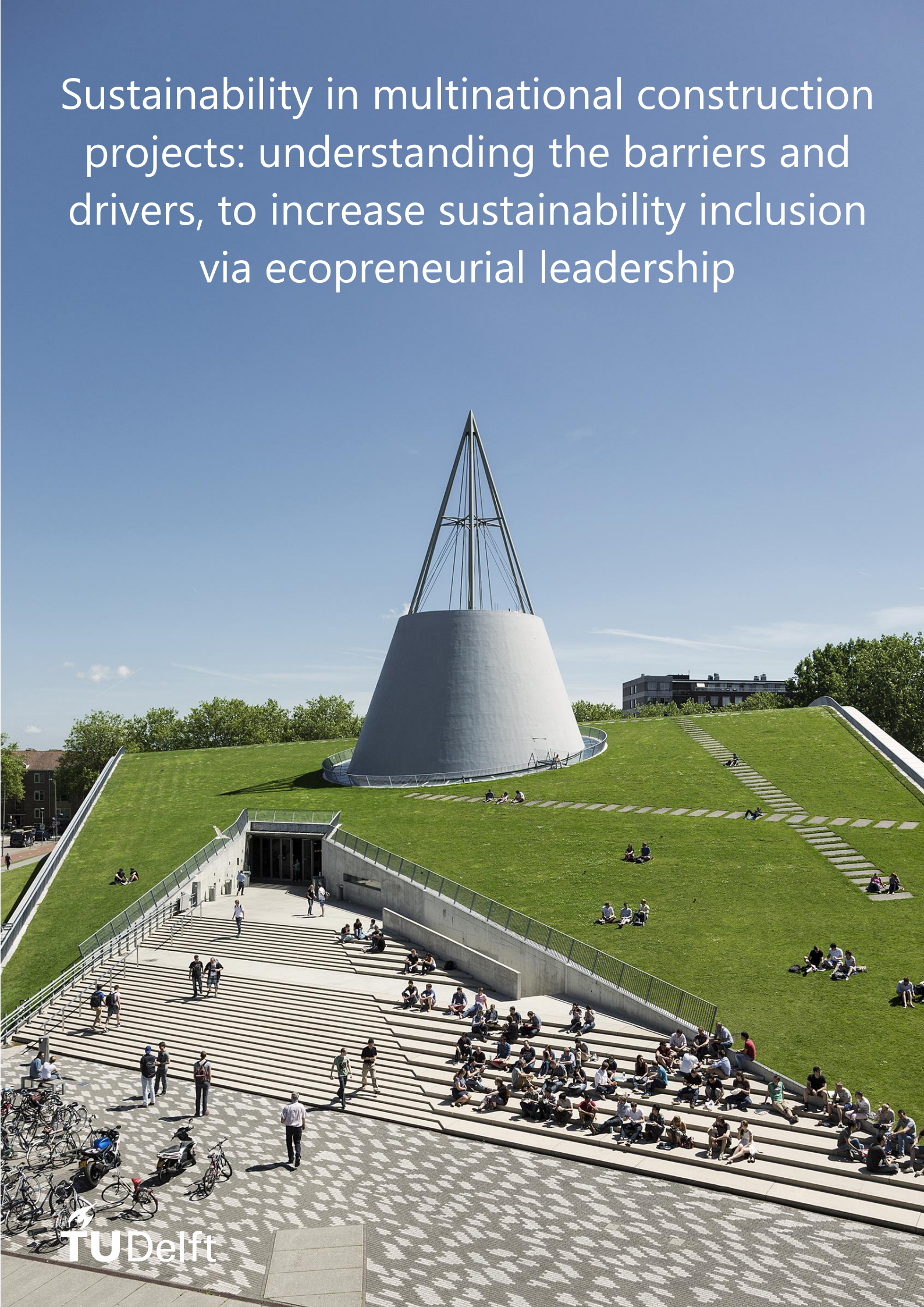
Sustainability in multinational construction projects: understanding the barriers and drivers, to increase sustainability inclusion via ecopreneurial leadership



SUSTAINABILITY IN MULTINATIONAL CONSTRUCTION PROJECTS: UNDERSTANDING THE BARRIERS AND DRIVERS, TO INCREASE SUSTAINABILITY INCLUSION VIA ECOPRENEURIAL LEADERSHIP

A thesis submitted to the Delft University of Technology in partial fulfillment of the requirements for the degree of

Master of Science in Construction Management and Engineering

by

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EXECUTIVE SUMMARY

Sustainability is an increasingly used term and it has become a focus point in almost any line of work, including construction practices. The construction industry is one of the industries with the largest negative impact on the environment, which is why this industry has the highest urgency to improve on sustainability performance. Project management has been proven to be highly influential on project performance, thus is seen as a key element in increasing the sustainability performance of construction projects.

Management of projects can enable more sustainable business practices and operations, thus has the opportunity to make a significant contribution to meeting the global need of reducing the environmental impact of the construction industry. To enable the opportunities for project management, thus to understand how to steer towards sustainability in such projects, more knowledge is required. Namely, knowledge on what drives the decision-making and what causes the current limited sustainability performance of construction projects. So, this research explored these drivers and barriers.

A qualitative methodology was used to explore these opportunities, by researching and assessing the present factors, both in theory and practice, that influence the decision-making towards limited to non-inclusion of sustainability in construction projects. The aim of these research was thus to seek answers to two main research questions:

Firstly, what are the barriers for inclusion of sustainability in construction projects? Secondly, how can an ecopreneurial leader drive sustainability in construction projects?

The key findings in practice, were similar to the findings in theory, but the practical findings were more extensive. So, to conclude on the answer to the first research question, the barriers found in practice can be listed. These are:

- Lack of awareness
- Change
- Non-alignment
- Non-incentivised
- Constraints on availability
- Unsuitable management of visions
- Insufficient transparency
- Lack of leadership mobilization
- Insufficient presence and quality of instruments
- Insufficient cooperation and collaboration of different institutions

The answer to the second research question is multidimensional, as different leaders, can drive sustainability in different ways. This answer can thus be provided as a framework, shown in Figure 1. Which provides an answer to the second research question for leaders of different institutions. In the middle the four different types of influences, related to the four institutions are shown. This all influences project management and how management of construction projects is able to include and maintain sustainability.

