LD+LPC)	Develop a roadmap (MNE+LPC)	Discussion and feedback sessions (MNE+LPC)
5.	Assign a lead engineer that is familiar with standards (LD+LPC)	Develop a roadmap (MNE+LPC)	Discussion and feedback sessions (MNE+LPC)
6.	Develop a roadmap (MNE+LPC)	Assign a lead engineer that is familiar with standards (LD+LPC)	Discussion and feedback sessions (MNE+LPC)

As presented in the table, it can be seen that assigning a lead engineer who is familiar with standards is considered the most important, since four out of six participants ranked it the highest. Development of a road map is considered the second most important practice, and it was also ranked by four out of six participants. Finally, organizing discussion and feedback sessions received a unanimous vote.

FG2 and FG4 stated that assigning a lead engineer is the key, since this individual will oversee the entire process. Moreover, it is also stated that while processes in the project are usually fixed, the lead engineer is flexible to adapt and find solutions in case problems arise. FG2 and FG4 explain:

"But I think that the key to everything is to assign a key individual who looks after. That person should be a spokesperson."

"I agree with the recommendation to assign a lead engineer. More important even than process, because the lead engineer is agile and he can move around a bit on what is necessary while the process is fixed."

FG5 suggested that the maturity level of a company can contribute negatively to expectation misalignment. During the early stages of a project, it is important to initiate discussions about the client's level of maturity, since it can happen that clients do not always have well-established departments. Therefore, the client needs to define their own needs.

Finally, FG2 considers that the roadmap should consist of two stages. The first stage is to have a properly developed project management plan, while the second stage is to create an onboarding plan, which will include a detailed explanation of the business process. FG2 explains:

"For the roadmap, I think you need two different stages. So you have your project management plan, and then you have something that should also, at the same time, represent an onboarding process where you are going to explain the process in general on the business we do."

5.2.3. Language Barriers

These are the best practices that are given to the participants to rank: use a professional translator (MNE), agree on a common language of the project (MNE+LPC), and encourage active clarification during meetings (MNE). The results are presented in the Table 5.5.

Table 5.5: Ranked recommendations for language barriers

Participant number	1st	2nd	3rd
1.	Agree on common language of the project (MNE+LPC)	Encourage active clarification during meetings (MNE)	Use a professional translator (MNE)
2.	Encourage active clarification during meetings (MNE)	Agree on common language of the project (MNE+LPC)	Use a professional translator (MNE)
3.	Agree on common language of the project (MNE+LPC)	Encourage active clarification during meetings (MNE)	Use a professional translator (MNE)
4.	Encourage active clarification during meetings (MNE)	Agree on common language of the project (MNE+LPC)	Use a professional translator (MNE)
5.	Agree on common language of the project (MNE+LPC)	Encourage active clarification during meetings (MNE)	Use a professional translator (MNE)
6.	Encourage active clarification during meetings (MNE)	Use a professional translator (MNE)	Agree on common language of the project (MNE+LPC)

From the Table 5.5, it can be seen that the most important recommendations that can be applied are to encourage active clarification during meetings and agree on a common language of the project. Each of these practices is ranked as the most important by three out of six participants. While the least important practice is the use of a professional translator, this practice scored five out of six.

FG1 mentions that hiring a professional translator would be the best case scenario. However, that is not always the case in real-life TD projects. Moreover, it explains that it is better to use the AI tools for translation. Since those tools proved to be reliable when it comes to translating more formal information and technical terms. Moreover, FG3 also states that this is not the best solution, since making the information understandable is more important than just translating it. FG3 explains:

"Help each other to understand, so it is not only translating, it is also understanding of what you want to discuss. It will help to have some common understandings of specific items in terms of what we understand about it."

FG2, FG6, FG4 stated that encouraging active clarification is important in TD projects. However, sometimes that can be challenging due to different cultures. For example, in some cultures, raising a hand to say that something is not understood is considered rude. Therefore, this needs to be tackled in a delicate way.

Additionally, FG3 suggests that it would be beneficial to create a glossary that includes the definitions of certain terms that are commonly used in TD projects. To ensure that everyone is aligned. FG3 explains:

"I think it would be useful to create some kind of glossary. Since we all think that we understand each other, but we don't."

5.2.4. Communication Style

Best practices that can be used to tackle this challenge and that are presented to the participants are: define a clear communication plan (MNE+LPC), centralize external communication (LD), and encourage open communication (LD). These practices are ranked from top to bottom, and Table 5.6 represents the result.

Table 5.6: Ranked recommendations for communication style

Participant number	1st	2nd	3rd
1.	Define a clear communication plan (MNE+LPC)	Centralize external communication (LD)	Encourage open communication (LD)
2.	Centralize external communication (LD)	Define a clear communication plan (MNE+LPC)	Encourage open communication (LD)
3.	Define a clear communication plan (MNE+LPC)	Centralize external communication (LD)	Encourage open communication (LD)
4.	Define a clear communication plan (MNE+LPC)	Centralize external communication (LD)	Encourage open communication (LD)
5.	Define a clear communication plan (MNE+LPC)	Centralize external communication (LD)	Encourage open communication (LD)
6.	Define a clear communication plan (MNE+LPC)	Centralize external communication (LD)	Encourage open communication (LD)

In the Table 5.6, it can be seen that the most important recommendation is defining a clear communication plan, since five out of six participants ranked it that way. The second most beneficial is centralizing external communication, and this practice is also ranked by five out of six participants. Encouraging open communication is ranked as the least important practice.

FG6 explains that as a public client, communication is a challenge that needs to be tackled carefully. Defining what type of communication is needed is necessary. Define if it is project-specific or organization-specific. Moreover, FG3 explains that during the creation of the communication plan, stakeholders that are involved in the project must be included, not only the local division, the foreign division, and the public client. Due to the size and complexity of TD projects, other stakeholders are involved. FG6 and FG3 explain:

"I am talking from a client side now, we play an important role in every communication that is about the project. We always take responsibility when it comes to communication with outside parties, with stakeholders and etc. Also, it is important to consider what communication we need, is the project specific or between the organizations."

"You have the communication with the advisor to the client we work for, and then the client has his own stakeholders as well. Now we mention the communication plan, but since there are so many communication plans, be specific, which one do you mean."

FG2 and FG4 state that ensuring open communication is a beneficial, although challenging, task. This is directly connected and affected by the cultural differences that exist between professionals.

5.2.5. Different Software and Programs

This challenge can be minimized by applying these recommendations: make a software plan (MNE+LPC), use international software(MNE+LPC), use output validation instead of rework (LD), and connect modelers from each organization (MNE+LPC). Additionally, Table 5.7 represents how participants ranked each recommendation.