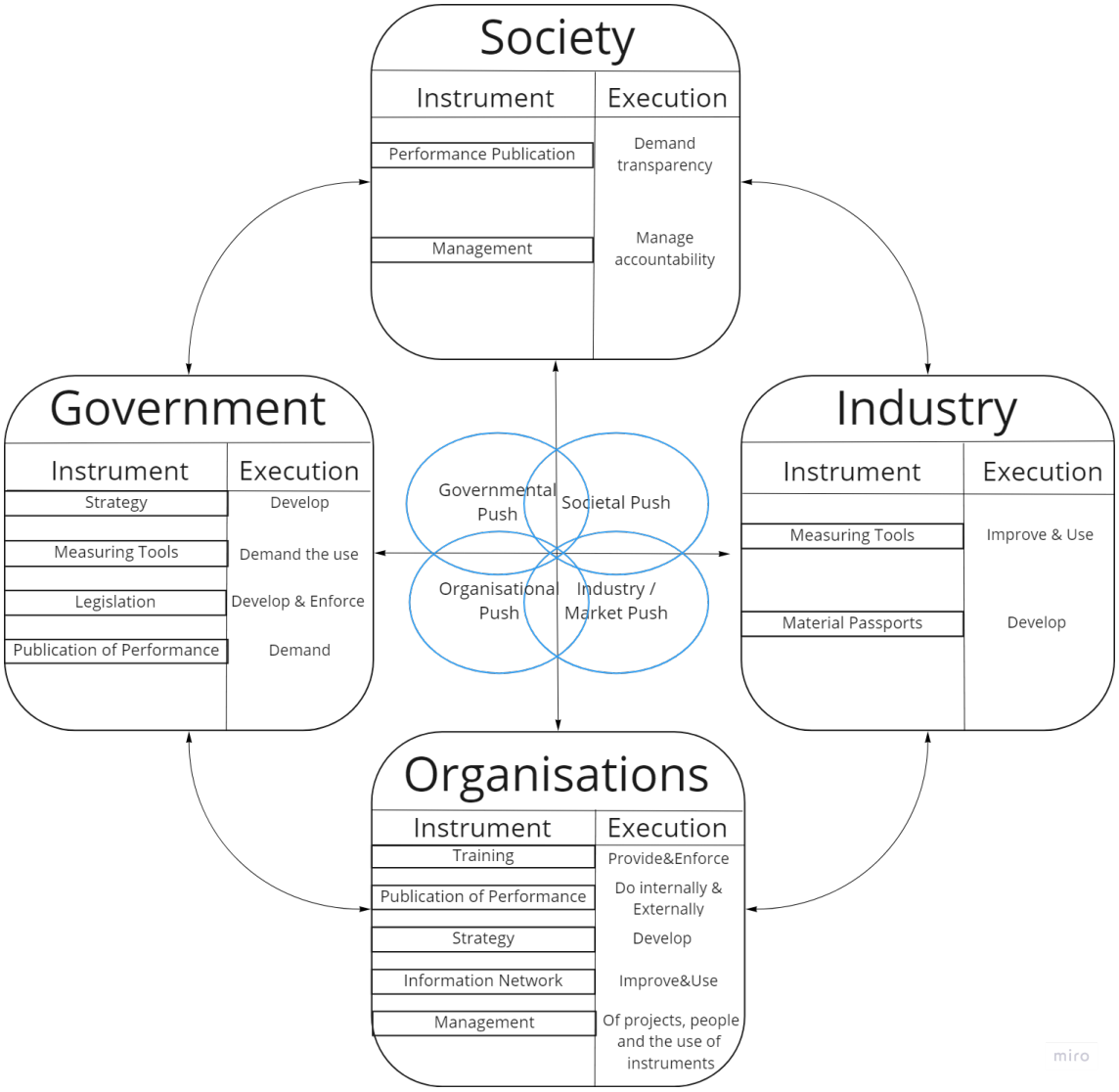

Figure 1: Opportunities Framework (source: Author)

The adopted qualitative methodology that resulted in these findings, entailed several steps:

First, conducting a literature study, to define the relevant concepts and provide a theoretical framework to which the rest of the research could be linked.

Then, interviews were conducted with Project/Program managers and project consultants of construction projects, to understand the current management of construction projects and the challenges they encounter throughout the project process.

Finally, these challenges were analysed with the use of Qualitative Content Analysis, to gather findings on which challenges form a limitation for inclusion of sustainability. The analysis provided insight in the presence of two types of limitations. Namely, factors of which the presence formed a limitation for sustainability inclusion, the barriers, and factors of which the absence, or insufficient presence, formed a limitation, so the requirements. As a result, a list was developed with factors of which the presence needed to be reduced, and factors of which the presence needed to be increased, to enable (more) inclusion of sustainability in construction projects.

By linking these two types together, opportunities could be noted of what needed to be done, the requirements, to overcome which causes, the barriers. These opportunities were then listed in the form of recommendations, on what actions needs to be undertaken and by which leader, to enable opportunities in practice.

Each Barrier and requirement followed from the data-analysis, that entailed several steps. These steps can be summarized as: (1) Scanning the interview transcript, (2) Marking quotes of each interview transcript that seemed relevant for this research, (3) Comparing the marked quotes of all transcripts to notice repetition, (4) Linking the quotes to a category that covered the content, (5) Assigning the categories with the most quotes to the coding frame as "Open Codes", (6) Grouping these categories into Code groups, or "Axial Codes", and finally, (7) Specifying for each Axial code whether it entails a barrier or a requirement. The outcome of these steps was a framework, the coding pattern, which can be seen in Figure 2.

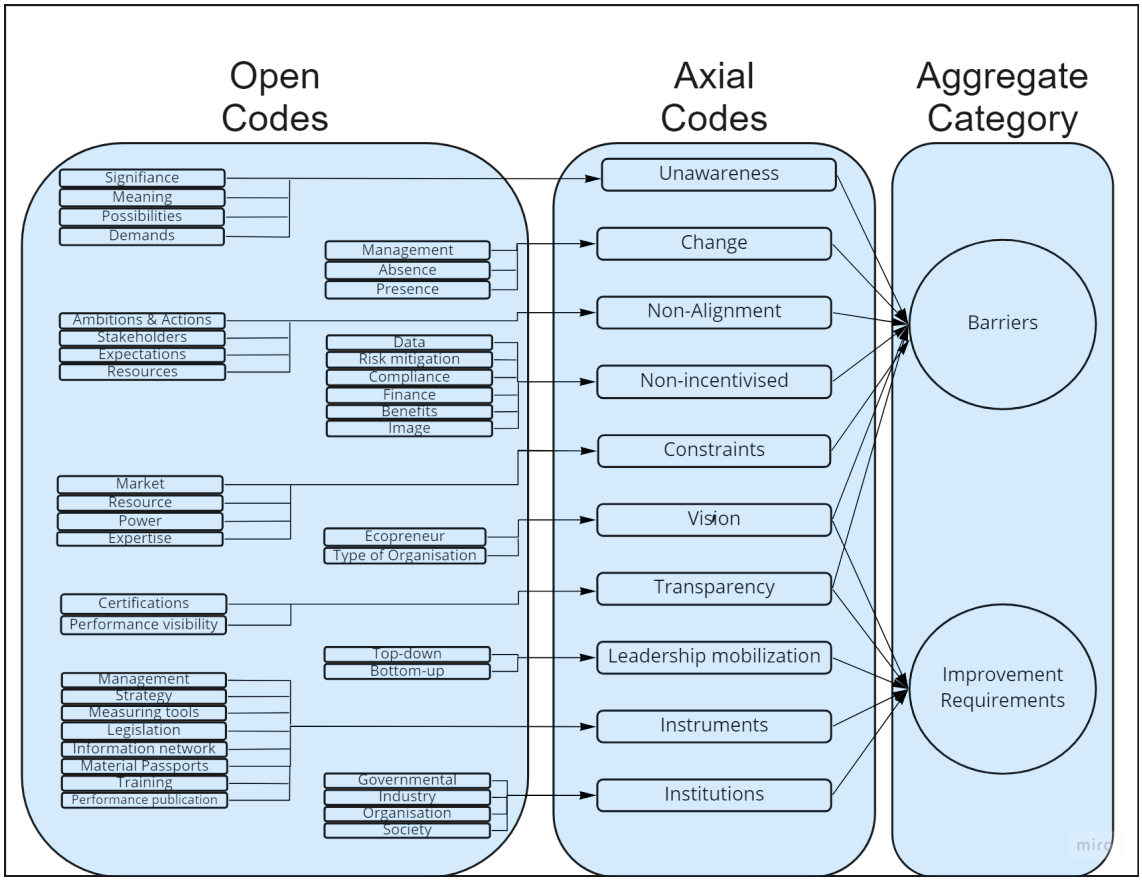

Figure 2: Coding Pattern (source: Author)

The coding pattern thus supports the aforementioned answer to the first research question. In addition to the recommendations part of the answer to the second research question, other recommendations also followed from this research. These additional recommendations can be divided into two types:

Recommendations for Practice

- It is highly recommended to check the effectiveness of the proposed actions and instruments, by starting to use and apply them on several construction projects, and continuously provide feedback to make them most suitable for application in practice and most effective for increasing sustainability inclusion. To ensure full maturation of the suggested instruments and approaches.

- On the organizational level, it is recommended for RoyalHaskoningDHV (RHDHV), but also for other consultancy firms in the construction sector, to set examples with internal projects, to provide a learning experience for employees, and to

improve the ability of advising clients as well as prove to clients the positive impact of increasing the inclusion of sustainability. This can also contribute to the training instrument, as it creates experiences and awareness and it manages change. Possibilities for this are to start with projects of minimal risk and minimal complexity, as these have more ability to deal with the additional complexity of sustainability. Think of an office, or multiple offices at different locations, for internal use, instead of for a client.

- During the project process, there are always several moments of chaos during which time pressure is increased. To prevent that such moments result in going back to old habits and limiting the use of instruments, it is recommended to have additional people assigned to keeping track of the situation and how sustainability inclusion is being maintained. They can then either host sessions to get back on track, or provide insights afterwards on how to deal with similar situations in the future.

- From the results it also became clear that employees are often just inconsiderate of sustainability inclusion, as they do what is requested and nothing else. So, beside the use of instruments that are recommended, as the development and implementation of those will take time, it is recommended to have methods in place, or employees assigned, to keeping track and managing the sustainability performance of projects. This will enable oversight and better visibility of which types of projects or which project managers require more guidance on including and maintaining sustainability.

Recommendations for future research

- The scope of this research was multinational construction projects, because they often have more resources available, tend to be less risk averting and have higher appetite for innovating. However, it is recommended to extend the research into national construction projects, as especially educational projects can also be very innovative and have many resources available. This can provide new insights on the possibilities for sustainability.

- This research focused on project management, so mainly the barriers present in the initial phases of projects. But, it is also beneficial to focus on the execution phase in future research. As the findings of this research include that the execution is a barrier due to several reasons, such as resource availability and lack of expertise available. However, without further research into the execution barriers, so present at execution or construction companies, overcoming these issues remains difficult.

- It is recommended to do further research into several of the instruments, such as the measuring tools. As this research provides findings supporting the need for improved measuring tools, and that this improvement can enable more sustainability inclusion. However, what these tools should entail and how to develop them, requires further research.

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ACRONYMS

1 INTRODUCTION

In this chapter several elements are introduced. Firstly, some background information about the topic of this research will be provided in Section 1.1. Next, the main problem is defined in Section 1.2 and the research objective is stated in Section 1.3. After that, the two main research questions are formulated and described in Section 1.4. The chapter ends by explaining the theoretical and practical relevance of this research in Section 1.5.

1.1 BACKGROUND

Over the last few decades, the urgency for governments, industries and organisations to deal with climate change has been increasing on a global level [Apanavičienė et al., 2020]. One of the industries that has proven to have large negative environmental impact, thus requires improvement on sustainability in order to deal with climate change, is the construction industry [Allen et al., 2018; UNEP, 2021; Ershadi and Goodarzi, 2021]. Related to the construction industry, sustainability can be defined in multiple ways, such as, as sustainable development (SD). A widely used definition has been provided by Brundtland et al. [1987], as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Sustainability is also often defined as integrating social, environmental, and economic responsibility, to use present resources in a rational way, so it doesn't compromise the ability of future generations to satisfy their needs [Atkinson, 1999; Kleindorfer et al., 2005; Armenia et al., 2019].

The need for sustainability inclusion in the construction industry regards every organisation involved in, and with, the industry, with construction companies being pressured increasingly to increase their overall sustainability performances of operational initiatives and report about them [Afzal et al., 2017].

So, corporations and organisations involved with construction, both during the construction process and during operation of constructions, need to transition into having corporate sustainability, which demands "the integration of environmental performance, social justice and economic efficiency" and, to put those ambitions into company's operational practices [Afzal et al., 2017].

The required improvement of the construction industry has resulted in that over the last couple years "In many advanced countries norms, laws and standards have been adopted that define the life cycle of a country's buildings from design to demolition." Apanavičienė et al. [2020]. However, countries and their governments can not be forced to contribute to the switch towards more sustainable construction, resulting in limited contribution from some countries. Thus, next to governmental influence, additional approaches and changes are required to achieve the necessary improvements of the construction industry [Apanavičienė et al., 2020].

To adopt such approaches and achieve change, the focus can thus be placed on organisations operating in the construction industry, which is done in this research. More specifically, the focus of this research is on construction projects. A main part of this focus is management of such projects, because of the impact of sustainability

on project management and thus the relevancy of both sustainability and project management for managers and organisations [Armenia et al., 2019; Kiron et al., 2017; Silvius et al., 2017; Silvius and Schipper, 2014; Silvius, 2013; Nidumolu et al., 2009; Lindgren and Packendorff, 2006; Hyväri, 2006].