Table 5.7: Ranked recommendations for different software and programs

Participant number	1st	2nd	3rd	4th
1.	Make a software plan (MNE+LPC)	Use international software (MNE+LPC)	Use output validation instead of rework (LD)	Connect modelers from each organization (MNE+LPC)
2.	Use international software (MNE+LPC)	Make a software plan (MNE+LPC)	Use output validation instead of rework (LD)	Connect modelers from each organization (MNE+LPC)
3.	Make a software plan (MNE+LPC)	Use output validation instead of rework (LD)	Use international software (MNE+LPC)	Connect modelers from each organization (MNE+LPC)
4.	Use international software (MNE+LPC)	Make a software plan (MNE+LPC)	Use output validation instead of rework (LD)	Connect modelers from each organization (MNE+LPC)
5.	Make a software plan (MNE+LPC)	Use international software (MNE+LPC)	Use output validation instead of rework (LD)	Connect modelers from each organization (MNE+LPC)
6.	Make a software plan (MNE+LPC)	Use international software (MNE+LPC)	Use output validation instead of rework (LD)	Connect modelers from each organization (MNE+LPC)

From the Table 5.7, it can be seen that making a software plan recommendation was ranked as the most important by four out of six participants. This table also shows that participants had a unanimous vote when it comes to connecting modelers from each organization, and it is ranked as the least important recommendation.

All of the participants agreed with the recommendations that were presented to them. However, FG3 highlights that discussion on which software and programs will be used for structural and electrical calculations should be discussed even before asking for a proposal request. FG3 explains:

"What I'm trying to highlight is that while having a plan is important, it often comes into play only after the work has been awarded. What could be even more valuable is having a conversation earlier, more specifically before the project officially begins."

During the session, valuable insights are gathered, which are then used to improve the framework. Moreover, it is stated by participants that all recommendations are valuable and should be implemented. However, some of them are more important. There is only one recommendation, which they did not approve, and that is using a professional translator to tackle the language barrier challenge. They believe that, in theory, this could help to bridge the language gap. However, in practice, that is not the case, due to technical terms in TD projects. It is also a positive sign for the framework since the opinions between participants from MNE and the local public client are aligning. Therefore, they are willing to collaborate and work together in order to achieve the goal, which is successful collaboration and a successful TD project that will impact the energy transition process.

5.2.6. Updated Framework

This section represents the updated set of recommendations that can be used by MNE and local public clients in TD projects to accelerate energy transition. In addition, changes that are made are presented in bold text.

Conflicting working cultures

Recommendation for an action:

1. Meetings for cultural alignment (MNE+LPC):

- **The first step is for the local and foreign division to have a meeting. In this meeting, divisions should first internally discuss their differences on the "way of working". Also, the local division should give an introduction to the whole collaboration to the foreign division. Therefore, this action is for MNE.**
- The second step is local division and public client to organize a meeting in which the foreign division will also participate. The goal of this meeting is to meet each other and discuss the differences, and explain their "way of working". This action is for MNE and the local public client.

2. Select cultural agent (MNE):

- Point out a representative from each side. Namely, there should be one representative from the local and foreign divisions.
- **Cultural agent from the local side should be someone who knows the language and culture very well.**
- This person should make sure that cultural differences are respected between teams during the collaboration and try to include everyone in the discussion during meetings.

3. Organize team building events (MNE)

- Create team-building events, in which people will be able to spend time together outside of the project and get to know each other on a more personal level. These events can also include games in teams in order to foster better collaboration.

Expectation misalignment

Recommendation for an action:

1. Assign a lead engineer who is familiar with standards (LD+LPC):

- The first step is for the lead engineer from the local division to meet with the local public client to define and translate the client's expectations related to documentation, design expectations, and quality expectations. Moreover, this leader should understand the differences between the standards in the two countries.
- The second step is for lead engineering from the local division to communicate this information with a foreign team.

2. Develop a roadmap (MNE+LPC):

- The first step is to develop a visual, like a roadmap, that can be used to capture the client's expectations, key milestones, and technical specifications from the start. The roadmap should include: the goals related to design and documentation, the timeline, and an explanation of how this will be achieved. **While creating the roadmap, the maturity level of the company should be considered. In this case, the local public client needs to carefully define their own needs.** Moreover, it is important to ensure that this is understood by all parties.
- The second step is to share the roadmap with the client, in order to ensure mutual understanding of previously mentioned points. Moreover, if necessary, the roadmap should be assessed and improved by the local public client during the project's life cycle.
- **This roadmap should also be used for the onboarding process of the foreign team. So both the roadmap and project management plan should be presented to them.**

3. Discussion and feedback sessions (MNE+LPC):

- The first step is to schedule a discussion and feedback sessions, especially during the design and construction phase. It is encouraged and recommended that the client be involved in these sessions.
- The second step is to create a document that will contain all the questions and answers.

Language barriers

Recommendation for an action:

1. Agree on a common language of the project (MNE+LPC):

- Before the project begins, it is important to agree on the common language of the project. This means that communication and necessary documentation should be in English.

2. Encourage active clarification during meetings (MNE):

- The first step is to appoint a person who will ensure mutual understanding between teams, and preferably, this should be someone from a local division.
- The second step is to encourage members from the foreign team to seek clarification if needed.

3. Create a glossary (MNE):

- Glossary with all necessary terms and definitions should be created. It should include the definitions of structural and electrical terms, as well as other terms that are often used in TD projects.

4. Use AI tools for translation (MNE):

- AI tools proved to be useful when it comes to translating more formal documents as well as technical terms.

Communication style

Recommendation for an action:

1. Define a clear communication plan (MNE+LPC):

- The first step is identifying all stakeholders involved in this collaboration and mapping the flow of the communication between them. Stakeholders are: the local division, the foreign division, and the local public client.
- The second step is to clarify who communicates what to whom and how often.
- Communication plan should include points like: type of information that should be shared, responsibilities, frequency of communication, and type of channels that will be used.
- **When making the communication plan, also consider the communication flow between other stakeholders that are involved in TD projects, not just the local and foreign divisions and the local public client.**

2. Centralize external communication (LD):

- The first step is to define a primary point of contact. Communication with external stakeholders should be done by the person who is appointed as the primary point of contact.
- The second step is to use push and interactive communication methods. Push communication methods are emails, while interactive communication methods are meetings.
- The third step is to use a pull communication method, which includes platforms on which all necessary information can be accessed by MNE divisions and public clients to ensure the continuous flow of the information

3. Encourage open communication (LD):

- The first step is to provide a coaching session on cultural differences between stakeholders.
- The second step is to encourage open communication, which involves speaking, defining needs, and avoiding vagueness. However, it is important to emphasize that this should be done respectfully.

Different software and programs

Recommendation for an action:

1. Discussion on software's (LD+LPC):

- Before the start of the project, discuss with the local public client about which software is used.

1. Make a software plan (MNE+LPC):

- The first step is to identify programs used by the other organizations.
- The second step is to clarify who is responsible for it.
- The third step is to understand the differences between programs and how information will be exchanged between the organizations.

2. Using international software (MNE+LPC):

- If the programs that are used are not compatible, agree on more international software and programs.

3. Use output validation instead of rework (LD):

- Validation can be done on the results by the local team. Therefore, there is no need for them to repeat the calculations that have already been completed by the foreign division.

4. *Connect modelers from each organization (MNE+LPC):*

- First, connect modelers from both the local and foreign divisions. By starting to collaborate early, it is possible to identify the differences and determine how to tackle them in order to minimize extra work during the project.

Figure 5.2 shows the updated version of the original proposed framework.

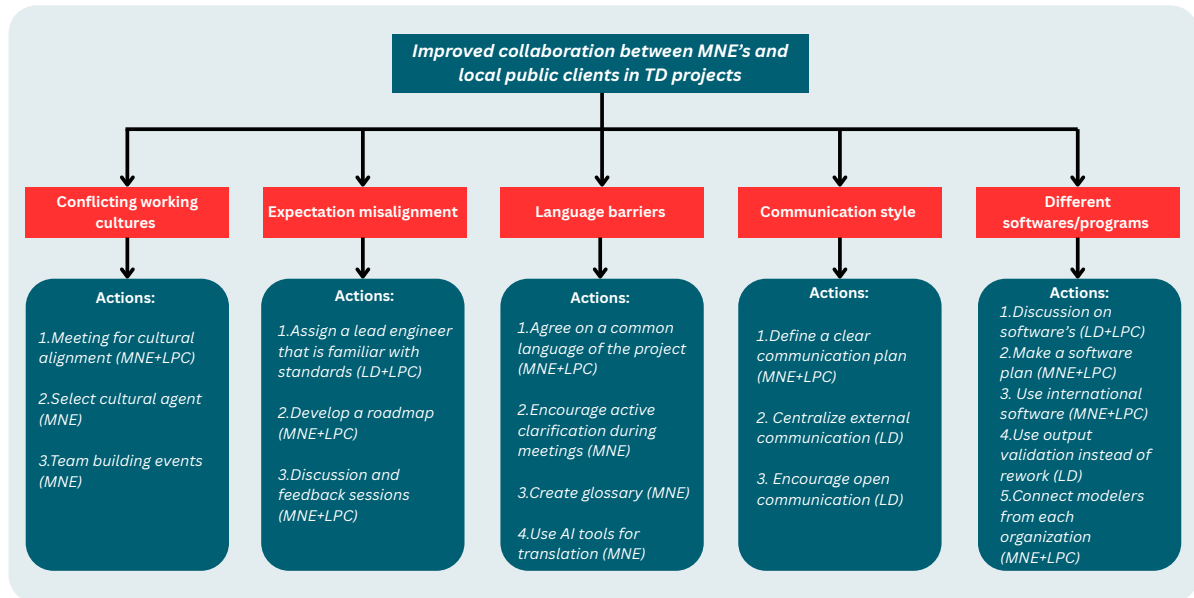


Figure 5.2: Updated framework based on feedback after validation session

6

Discussion

Once the research is completed, it is important to merge all findings and generate a detailed discussion. Therefore, the aim of this chapter is, first to explain the objective of the research. Then, to discuss the main findings and how this research relates to the existing literature. Afterwards, the present practical implications will be presented, explaining what this research means for multinational enterprises (MNEs) and local public clients in transmission and distribution projects. Each of these topics is discussed in a separate section.

6.1. General Discussion of the Research

This research was motivated by the growing pressure on transmission and distribution (TD) infrastructure to support the energy transition process in Europe. Existing energy infrastructure faces limitations that negatively affect energy transportation due to the growth of renewable electricity generation (Arcia-Garibaldi et al., 2018). To address these issues, there is an urgent need to upgrade TD lines and develop new ones. In order to achieve this, effective collaboration between the public and private sectors is crucial. Combining the capabilities and resources of both private and public sectors, it is possible to contribute to a more sustainable future (Popescu et al., 2023), while also fostering knowledge and experience sharing between organizations (Grafius et al., 2020). MNEs are crucial for these projects since they possess expertise and knowledge that can contribute to the development of a more sustainable future (Bass and Grøgaard, 2021), while local public clients play an important role, since a private party cannot achieve performance alone (Verweij and Satheesh, 2023).

While previous research emphasizes the importance of inter-organizational collaboration, it hardly explores the specific dynamics between MNEs and local public clients within the context of TD projects, especially regarding sector-specific challenges. This research delves deeper into the characteristics of collaboration between public and private parties, as the existing literature generally focuses on public-private partnerships and often lacks information about the specific types of organizations involved. Thus, this research introduces a form of public-private partnership which involves organizations like MNEs and local public clients that are crucial for TD projects, see Figure 6.1. Moreover, most of the literature focuses on general construction or infrastructure context and often lacks detail on organization type, country context, or practical application of strategies. Additionally, the explanation on how to overcome collaboration challenges is limited. Hence, the needs of TD projects remain unknown, even with their critical role in achieving sustainability targets.

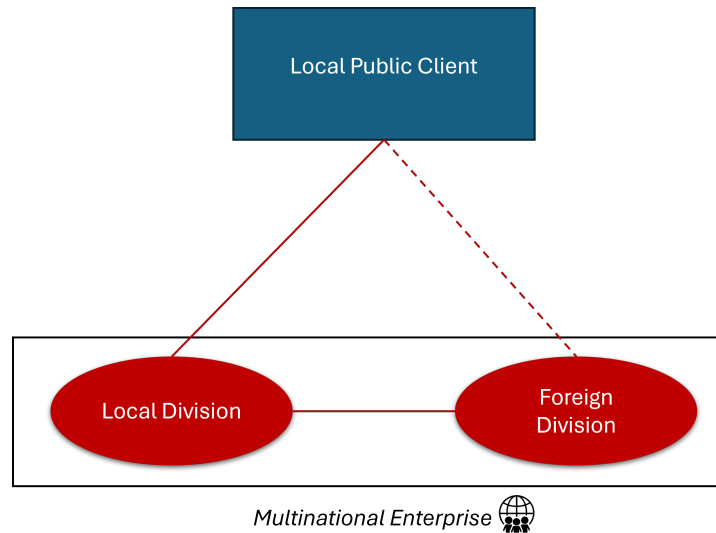


Figure 6.1: Type of public-private partnership

In order to address this gap, this research proposes a framework that focuses on tackling the challenges and improving the collaboration between MNEs and local public clients in TD projects. By doing so, it extends existing collaboration theories to an underexplored sector and offers actionable strategies for enhancing project delivery in the energy transition. Thus, it represents a new contribution to the literature on inter-organizational collaboration in energy infrastructure, specifically within transmission and distribution projects.

6.2. Summary of Findings and Connection to the Literature

The aim of this section is to provide a more detailed discussion of the connection between the empirical findings and the literature. Also, the goal is to explain the research findings and their contributions.

6.2.1. Key Challenges

Due to the limited research on this sector-specific collaboration, in this study, challenges are found in the literature related to different construction sectors. Relevant challenges were identified in existing studies on inter-organizational collaboration, public–private partnerships, and international collaboration. By drawing from this broader literature, this research validates whether typical collaboration challenges also apply to TD projects and whether new, context-specific challenges emerge.