This relevancy has resulted in that in the last decade, concepts related to and aspects of, sustainability in the construction industry, have been significantly researched [Apanavičienė et al., 2020]. Which has resulted in new tools and methods to construct buildings more sustainably, and quantify the environmental impact of a construction project in its entirety [Apanavičienė et al., 2020; Awadh, 2017].

These tools and methods can contribute to sustainability improvement, but require implementation and adaptation at the right time throughout the project process, by project management [Gunduz and Almuajebh, 2020; Li et al., 2018]. As long as project management does not include sustainability as an objective, the tools won't be used and they wont have any benefit [Silvius et al., 2017].

There is thus "an increasing interest in developing and proving new managerial practices for project management, and principles of sustainability dominate every context of business and organizational management. Therefore, the integration of these two fields represents the future for project-based organizations." Armenia et al. [2019].

So, beside an increasing demand for new or updated constructions and construction methods, there is also an increasing demand for more effective and efficient project management, that allows for developing construction projects with higher sustainability, while being resilient to risks, emerging trends and disruptions [Gareis et al., 2013]. The requirements and needs to deliver sustainable construction projects will not be lowered in the future, and managers along with consultants and other stakeholders need to alter their strategies to improve the sustainability performance of their organisations and projects to meet the changing and rising demands [Turlea et al., 2010]. Construction projects have a high level of asset specificity and multiple requirements to be met during the design and construction process, which makes them uncertain and complex [Awuzie and McDermott, 2013; Ershadi and Goodarzi, 2021].

Several factors are responsible for increasing the degree of complexity of a project and its environment, and, especially for mega-projects, if this complexity is not properly managed, can result in undermined project performance [Awuzie and McDermott, 2013]. Five groups of factors have been identified by Wood and Ashton, one of which is environmental factors [Awuzie and McDermott, 2013; Wood and Ashton, 2010]. Environment and sustainability are related and overlapping because the three aspects of sustainability are identified as "Triple Bottom Line," or alternatively "Triple P: people, planet, and profit" which shows the balance or harmony between economic, social, and environmental aspects [Armenia et al., 2019; Elkington, 2012]. This enables the conclusion that sustainability can make construction projects more complex. Meaning that achieving or including sustainability in construction projects does not only require a focus on the technical aspects, and/or use of the right tools and methods, but also requires a different way of managing such projects [Awuzie and McDermott, 2013; Armenia et al., 2019; Gareis et al., 2013; Schipper and Silvius, 2012; Wang, 2021]. It also means that the project owner of such projects, thus the organisation responsible for managing it, should have the opportunity to take risks and initiate trends, which multinational organisations have due to their size and resources [Singh, 2015].

So, when organisations with sufficient resources to take risks and innovate, such as multinationals, start to use effective methods of strategic project management, to improve the sustainability of their construction projects, they can pave the way for other organisations to do the same [Singh, 2015].

There is thus not only need for new construction methods to cope with the increasing sustainability requirements and ambitions, but there is also a need for involvement of multinational organisations and effective application of these methods by project managers [Oke et al., 2019; Sertyesilisik, 2017]. This is why the focus can be further deepened into not any organisation, but multinational organisations. So, not just construction projects, but multinational construction projects. Effective application requires commitment and collaboration of involved parties, and each of them needs to play their part in the supply chain, so each of them needs to "act as components of a broader system and affect the outcomes" Xue et al. [2018].

Thus, it makes sense that the increasing demand for sustainable construction and development comes with inclusion of it's principles in project management as one of the main development scenarios for companies seeking to ensure their stability and investment attractiveness in the future [Wang, 2021].

1.2 PROBLEM DESCRIPTION

As aforementioned, when aiming for inclusion of sustainability in construction projects, project management changes and decision making becomes more challenging. This is due to the complexity of sustainable development and sustainable construction projects, and the highly dynamic and less familiar environment in which such projects are positioned. [Gareis et al., 2013; Wang, 2021].

The benefit of sustainable construction projects compared to non-sustainable construction projects, for both companies and society, has already been proven by Wang [2021]. The full positioning of different types of projects can also be found in Figure 1.1. This proves that lack of benefit cannot be the cause of limited inclusion of sustainability in construction projects.

So, this research focuses on the overall difficulty to decrease the environmental impact of the construction industry. Specifically, the part of that problem that lies in management of construction projects. Namely, that regardless of the proven urgency and the extend to which the inclusion of sustainability in construction projects has been researched, it remains to be unknown what is limiting the inclusion of sustainability in construction projects. Without further research into these barriers, suitable approaches can not be taken, thus inclusion of sustainability in construction projects wont be increased and such projects wont be able to have a positive contribution to the societal challenge of dealing with climate change. The problem statement of this research is therefore:

Academia have proven that in large construction projects, complexities are a major source of risks. Previous research has also suggested that sustainability could increase the complexity, thus the risks. But, also that it could increase the project benefits. Even though many studies have been done into the relations between project management, project performance and sustainable construction, no attempt was made at understanding the sustainability barriers present in construction projects. This limits the possibility of noticing opportunities for increasing the inclusion of sustainability in construction projects. Thus, insufficient suitable approaches are being undertaken to increase the inclusion of sustainability in construction projects, while the need for that is increasing.

1.3 RESEARCH OBJECTIVE

The objective of this research is to make a scientific contribution to the existing research on sustainability in construction projects. Also, to make a practical contribution to organisations involved in the realisation and management of construction projects who are challenged by managing sustainability in such projects. This

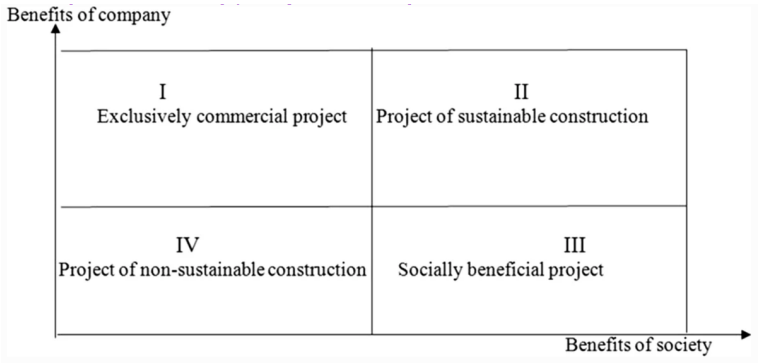

Figure 1.1: Diagram of project portfolio balancing (Source: [Wang, 2021])

overall objective can be subdivided into three objectives: (1) To develop better understanding of the extend to which, and how, sustainability is aspired and incorporated in construction projects, (2) To gather knowledge on what drives or limits the leaders involved in construction projects, both directly, such as the project managers, and indirectly, such as higher management, within organisations, to include sustainability in projects, and (3) To develop recommendations for organisations, on how to increase the inclusion of sustainability in construction projects by overcoming barriers and enabling opportunities.