This literature review identified eight main categories of challenges, each further divided into specific challenges, resulting in a total of 25 distinct challenges. The main categories are identified as: cultural challenges, communication challenges, organizational challenges, leadership and team-building challenges, legal and regulatory challenges, financial challenges, skill and competency challenges, and different software and programs challenges. Those are the challenges that occur in either the construction industry in general or infrastructure projects. Detailed explanations of these challenges are found in Section 2.4.

In order to assess whether these challenges also appear in the collaboration between MNE and local public clients in TD projects and uncover additional ones, an empirical study was conducted through semi-structured interviews. Therefore, it was important to include interviewees from both organizations, namely MNE and the local public client. This approach ensured that insights were gathered from both parties in the collaboration. The interview findings confirmed the relevance of many literature based challenges already described in other construction sectors, while also revealing additional issues specific to TD projects. During the interview, 11 new challenges were identified, therefore, in total, there are 36 challenges. Although it is identified that out of these 36, 27 were found to be relevant to the collaboration context studied, while 8 literature based challenges were not mentioned by interviewees. These results suggest that while many collaboration challenges that MNEs and local public clients come

across in TD projects are shared with the literature-based challenges of the other construction sectors, there are also unique challenges present. These findings support the need to tailor inter-organizational collaboration frameworks to the characteristics of TD projects in order to foster effective collaboration.

Another important contribution of this research is the identification of the key challenges that stakeholders are facing in collaboration during TD projects. Through the analysis of the interviews these have been identified. The identified challenges are: conflicting working cultures, expectation misalignment, language barriers, communication style, and different software and programs. Challenges like conflicting working cultures, language barriers, communication style, and different software and programs, are found in the literature in other construction sectors. Although the empirical study was conducted with professionals in the TD sector, this research confirms that these challenges are not unique to the TD sector. They also appear in other construction sectors. However, expectation misalignment is a key challenge that emerged through interviews and can be considered a novel contribution of this study.

6.2.2. Recommendations for Actions and Framework

Considering the role of collaboration in TD projects for sustainability, this research proposed a framework. The set of practical recommendations was developed based on both interview findings and supporting literature, where applicable. During the interviews, interviewees were asked to define the most important challenge and to describe the strategies they believed could effectively address it. After the development of the framework, it was validated through a focus group study, and the framework was further tailored for collaboration in the TD project.

For cultural differences, interviewees suggested these recommendations: meetings for cultural alignment, select a cultural agent, and organize team-building activities. However, due to the broad definition and multidimensional nature of organizational culture, specific practices tailored to this context were not found in the existing literature. Therefore, the best practices are tailored and put into a framework.

To address expectation misalignment, interviewees proposed several strategies focused on aligning goals and responsibilities early in the project. These include assigning a lead engineer, utilizing a shared roadmap to clarify objectives, and organizing structured discussion sessions. These recommendations align with the literature, which suggests that timeliness, aesthetics, functionality, safety, and overall project quality should be defined in the early stages (Lau and Rowlinson, 2009). Moreover, Chan and Oppong, 2017 suggests that it is important for a contractor to map out the client's expectations to specific project deliverables. Which means that in this case, MNE should map out client expectations. Lau and Rowlinson, 2009 also suggests communication between client and contractor in order to receive feedback and ensure consistency. Moreover, after the validation session, it was stated that the client's maturity level should also be considered and added to the roadmap. Together, these findings support a proactive, structured approach to solving the expectation management challenge that is in the way of successful collaboration in TD projects.

To address language barriers, interviewees recommended establishing a common project language and encouraging active clarification during meetings to ensure mutual understanding. This approach was seen as especially useful in preventing misunderstandings in technical discussions of the multinational teams. Jinfang, 2023 supports this claim and suggests that in international construction projects, it is useful to use professional translators. This was adopted into the framework. However, it was later removed following feedback from the focus group, which considered translators ineffective in the technical context of the projects. Aichhorn and Puck, 2017 suggests that continuous interaction between people can help them to bridge the language barriers. This backs the proposed solution and was approved during the focus group session. Moreover, recommendations such as creating a glossary and usage of AI tools for translation were implemented in the framework after the focus group session.

To manage differences in communication style, interviewees emphasized the need for clearly defined communication protocols. These included centralizing external communications through a designated contact person, encouraging open communication within teams. These findings are supported by Gamage, 2022 and Setiawan et al., 2021. These suggest that effective communication can be tackled by using a structured communication plan. Such a plan should include the type of information that will be shared, appropriate communication methods, and clearly defined responsibilities. Moreover, Gamage, 2022 suggests that in international collaboration, it is important to educate team members on cultural

differences between each other to foster mutual understanding and respectful interaction. Moreover, during the validation session, it was emphasized that other stakeholders, which are not the local and foreign divisions and the local public client, should be included in the communication plan as well, since they are part of the TD projects.

To address the challenge of different software and programs, interviewees recommended as best practices: using international software, using output validation instead of rework, and connecting modelers from each organization. Unlike communication-related challenges, in the literature, it is not stated clearly how this challenge can be tackled, highlighting a gap in guidance for digital coordination. Therefore, in this research, the idea to tackle this challenge in a similar way to the communication style challenge is proposed. Instead of creating a communication plan that was suggested by Gamage, 2022, in this case, it is possible to create a software coordination plan. Such a plan defines which software tools are used by each party, identifies responsible personnel, outlines integration challenges, and establishes protocols for managing software incompatibilities. Moreover, this plan should be developed and communicated at the beginning of the project to avoid conflicts and inefficiencies. This approach contributes a novel, actionable mechanism for addressing one of the key challenges in TD project collaboration.

It can be seen from the findings that there is a clear relationship between the practices identified in the interviews and those documented in the literature. In many cases, empirical insights and theory mutually support each other, providing a solid foundation for the proposed framework. Based on this, the actionable set of recommendations listed above was developed to address key challenges. These recommendations were turned into a practical framework designed to support collaboration between MNEs and local public clients in TD projects, ultimately contributing to more effective project delivery and progress toward energy transition goals. To evaluate its applicability, the framework was validated by the professionals. Participants confirmed the relevance of the proposed recommendations. However, some minor changes were proposed that have already been discussed in detail in Section 5.2.

Given the recognized importance of effective collaboration in accelerating the energy transition, this research contributes new insights into how MNEs and local public clients can address their most crucial collaboration challenges in TD projects. The proposed framework enhances the existing literature by translating both empirical findings and theoretical guidance into actionable practices tailored to the underexplored collaboration between MNEs and local public clients in TD projects. Moreover, equipped with a practical tool, that is this framework, stakeholders will be motivated to collaborate towards a more sustainable future promoted by more effective inter-organizational collaboration supported by this study.

6.3. Practical Implications

The framework developed to enhance collaboration between MNEs and local public clients in TD projects was created based on findings from both the literature review and empirical interviews. It was tested whether challenges identified in the literature are also applicable to this specific sector. Moreover, most of the challenges addressed in the framework originate from literature, as well as some of the practices for tackling them. Therefore, this framework is backed by the theory from literature while also improved with real-world insights.

The framework was designed to be immediately applicable and testable in practice, since it consists of concrete recommendations and detailed explanations on how challenges arising between MNEs and public clients can be addressed. Moreover, the framework specifies which stakeholder is responsible for implementing each practice, ensuring clarity ready for use. The primary goals of the framework are to ensure successful collaboration, motivate stakeholders for collaboration, and ensure the success of the project, ultimately contributing to the energy transition process.

7

Conclusion

The aim of this chapter is to present the key findings of the research, insights from both the literature and the empirical study. It also outlines practical recommendations for stakeholders, and the limitations that had an impact on the research process will be presented. Finally, recommendations for future research are given.

7.1. Answering Research Questions

This master's thesis investigates how collaboration between multinational enterprises (MNEs) and local public clients can be improved in transmission and distribution (TD) energy projects, in order to accelerate energy transition.

SQ 1: What are the characteristics of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?

Collaboration between divisions of the same MNE and local public client in the TD projects is defined by using the literature. Namely, this type of collaboration is classified as inter-organizational collaboration since it is defined as the collaboration between two different organizations. This type of collaboration is essential for the transfer of knowledge and expertise (Dietrich et al., 2010; Bedwell et al., 2012), and this in turn will have a positive impact on the project's success (Manley and Chen, 2017). MNEs are organizations that possess technical skills and institutional knowledge that can contribute to a more sustainable future (van Zanten and van Tulder, 2018). This potential is maximized when both the private and public sectors combine their skills and resources (Popescu et al., 2023; Nezami et al., 2022). TD projects would not be possible without a public client, since these projects are part of the energy infrastructure projects that are built through private-public partnership (Koops et al., 2017).

In the context of accelerating the energy transition and responding to the increasing need for new and updated transmission and distribution lines, local and foreign divisions of the same MNE and local public client collaborate. This collaboration, due to time constraints and local capacity limitations, requires efficient coordination and alignment between all involved parties.

SQ 2: What are key challenges influencing the success of collaboration between divisions within the same MNE and local public clients in the transmission and distribution projects?

A total of 38 challenges were initially identified through the literature review and interviews, and 27 were deemed relevant. However, after conducting a multi-criteria decision-making (MCDM) analysis, the key challenges were identified. The top five key challenges are presented below, representing the obstacles for effective collaboration between divisions from the same MNE and local public client in TD energy projects:

- **Conflicting working cultures:** Aarseth et al., 2013 states that cultural challenges arise from having people with different cultural backgrounds. In the context of this study, differences in

understanding the workload that is expected, behavior during meetings, and what is considered polite or professional conduct in the host country.

- **Expectation misalignment:** This challenge emerged during interviews with professionals. It arises when each stakeholder has a different perception of what is expected and how the project should be executed. Furthermore, problems occur when the foreign division is unaware of the required level of design details, documentation style, and quality of the design that is expected from them.
- **Language barriers:** In international collaboration, the major challenge that projects are facing today is language barriers (Järvenpää et al., 2021). Since TD projects involve the specific technical terminology that varies per country, due to language barriers, miscommunication might arise. Additionally, due to the translation of information into English, there might be a loss of information in translation.
- **Communication style:** Järvenpää et al., 2021 states that effective communication does not only rely on language skills but also on the ability to understand and navigate cultural contexts. Thus, this challenge is closely linked to cultural challenges, and particularly when a foreign division joins the project, problems might arise. For example, in some cultures, open communication is encouraged while in others it is not.
- **Different software and programs:** Using different software can lead to problems with sharing different data formats (Nezami et al., 2022). When different stakeholders are involved in the project often rely on using different software and programs for structural and electrical calculations, resulting in incompatibilities in file formats and calculation methods. These differences hamper smoothness.

SQ 3: What are the best practices to tackle challenges and improve this type of collaboration to stimulate greater organizational cooperation and accelerate energy transition?

Best practices to address the key challenges were identified through both the literature review and empirical study. The practices that are identified for the challenges are as follows:

- **Conflicting working cultures:** Few different practices are found through empirical study. The first practice is to organize meetings for cultural alignment, in which the cultural differences between stakeholders will be discussed. The second practice is to select a cultural agent who will be aware of the differences and try to navigate a collaboration so that conflicts and misunderstandings do not arise. The third practice is to organize team-building activities, through which team members will be able to connect on a more personal level. The literature is limited when it comes to offering best practices for this challenge since culture involves many different aspects and is context-dependent. Thus, practices found offer valuable, experience-based strategies for addressing cultural challenges.
- **Expectation misalignment:** The first practice that is found through empirical study is assigning a lead engineer who is familiar with standards, and is able to share the standards defined by the public client with the foreign division. The second practice is to use a roadmap to align the goals between the organizations, while the third practice is to organize discussion sessions. The literature also emphasizes the importance of managing stakeholder expectations. Lau and Rowlinson, 2009 states that in the early stages of the project, it is important to define factors like timeliness, aesthetics, functionality, safety, and overall project quality. Furthermore, it also states that constant client involvement and communication between stakeholders are crucial to avoid misunderstandings. Similarly, Chan and Oppong, 2017 states that mapping out the client's expectations to specific project deliverables is important.
- **Language barriers:** Three practices are found during the empirical study that can be used to tackle this challenge. The first practice identified is to agree on a project language at the beginning of the project, ensuring consistent communication across all stakeholders. The second practice is to encourage active clarification, which means that participants should ask for an explanation of certain terms. In support of these practices, the literature also offers valuable insights. Jinfang, 2023 states that in international collaboration in the construction industry, companies should use professional translators. Additionally, Aichhorn and Puck, 2017 emphasizes that regular com-

munication among team members can bridge the language barriers and reduce anxiety during meetings.

- **Communication style:** Defining the communication protocol is the first practice identified during the empirical study. This means that it should be defined between the stakeholders who communicate what to whom and how often. The second practice identified is to centralize the external communication, which means that it is important to define the primary point of contact for external stakeholders. Finally, the third practice is to encourage open communication between participants. The literature supports these practices. Gamage, 2022 and Setiawan et al., 2021 state that for effective communication, stakeholders should define a proper communication plan. This plan should include points like types of information to be shared, the appropriate communication channels, and assigned responsibilities.
- **Different software and programs:** Several empirical practices were identified to address challenges related to the use of different software tools among project stakeholders. First, using internationally recognized software for structural and electrical calculations can improve compatibility and reduce conversion issues. The second practice is to use output validation instead of rework, which is the second recommendation proposed by professionals. This means that instead of redoing calculations in different software, extra checks can be done on the results only. Connecting modelers from each organization is the third practice, and by connecting modelers, differences between software can be discussed as well as how to proceed further. While the literature on this topic is limited, the idea of developing a dedicated software coordination inspired by the communication plan that is explained by Gamage, 2022 and Setiawan et al., 2021 is proposed. A software plan can be developed covering the type of software used, the differences between software, and the responsibilities defined.