The research objective can thus be summarized as **Understanding which factors influence the inclusion of sustainability in construction project and how organisations and leaders can deal with those factors to keep up with the increasing urgency and necessity for higher sustainability of construction projects.**

The approach to meeting this objective entailed three main steps.
Firstly, setting the scene for sustainability in management of construction projects in the literature, by considering general management of construction projects and sustainable management of construction projects.

Secondly, investigating the current extend to which sustainability is considered, included and maintained during the process of construction projects, as well as the ambitions and influence of leaders in organisations. So, management of projects in practice. This helped to understand the current focus of practitioners on the concept of sustainability and identify the important gaps, hindering them from implementing sustainability (more) in their projects.

Finally, by filling these gaps and studying the relationship between the sustainability barriers in theory and practice, present in construction projects, opportunities were found, that could be transformed into recommendations on how to enable those opportunities. Thus, the requirements that need to be met.

This advise entails several actions, as well as who should undertake those actions, to enable practitioners to make more effective use of the resources present, to overcome the apparent complexity of including sustainability in construction projects, and to increase the inclusion of sustainability in projects through management. Thus, advise on the actions to undertake and who should undertake them, to enable en secure more sustainability inclusion in construction projects.

1.4 RESEARCH QUESTIONS

The aim of this research is to explore the different factors that affect the inclusion of sustainability in construction projects. By focusing on organisations, mainly multinational organisations, and the management of those organisations as well as of their projects, and using scientific and practical knowledge for developing recommendations suitable for practice.

Therefore, this research seeks to answer two research questions;
Firstly, what are the barriers for inclusion of sustainability in construction projects? Secondly, how can an ecopreneurial leader drive sustainability in construction projects?

1.5 RESEARCH RELEVANCE

Historically, research into sustainability of the construction industry, and sustainable construction has paid great attention to analysing impact, and what that impact should be [Bhave et al., 2014]. Meanwhile, limited attention has been paid to analysing the causes of impact and how they are all connected. Resulting in also limited attention on how to change the current impact and how to work towards reducing it. However, in recent years, scientific research into sustainable project management and sustainable development has increased.

So, by using that existing research, and building upon that with a more process and change driven focus, an addition can be made to the existing research field. Thus, there is a need for research into who and what could be part of the solution, instead where to seek the solution or what the result of a solution should be.

To conclude, this research focuses not only on what needs to change in the industry, but what needs to change within organisations and in projects, as well as how that change could be achieved and what should be further researched to develop methods and tools that enable change.

1.5.1 Theoretical Relevance

In terms of scientific and theoretical relevance, this research provides a theoretical and practical data driven approach for enabling sustainability in construction projects with project management.

This expands the view on the sources of opportunities in large construction projects. A shift towards focusing not only on increasing sustainability with new construction methods and materials, but also on how to minimize the risks and increase the benefits via project management and stakeholder alignment. This can be considered as taking a new approach in finding ways to reduce the environmental impact of the construction industry.

The emphasis of this research is also placed more on the people involved, and how they can be stimulated and aided in undertaking positive actions towards reducing the environmental impact of the construction industry. Instead of focusing solely on objective and individual things, while there are so many subjective and coherent matters involved. So, improving the understanding of not only individual things, but also the coherence and interrelation of those things. Also, not solely noticing the barriers, but also building upon that knowledge by understanding the requirements for transforming them into opportunities.

In previous research, a description has already been given of sustainability aspects and also on how sustainability of construction influences project management [Wang, 2021]. However, the problems of managing multinational projects when aiming for sustainability, has not been studied sufficiently.

In addition, there is a gap in literature on the potential influence of project management on sustainability of construction and how to use this influence between

the two positively [Armenia et al., 2019; Kiron et al., 2017; Silvius et al., 2017]. Hence, this research supports the theoretical findings on sustainability in and of construction projects, as well as theoretical findings on project management. The contribution of this research to those findings, thus the theoretical relevance is, additional findings on the concepts their interrelations, as well as which factors affect those relations.

1.5.2 Practical Relevance

The concepts in this research, and the research focus, are also of value for practitioners, as it analyses the way many construction projects are managed in practice, and which real-life challenges are encountered related to sustainability. This is, opposed to analysing solely what is expected and considered in theory, more beneficial for practitioners, as it enables developing recommendations suitable for practical implementation.

It is also believed that this concept, and research focus, is of value for practitioners as it describes the way many modern industries and organisations work. In terms of practical relevance, identifying opportunities is most of the time a harder task for practitioners than identifying threats or problems [Johansen et al., 2015]. So, by increasing the understanding of not only the common barriers, but also the common drivers, and how to notice opportunities as well as how to take them, concrete benefits for project managers and organisations can be provided [Hillson, 2016]. Benefits that are proven to be needed, but not yet provided [Dalcher, 2016]. The benefits include:

- More opportunities are identified and realized, since using a structured way of looking into the possible opportunities will give the chance to tackle some missed opportunities and perhaps capture some of them.

- Increasing the chances of project success since the identified opportunities can lead to a better achievement of the project objectives, leading to increased reputation and business growth of the organization.

- A change in the view of the Project Manager from “fearing” complexity to exploiting complexity, thus encouraging the team to think creatively about ways to work faster, simpler, better or more effectively in complex environments, in an attempt to search for opportunities that complexity can offer rather than trying to reduce or avoid it.

- A more future proof approach to managing projects, and securing investments, business relations and potential growth.

2 RESEARCH DESIGN

Doing research into sustainability within the construction industry has a broad range of possible perspectives and focuses. For any research or project, especially one positioned in a very extensive research field, a major contribution to unsuccessful delivery is the lack of understanding, so lack of clear definitions and a clear scope [Mirza et al., 2013]. So, for this research, the meaning of the used terminology and key concepts has been defined, and a clear scope, with clear boundaries, has been set. This has ensured that this research would be both of scientific and practical relevance, and was set up for success from the start.
This chapter presents the research approach by first, in Section 2.1, defining the boundaries that have been set for this research, so the scope of the research. Then, in Section 2.2, an elaboration is given on how and which research method has been used for defining the research terminology and key concepts, as well as which other methods have been used throughout this research, and how these were used to retrieve answers to the research questions. Finally, in Section 2.3 the outline of the research is shown.

2.1 RESEARCH SCOPE

As was mentioned in the Chapter 1 is the construction industry one of the industries with the most negative impact on the environment [Allen et al., 2018; UNEP, 2021; Ershadi and Goodarzi, 2021]. The urgency for this industry to change, means that research contributing to enabling that change is not only scientifically relevant but also practically relevant. This resulted in the first boundary of this research; focusing on sustainability in the construction industry, thus construction projects and the organisations managing those projects. Meaning that management of other types of projects is excluded from the scope, as well as researching projects from a different point of view than the management point of view, such as the point of view of contractors and suppliers.