RQ: How can collaboration between divisions within the same multinational enterprise and local public clients in the transmission and distribution projects be improved to accelerate energy transition?

The main research question is answered by combining the findings from the second and third research sub-questions. The study identified the key challenges that hinder effective collaboration between MNE divisions and local public clients, as well as a set of best practices to overcome these obstacles. These findings were put into a practical framework consisting of actionable recommendations, with clearly defined roles for the stakeholders. A set of recommendations is derived for MNE and local public clients.

The framework provides tailored guidance for both MNEs and local public clients, outlining specific steps that can be taken to minimize challenges and enhance collaboration in TD projects. Furthermore, improved collaboration leads to successful project, which has a direct impact on the energy transition by enabling the timely replacement or upgrading of outdated infrastructure. This, in turn, will lead to energy from more sustainable resources being successfully transported to the end users.

Additionally, each recommendation in the framework specifies the stakeholder responsible for implementation of the action, enhancing clarity and accountability. The list of high-level recommendations is presented below, as the detailed explanations are in Chapter 5.

1.Conflicting working cultures

- Meetings for cultural alignment (MNE+LPC)
- Select cultural agent (MNE)
- Organize team building events (MNE)

2.Expectation misalignment

- Assign a lead engineer who is familiar with standards (LD+LPC)
- Develop a roadmap (MNE+LPC)
- Discussion and feedback sessions (MNE+LPC)

3. Language barriers

- Agree on common language of the project (MNE+LPC)
- Encourage active clarification during meetings (MNE)
- Create a glossary (MNE)
- Use AI tools for translation (MNE)

4. Communication style

- Define a clear communication plan (MNE+LPC)
- Centralize external communication (LD)
- Encourage open communication (LD)

5. Different software and programs

- Discussion on software's (LD+LPC)
- Make a software plan (MNE+LPC)
- Using international software (MNE+LPC)
- Use output validation instead of rework (LD)
- Connect modelers from each organization (MNE+LPC)

7.2. Recommendations

As demonstrated throughout this research, effective collaboration between MNE divisions and local public clients is essential for the successful delivery of TD projects, given their complexity and importance for the energy transition. The framework that is proposed offers a structured approach to strengthening this collaboration by addressing the most critical challenges through targeted, actionable practices. Therefore, it should be used by these stakeholders.

The goal of the framework is not only to improve collaboration outcomes, but also to demonstrate that the common obstacles faced in joint projects can be systematically addressed and should not discourage collaboration. By applying the framework at the beginning of a project, stakeholders can proactively reduce the risks and focus on their shared goal, which is to have successful infrastructure projects that accelerate the transition to sustainable energy. If collaboration and the project are successful, this can encourage more collaboration in future projects and strengthen their relationship.

In addition, incorporating these collaborative practices into project proposals is recommended. Doing so allows both stakeholders to commit to actions that need to be taken in order to minimize the challenges and motivate them to act as one entity in the project rather than as separate organizations.

7.3. Research Limitation

This section outlines the key limitations that affected this research. The following were identified:

- Sample size and composition of interviewees: In this research, there were in total 17 interviewees from different countries and different stakeholders. The number of interviewees from each stakeholder is: Dutch division (9), Spanish division (3), Swiss division (1), the UK division (2), and Dutch public client (2). A more balanced distribution would have strengthened the analysis, particularly more input from the Dutch public client and additional international divisions. However, this was hard to achieve since professionals from other divisions are located in other countries, and due to busy schedules and time restrictions for this thesis, it was impossible to find more people. In particular, finding local public client representatives with relevant experience proved challenging.
- Scope of the literature review: Since this sector is still underexplored within the academic literature compared to other sectors in the construction industry. As a result, it was difficult to identify the best practices from the literature that are tailored specifically to this type of collaboration in TD projects. Therefore, the literature that was found had to be adapted according to the empirical

findings from interviewees. If more sector-specific guidance were available in the literature, the recommendations could have had a stronger theoretical foundation and relied less on expert judgment.

- Validation: The framework was validated through a focus group consisting of professionals who participated in interviews as well. While their feedback was valuable, it would have been beneficial to extend the validation to additional MNEs and public clients operating in the same sector to ensure broader applicability.

7.4. Recommendations for Further Research

After concluding this master's thesis research, and considering the limitations that this research encountered. There are a few recommendations that can be used for further research, and those are:

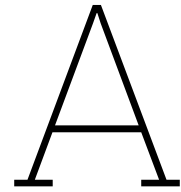
- This framework is validated through an organized focus group session. The outcome of this session is suggestions on how recommendations can be improved and are more tailored to this type of collaboration. However, the framework has not yet been tested in an actual project setting. Future research should evaluate its practical applicability and impact when implemented during real-life collaborations.
- An empirical study is done by interviewing professionals who are working on transmission and distribution projects and who are involved in this type of collaboration. Given the similarity of collaboration challenges that are found in this research to other construction sectors, it might also be applicable to those. Future research could investigate whether the identified challenges and best practices also apply in other domains and compare context specific variations.
- The majority of the empirical data in this study was gathered from MNE professionals. Further research should explore the perspectives of local public clients more deeply to better understand their needs, priorities, and challenges in such collaborations.
- The scope of this research was on energy transmission and distribution projects in the Netherlands. It was identified that there is an overlap in the challenges mentioned by actors from different countries. However, the actions that need to be taken to minimize the challenges might vary per country. Therefore, it would be valuable to investigate further whether the framework with an actionable set of recommendations can also be utilized by MNE and public clients in other countries.

References

- Aarseth, W., Andersen, B., Ahola, T., & Jergeas, G. (2012). Practical difficulties encountered in attempting to implement a partnering approach. *International journal of managing projects in business*, 5(2), 266–284.
- Aarseth, W., Rolstadås, A., & Andersen, B. (2013). Managing organizational challenges in global projects. *International Journal of Managing Projects in Business*, 7(1), 103–132.
- Adler, P. A., Adler, P., & Weiss, R. S. (1995). Learning from strangers: The art and method of qualitative interview studies. *Contemporary Sociology*, 24. <https://doi.org/10.2307/2076552>
- Aichhorn, N., & Puck, J. (2017). Bridging the language gap in multinational companies: Language strategies and the notion of company-speak. *Journal of World Business*, 52(3), 386–403.
- Arcia-Garibaldi, G., Cruz-Romero, P., & Gómez-Expósito, A. (2018). Future power transmission: Visions, technologies and challenges. *Renewable and Sustainable Energy Reviews*, 94, 285–301. <https://doi.org/https://doi.org/10.1016/j.rser.2018.06.004>
- Bass, A. E., & Grøgaard, B. (2021). The long-term energy transition: Drivers, outcomes, and the role of the multinational enterprise. <https://doi.org/10.1057/s41267-021-00432-3>
- Bedwell, W. L., Wildman, J. L., DiazGranados, D., Salazar, M., Kramer, W. S., & Salas, E. (2012). Collaboration at work: An integrative multilevel conceptualization. *Human Resource Management Review*, 22. <https://doi.org/10.1016/j.hrmr.2011.11.007>
- Burghard, U., Dütschke, E., Caldes, N., & Oltra, C. (2022). Cross-border concentrated solar power projects - opportunity or dead end? a study into actor views in europe. *Energy Policy*, 163. <https://doi.org/10.1016/j.enpol.2022.112833>
- Busco, C., Walters, J., & Provoste, E. (2024). Stakeholder management within ppp-arranged civil engineering megaprojects: A systematic literature review of challenges, critical success factors and stakeholder roles. *International Journal of Public Sector Management*, 37(5), 649–671.
- Caldés, N., Río, P. D., Lechón, Y., & Gerbeti, A. (2019). Renewable energy cooperation in europe: What next? drivers and barriers to the use of cooperation mechanisms. *Energies*, 12. <https://doi.org/10.3390/en12010070>
- Chan, A. P., & Oppong, G. D. (2017). Managing the expectations of external stakeholders in construction projects. *Engineering, Construction and Architectural Management*, 24(5), 736–756.
- Deep, S., Gajendran, T., & Jefferies, M. (2020). Factors influencing power and dependence for collaboration among construction project participants. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 12. [https://doi.org/10.1061/\(asce\)la.1943-4170.0000362](https://doi.org/10.1061/(asce)la.1943-4170.0000362)
- Dietrich, P., Eskerod, P., Dalcher, D., & Sandhawalia, B. (2010). The dynamics of collaboration in multipartner projects. *Project Management Journal*, 41. <https://doi.org/10.1002/pmj.20194>
- Eikelenboom, M., & van Marrewijk, A. (2023). Creating points of opportunity in sustainability transitions: Reflective interventions in inter-organizational collaboration. *Environmental Innovation and Societal Transitions*, 48. <https://doi.org/10.1016/j.eist.2023.100748>
- Energy infrastructure in the EU. (n.d.). https://energy.ec.europa.eu/energy-explained/energy-infrastructure-eu_en
- ENTSO-E confirms successful synchronization of the Continental European electricity system with the systems of the Baltic countries. (2025, February). <https://www.entsoe.eu/news/2025/02/09/entso-e-confirms-successful-synchronization-of-the-continental-european-electricity-system-with-the-systems-of-the-baltic-countries/>
- Erik Eriksson, P., Nilsson, T., & Atkin, B. (2008). Client perceptions of barriers to partnering. *Engineering, construction and architectural management*, 15(6), 527–539.
- European Commission, D. E. (2023, March). *Baltic Synchronisation Project – Phase 1* (tech. rep.). https://ec.europa.eu/assets/cinea/project_fiches/cef/cef_energy/4.8.1-0021-LTLV-W-M-18.pdf
- Gallegos, J., Arévalo, P., Montaleza, C., & Jurado, F. (2024, January). Sustainable electrification—advances and challenges in electrical-distribution networks: A review. <https://doi.org/10.3390/su16020698>

- Gamage, A. (2022). Importance of effective communication to minimize disputes in construction projects. *Scholars Journal of Engineering and Technology*, 10(7), 128–140.
- Glossary:multinational enterprise (mne) - statistics explained - eurostat. (n.d.). https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary%3AMultinational_enterprise_%28MNE%29
- GmbH, A. S. S. D. (2023). Atlas.ti mac [Qualitative data analysis software].
- Grafius, D. R., Varga, L., & Jude, S. (2020). Infrastructure interdependencies: Opportunities from complexity. *Journal of Infrastructure Systems*, 26. [https://doi.org/10.1061/\(asce\)is.1943-555x.0000575](https://doi.org/10.1061/(asce)is.1943-555x.0000575)
- Gu, Z. (2022). Complex heatmap visualization. *Imeta*, 1(3), e43.
- Gunduz, M., & Abdi, E. A. (2020). Motivational factors and challenges of cooperative partnerships between contractors in the construction industry. *Journal of Management in Engineering*, 36(4), 04020018.
- Hosseini, A., Windimu, P., Klakegg, O. J., Andersen, B., & Laedre, O. (2018). Project partnering in the construction industry: Theory vs. practice. *Engineering Project Organization Journal*, 8. <https://doi.org/10.25219/epoj.2018.00101>
- Jalali Sohi, A., Nezami, M. R., Bakker, H., & Hertogh, M. (2021). Inter-organizational co-creation: An approach to support energy transition projects. *Research on Project, Programme and Portfolio Management: Integrating Sustainability into Project Management*, 151–166.
- Järvenpää, A.-T., Pavlik, A., & Gustavsson, T. K. (2021). Contextual communicative competence in multinational infrastructure projects. *Buildings*, 11(09), 403.
- Jinfang, Y. (2023). Bridging language gaps in global construction projects: The critical role of professional translators. *International Journal of Business and Management Invention*, 12(6), 319–325.
- Kardaś, S. (2024, November). Gridlock: Why europe's electricity infrastructure is holding back the green transition. <https://ecfr.eu/article/gridlock-why-europes-electricity-infrastructure-is-holding-back-the-green-transition/>
- Khouja, A., Lehoux, N., Cimon, Y., & Cloutier, C. (2021). Collaborative interorganizational relationships in a project-based industry. *Buildings*, 11(11), 502.
- Knott, E., Rao, A. H., Summers, K., & Teeger, C. (2022). Interviews in the social sciences. *Nature Reviews Methods Primers*, 2(1), 73.
- Kokkonen, A., & Vaagaasar, A. L. (2018). Managing collaborative space in multi-partner projects. *Construction Management and Economics*, 36, 83–95. <https://doi.org/10.1080/01446193.2017.1347268>
- Koops, L., Bosch-Rekveltdt, M., Bakker, H., & Hertogh, M. (2017). Exploring the influence of external actors on the cooperation in public–private project organizations for constructing infrastructure. *International Journal of Project Management*, 35(4), 618–632.
- Lau, E., & Rowlinson, S. (2009). The expectations, needs, risks, and constraints for project performance. *25th Annual ARCOM Conference, Nottingham*, 585–594.
- Liu, Y., Amini-Abyaneh, A., Hertogh, M., Houwing, E. J., & Bakker, H. (2021). Collaborate to learn and learn to collaborate: A case of exploitative learning in the inter-organizational project. *Engineering, Construction and Architectural Management*, 28. <https://doi.org/10.1108/ECAM-01-2020-0078>
- Manley, K., & Chen, L. (2017). Collaborative learning to improve the governance and performance of infrastructure projects in the construction sector. *Journal of Management in Engineering*, 33. [https://doi.org/10.1061/\(asce\)me.1943-5479.0000545](https://doi.org/10.1061/(asce)me.1943-5479.0000545)
- Nabi, M. A., Assaad, R. H., & El-adaway, I. H. (2023). Analyzing causes of disputes in public–private partnership construction projects. *Canadian Society of Civil Engineering Annual Conference*, 17–29.
- Nations, U. (n.d.). The Paris Agreement | United Nations. <https://www.un.org/en/climatechange/paris-agreement>
- Nezami, M. R., de Bruijne, M. L., Hertogh, M. J., & Bakker, H. L. (2022). Collaboration and data sharing in inter-organizational infrastructure construction projects. *Sustainability*, 14(24), 16835.
- Nezami, M. R., de Bruijne, M. L., Hertogh, M. J., & Bakker, H. L. (2024). Assessment criteria for inter-organizational collaboration in interconnected infrastructure projects. *Engineering, Construc-*