A second boundary was set entailing construction projects of multinational organisations, further referred to as multinational construction projects. This entailed construction projects of which the project owner is a multinational organisation. This scope boundary was set, to increase the practical value of this research. Because, multinational organisations are known for having more resources and able to take more risks thus be more innovative and open to change [Osabutey et al., 2014; Singh, 2015]. Local firms have less absorptive capacity compared to multinational firms [Eapen, 2012]. This boundary also increases the scientific value as little attention has been devoted to multinationals in previous research on this research's topics, while that is considered to be of great importance [Söderlund, 2004].

The field in which this research is positioned is project management, which thus is part of the scope of this research. But, an addition to this scope is the focus on the influence of ecopreneurial leaders on project management. This focus requires some elaboration as it stems from research on several topics.

What Antonakis and Autio [2007] mentioned about entrepreneurs is that they are people that need to not only convince themselves but that they also need to convince others, such as their clients, partners and employees. They mention: "En-

trepreneurs need to paint a vision that is uplifting, convincing, and resonated with the desires of those who need to comply with their vision." In the problem description a reference has already been made to the research of Klein Woolthuis [2010], in which was mentioned that entrepreneurs are key players in achieving sustainability but that they encounter barriers. Especially ecopreneurs, which are environmentally oriented entrepreneurs, are thus crucial in transforming the industry [Schaltegger and Hansen, 2017; Schaltegger and Wagner, 2011]. Because this research focuses on sustainability, ecopreneurship is included in the scope, instead of the general term entrepreneurship.

Tabassi et al. [2016], and other academia, explained the potential influence of leadership on sustainability [Kezar, 2012]. Research on leadership has also demonstrated the importance of leadership throughout organizations for "furthering goals, meeting the mission, and creating change." Kezar [2012] for which was specified that it regards leadership at all levels throughout organizations [Astin and Leland, 1991; Conger and Pearce, 2003; Kezar et al., 2006].

The limitations of creating change by only relying on top-down leadership have also been identified by numerous studies [Conger and Pearce, 2003; Kezar, 2012]. Adding to this, have academics also identified that broader leadership, including bottom-up leadership, typically contributes to change. As it leads to increased expertise to draw on, more complex solutions and ideas, greater buy-in and consensus, thus more energy and enthusiasm for change [Conger and Pearce, 2003; Kezar, 2012].

That is why this research also focuses on the concept of leadership and leadership on all levels within organisations is included in the scope. In the problem description a reference has already been made to the research of Klein Woolthuis [2010], in which was mentioned that entrepreneurs are key players in achieving sustainability but that they encounter barriers. So, when keeping in mind what Antonakis and Autio [2007] and Klein Woolthuis [2010] said about entrepreneurs, what the meaning is of ecopreneurship and what the relation between leadership and sustainability is, an expectation can be developed that it might be valuable to combine ecopreneurship and leadership to overcome the known barriers for these two actors separately, and achieve sustainability. Winston and Patterson [2006] also considered this combination and Shafique and Kalyar [2018] confirmed the joint influence of ecopreneurs and leaders on sustainability. So, this resulted in the decision to include ecopreneurial leadership in the scope of this research.

So to add to the research objective, because the focus in this research lies on ecopreneurial leadership, the objective can also be rephrased as which (ecopreneurial) leader should undertake the actions, to overcome the different, most frequently encountered, barriers, in order to increase the inclusion of sustainability in construction projects.

2.2 RESEARCH SETTING AND METHODOLOGY

This section presents the methodology that was used during this research to fulfill its objective and answer the two research questions. The research is mainly divided into three parts:

1) Literature study part: Defining the key concepts of this research by reviewing previous research on those concepts. The literature study covered several studies positioned in the research field of management of construction projects to not only define the concepts but also to illustrate the relationship between the concepts and their inter-dependency in the context of management of multinational construction projects.

2) Empirical study part: Addressing the set of research questions with the use of a qualitative approach. The approach entailed semi-structured interviews, during which questions were posed, focused on gathering insights in the different per-

ceptions and experiences of people involved in the management of construction projects. The purpose was to find consistencies among the results that would provide valid data on the barriers, the drivers and the actors / leaders, influencing the inclusion of sustainability, in construction projects. This data on drivers, barriers and actors jointly thus provided insight in potential opportunities.

3) Development part: Analysing the data, linking theory to practice and transforming barriers into opportunities. These opportunities were then transformed into a list of recommendations that provide a structured approach to increasing the inclusion of sustainability in multinational construction projects. Thus several steps that can be taken and by which type of leader.

The research strategy is summarized in Figure 2.1.
A qualitative research methodology was adopted for the empirical study part as this method "enables a better understanding of people's lived experiences and generates closer and empathetic understanding of these experiences." Ninan and Sergeeva [2022]; Pink et al. [2010]. Since the research objective is to understand what influences the inclusion of sustainability in multinational construction project, and how to overcome it, data is sought on experiences and examples from practice, so subjective data. As this is non quantifiable, a qualitative research methodology is preferred over a quantitative research methodology [Jemna et al., 2016].

The qualitative methodology consisted of interviews, because especially individual cases provide excellent opportunities to increase the contextual understanding, and when combined, they enable in-depth data collection and analysis [Lundin and Steinthórsson, 2003]. The interviews were face-to-face and semi structured to collect data that is comparable and insightful, thus useful [O'Cathain et al., 2014]. During the interviews several insights were sought, mainly concerning the interests and demands involved, but also, the ambitions, the extend to which those were present, on what level, what they entailed, and to what extend they were achieved. These insights contributed to increased understanding of the most common sustainability drivers and barriers. Other insights that were sought were the role of leaders in projects and organisations, and their influence on the decision-making or project design, as well as insights on overall experiences and thoughts on opportunities for sustainability.

The full research has been executed in three phases, a preparation phase, an execution phase, and an evaluation phase. The first two phases focused both on retrieving data.

The first phase entailed the retrieval of existing data on the relevant subjects from previous research, which provided understanding of the research field, thus what was yet unknown and needed to be collected during the second phase.

The second phase entailed the retrieval of new data on the relevant subjects through the use of interviews. The set-up of the interviews was thus developed, based on the data retrieved during the fist phase.

The third phase focused on analysing the interview data. This analysis was a content analysis, which is an approach to analysing textual data from responses to open-ended questions in interviews.
The content analysis was used for: Applying structure to the data, identifying common themes and concepts, identifying importance of themes and concepts, identifying patterns and relations in data, and exploring meaning in data. This type of analysis is able to facilitate qualitative data, and it is recognised as an effective technique for making valid and replicable inferences from data, which is why this analysis was done for this research [Swann, 2020].

This entailed re-watching and re-reading the recordings and the transcripts multiple times, comparing all the interview transcripts to notice repetitive elements, and grouping these similar instances into categories of barriers. The result was an answer to the first main research question. This process was then repeated to gather similar instances for groups of drivers, which were then linked to the barriers to find

opportunities. These opportunities were finally transformed into recommendations of how to use those opportunities.

The data-collection conducted throughout the first two phases had a total duration of 4 months in 2022. The data analysis had a total duration of 1,5 months in 2022. The interviews conducted each had a duration around 45 min to one hour, with the total duration of 16 interviews adding up to 15 hours of interview data. A further elaboration on the methods used is provided in the sub-sections.

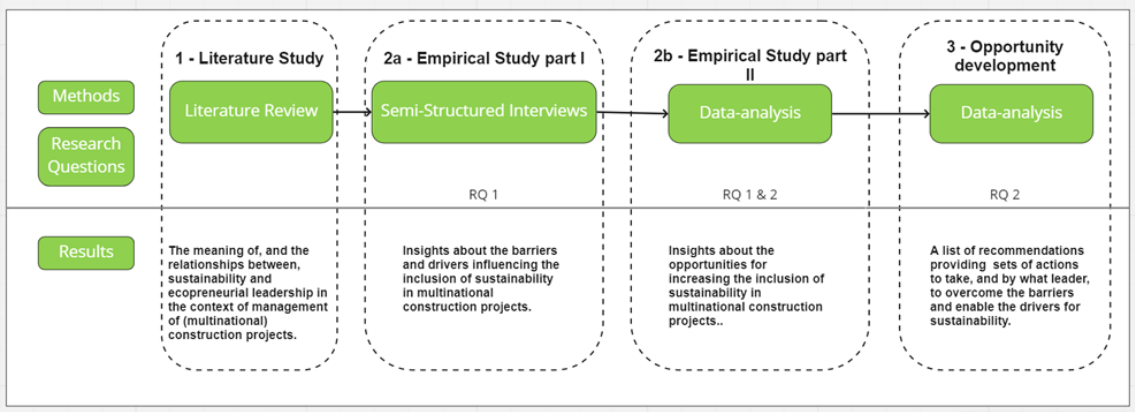

Figure 2.1: Research strategy: methods and to which of the main questions they contribute, as well as the results (source:Author)

2.2.1 Literature Study

The number of journal papers and publications, both governmental and industry related, is increasing [Alwan et al., 2017] This has made reviewing previous research an essential component for synthesizing the research field in which the concepts of this research are positioned [Engert et al., 2016]. The research field is also very extensive, with a wide range of perspectives that can be considered and a wide range of elements that can be included. This makes defining clear boundaries important for maintaining a clear scope [Seuring and Müller, 2008; Mirza et al., 2013]. So, reviewing previous research is not only essential but also very valuable. Because it provides data and increases the understanding of the concepts and scope of this research. Also, because it ensures that this research has scientific value by adding knowledge to the existing research.

The review has been conducted by using structured keywords in established and high quality databases and making use of academic journals, such as from International Journal of Project Management (IJPM) and Project Management Journal (PMI). The databases that have been used include Mendeley, Google Scholar, Scopus, Researchgate and ScienceDirect. Some of the keywords that have been used are: Sustainability, sustainable construction, entrepreneurship, sustainable entrepreneurship, entrepreneurial leadership, leadership, ecopreneurship, sustainable development, environmental development and construction process. So to conclude, reviewing previous research has provided the data that formed the foundation of this research and ensured scientific value of this research.

2.2.2 Interviews

As introduced in the beginning of this chapter, new data has mainly been retrieved through interviews. These interviews were set-up in the second phase of the research, after sufficient knowledge was gathered in the preparation phase. This enabled the interviews to be set up in such a way that useful and new data would be retrieved. To explore the research questions, I studied how an organization in

the Netherlands RHDHV managed sustainability. For this, I conducted 16 interviews with project/program managers and project consultants.

The interviews were conducted to increase the understanding of the factors encountered by practitioners, in multinational construction projects, forming a barrier for the inclusion of sustainability. The interviews were also aimed at understanding where the opportunities lie for leaders to push and enable, so drive, sustainability inclusion. The targeted practitioners thus included project managers, program managers and practitioners. The reason for interviewing people from these three target groups was their involvement with projects early on, as well as throughout, giving them good insights in not only the project ambitions but also their performance.

An invitation was send to 20 practitioners, both from RHDHV and clients, out of which 16 responded and accepted the invitation. The response rate was thus 80%. From the 16 interviewees: 9 were project or program managers, 5 were both project manager and consultant, 2 were consultants and 1 had been a project manager but is currently in a higher management function.

Given the area of interest being multinational construction projects, most of the interviewees are currently involved with projects from multinationals. Some of the interviewees were also experts on sustainability. To have both the perspective of sustainability experts and non-sustainability experts was a decision made to consider whether having expert knowledge on sustainability influences how projects are managed. Thus, this challenged the data and provided insights on the benefit of having expertise knowledge on sustainability. So, whether the presence of sustainability knowledge contributes positively to inclusion of sustainability in multinational construction projects.

A visual elaboration on the division among the interviewees within the interview group has been provided in Figure 2.2 and the full list of interviewees with interview details is provided in Table 2.1.

The interviews were used to gather additional data on the project process of multinational construction projects. To fulfill the purpose of the interviews, an interview guide, composed of 14 questions, was prepared. This guide is described in Section 4.1. The main aim of the interviews was to gather more insights in the problems that are encountered during the project process. By gaining insight in what the project process entails in practice, opportunities could be noticed for a wide range of projects even though each project has an individual approach.

Figure 2.2: Interviewee divisions (source:Author)

Interviewee	Date	Designation	Duration
1	15th of June	RHDHV Project manager for multinational clients	00:51:47
2	16th of June	RHDHV Consultant on sustainability for Dutch clients	00:46:16
3	17th of June	RHDHV Project Manager of public clients and a Sustainability expert	01:07:29
4	17th of June	RHDHV Project manager for multinational clients	00:56:39
5	22th of June	RHDHV Commercial Director and previous Project Manager for multinational clients	01:00:36
6	23th of June	RHDHV Consultant for multinational clients and a Sustainability expert	00:59:23
7	29th of June	RHDHV Project Manager for public clients	01:07:46
8	29th of June	Project manager of a public client	00:42:38
9	7th of July	RHDHV Project Manager and Consultant for Multinational Clients as well as a sustainability expert	01:02:42
10	15th of July	RHDHV project manager for multinational clients	00:51:19
11	22th of July	RHDHV Project Manager and Consultant for Multinational Clients	01:00:38
12	26th of July	RHDHV Project Manager and Consultant for Multinational Clients	00:54:25
13	18th of August	RHDHV project manager and consultant for Multinational clients	00:59:21
14	26th of August	Project manager of a multinational client	00:55:39
15	6th of September	RHDHV Project Manager and Consultant for Dutch clients	00:50:45
16	13th of September	Program/Project manager of a multinational client	00:50:46

Table 2.1: Interviews (source: Author

2.2.3 Analysis

All the interviews were recorded in Microsoft Teams and transcribed to text to enable in-depth data-analysis. The data was then analysed with the use of the Qualitative Content Analysis (QCA). QCA can be used for systematically describing the meaning of the qualitative data that has been gathered, by allocating successive parts of the qualitative content, to categories of a coding frame [Selvi, 2019; Schreier et al., 2019; Mayring, 2015].