- tion and Architectural Management*, 31, 3456–3478. <https://doi.org/10.1108/ECAM-11-2022-1109>
- Ponhan, K., & Sureeyatanapas, P. (2022). A comparison between subjective and objective weighting approaches for multi-criteria decision making: A case of industrial location selection. *Engineering and Applied Science Research*, 49(6), 763–771.
- Popescu, C. R. G., Yu, P., & Wei, Y. (2023). *Achieving the sustainable development goals through infrastructure development*. IGI Global.
- Reckendrees, A., Gehlen, B., & Marx, C. (2022). International business, multinational enterprises and nationality of the company: A constructive review of literature. *Business History*, 64, 1567–1599. <https://doi.org/10.1080/00076791.2022.2118718>
- Saldaña, J. (2021). The coding manual for qualitative researchers.
- Saukko, L., Aaltonen, K., & Haapasalo, H. (2020). Inter-organizational collaboration challenges and preconditions in industrial engineering projects. *International Journal of Managing Projects in Business*, 13, 999–1023. <https://doi.org/10.1108/IJMPB-10-2019-0250>
- Schneckenberg, D., Truong, Y., & Mazloomi, H. (2015). Microfoundations of innovative capabilities: The leverage of collaborative technologies on organizational learning and knowledge management in a multinational corporation. *Technological Forecasting and Social Change*, 100, 356–368. <https://doi.org/10.1016/j.techfore.2015.08.008>
- Setiawan, F., Hansen, S., & Fujiono, A. (2021). Measuring the influence of communication planning towards construction project performance. *Project management*, 8(16), 2.
- Sim, J., & Waterfield, J. (2019). Focus group methodology: Some ethical challenges. *Quality & quantity*, 53(6), 3003–3022.
- Taherdoost, H., & Madanchian, M. (2023). Multi-criteria decision making (mcdm) methods and concepts. *Encyclopedia*, 3(1), 77–87.
- Tavory, I., & Timmermans, S. (2014). *Abductive analysis: Theorizing qualitative research*. University of Chicago Press.
- Trans-European networks for Energy. (n.d.). https://energy.ec.europa.eu/topics/infrastructure/trans-european-networks-energy_en
- van Zanten, J. A., & van Tulder, R. (2018). Multinational enterprises and the sustainable development goals: An institutional approach to corporate engagement. *Journal of International Business Policy*, 1. <https://doi.org/10.1057/s42214-018-0008-x>
- Verweij, S., & Satheesh, S. A. (2023). In search of the collaborative advantage of public-private partnerships: A comparative analysis of dutch transport infrastructure projects. *Public Administration Review*, 83. <https://doi.org/10.1111/puar.13589>
- Widuto, A., & Service, E. P. R. (2023, November). *Energy transition in the EU* (tech. rep.). [https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754623/EPRS_BRI\(2023\)754623_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754623/EPRS_BRI(2023)754623_EN.pdf)
- WSP. (2025a). *Energietransitie*. Retrieved February 28, 2025, from <https://www.wsp.com/nl-nl/inzichten/energietransitie>
- WSP. (2025b). *Power and energy-wsp*. Retrieved February 24, 2025, from <https://www.wsp.com/nl-nl/hubs-nl/power-and-energy>



Interview Protocol

Date and Time:

Location:

Participant (name, role and years of experience):

Introduction

- Aim: The aim of my master thesis is to investigate challenges that occur during in the international collaboration between multiple divisions on one side and local public client on the other side in Transmission and Distribution projects. Moreover, to provide a framework (it is a guide) that can be used by companies like WSP to improve this type of collaboration. The goal of this interview is to understand what are the challenges that might occur in these kind of projects.
- Structure of the interview: This interview is structured in such a way that we discuss challenges that you encountered in your projects when working with international teams.
- Duration: Interview will last approximately 1h.
- Important: Everything you say will be confidential and only available to me. Before using your answers in my thesis they will be anonymized, therefore they will not be traceable. In case you are curious to see your answers, I can share it with you.
- Permission for video/audio recording: In order for me to fully focus on our conversation, is it okay if I audio/video record this meeting? No one will have access and audio recording will be deleted once transcript is done.

Questions

1. Can you describe your role within the company and how many years of the working experience you have?
2. Can you describe your role in international projects and your experience working with teams across different countries?
3. What challenges have you experienced in international collaboration during your projects and what challenges do you consider are the most important? Give an example please.
4. What differences have you noticed in how people work in different countries?
5. What difficulties did you experience when there was a problem with understanding and ensuring everyone was on the same page when working with people from different countries?
6. How would you describe the difference in how organizations operate in different countries?
7. How would you describe an experience where building and leading a team with members from different countries was challenging?
8. How have you experienced varying international standards and practices in your projects?
9. Can you describe a situation where there was an issue with financial decisions?
10. What difficulties did you experience with teams from another countries where there was a difference in the level of knowledge?
11. What challenges have you faced when teams from other countries are using different tools (like

programs)?

12. Based on everything we talked about what would you say are the most important challenges that occur on TD projects?

13. How would you tackle those challenges?

14. Is there something that you would like to discuss or add that we did not cover until now?

Email for participants

Dear (name and surname),

I am Anya Pilipovich, a master's student at TU Delft, studying Construction Management and Engineering. Currently, I am doing my graduation internship at WSP under the supervision of Frans-Jan Willemen. My research focuses on investigating the challenges that occur in international collaboration between companies like WSP and public clients in Transmission and Distribution projects. The goal of my master's thesis is not only to identify key challenges but also to propose a framework (guide) to improve this collaboration.

I believe that your knowledge and experience could significantly contribute to my research goals. Therefore, I would like to schedule an interview with you. This interview will last approximately 1h, during which I will ask open-ended questions to gather your perspective on certain topics. The interview will be recorded to allow me to fully focus on our conversation and later create transcripts. The recording will be accessible only to me and will be permanently deleted once my research is complete, while, the transcripts will be anonymized. It is important to note that your participation is entirely voluntary, and you may choose not to answer certain questions.

If you have any questions or are willing to participate, please let me know. I look forward to hearing from you!

Kind regards,
Anya Pilipovich