The main reason for using QCA is that it focuses on understanding the material in relation to a particular context of communication [Mayring, 2015; Kracauer, 2022]. It requires that the interpreter specifies which part of the communication process the conclusions from the material analysis relate to, thus the interpretation of text or statements, is always done within its context, so the material is examined without neglecting the origin and context [Mayring, 2015; Selvi, 2019].

QCA is suitable for the data analysis included in this research, because it can cope with a large amount of data, which was generated by the 16 interviews, and aims at reducing this data, which was necessary since not all the data gathered was relevant [Flick, 2014]. QCA is also able to generate a coding frame which offers a valid description of the data with regard to the material of the research [Flick, 2014]. This point is further elaborated on in Chapter 4.

The steps that have been taken for the QCA are:

- Preparing the data for analysis; this included ensuring the transcripts were correct by re-watching the video recordings while correcting the transcripts.

- Organizing the data; this included marking relevant parts and making corrections to the quotes. The corrections solely were done for grammar mistakes,

repetition of words (stuttering) and filtering words out such as: uhm, like, you know, so yeah. It also included translating the Dutch data into English.

- Reporting the results; discussing the findings with the theoretical background in mind to ensure the results were situated in theory.

The data was analysed on repetition of elements that could be marked as a barrier, driver or opportunity. So initially words and short sentences were sought such as: challenging, ambition, limitation, lack of, difficult, we should, we are not able and in order to.

As the interviews took place after the literature study, basic knowledge had already been retrieved on the subjects, which reduced the need for going back and forth between theory and data. The transcripts were analysed multiple times, as repetition results in new insights and more understanding [Steger, 2007].

During the analysis repetition of other keywords were also noted, such as alignment, awareness, understanding, information management, change, driven, vision, transparency and strategy.
From the open coding this enabled the creation of codes such as management of change, absence of change and presence of change. After creating the open codes, axial coding was employed and grouped these into a category 'change'. The codes were not predetermined, but all emerged from the data.
For example, there were multiple statements related to resources, namely, time, money, expertise, people, materials and technology. The initial thought was to group those under an axial code resources, as resources were often part of the reason for excluding sustainability or reducing the inclusion. But, when continuing the analysis it became clear that resources are always a decision-maker, but not in itself always a barrier for sustainability.

So, they were part of barriers, such as that changes in resources availability can be a barrier, or that resources when not aligned with the ambitions can be a barrier. Therefore, the different resources were not grouped under one axial code, but part of the axial codes.
Another example is that initially it was expected that lack of visibility was a barrier, until it was noted that it is not solely that the environmental impact is often not visible. As often the impact is not fully visible, but this is also often just an excuse. So this was rephrased to transparency, as environmental impact should become more transparent, internal, but also external, to prevent ignorance (barrier) and enable a societal push (opportunity).

Thus, several revisions have been carrier out to ensure that the axial codes and open codes were extracted to be exclusive and collectively exhaustive [Sonpar and Golden-Biddle, 2008].

In Figure 2.3 a full overview is provided on the coding pattern. In Section 4.4 the power quotes are discussed along with several proof quotes to show prevalence of the category, following the suggestions of [Ninan and Sergeeva, 2022; Pratt, 2008].

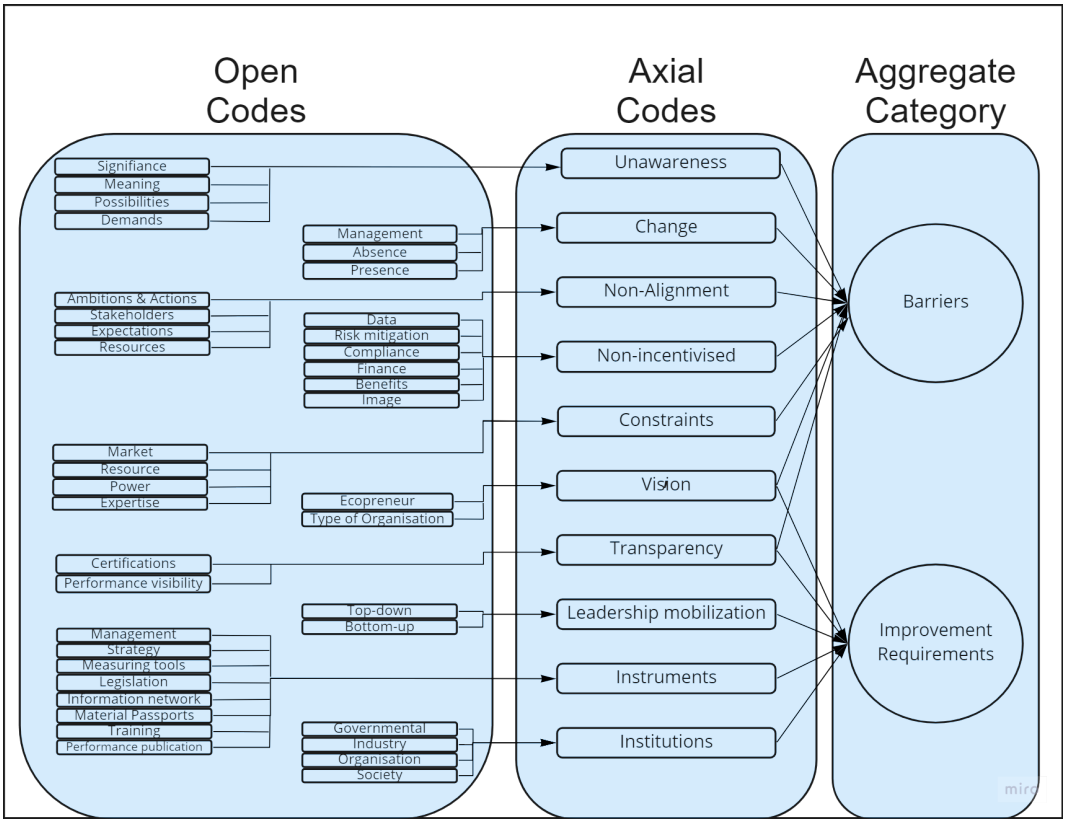

Figure 2.3: Coding Pattern (source: Author)

2.3 RESEARCH OUTLINE

In Figure 2.4 the research outline is presented, with a full overview of the different chapters of this research report.

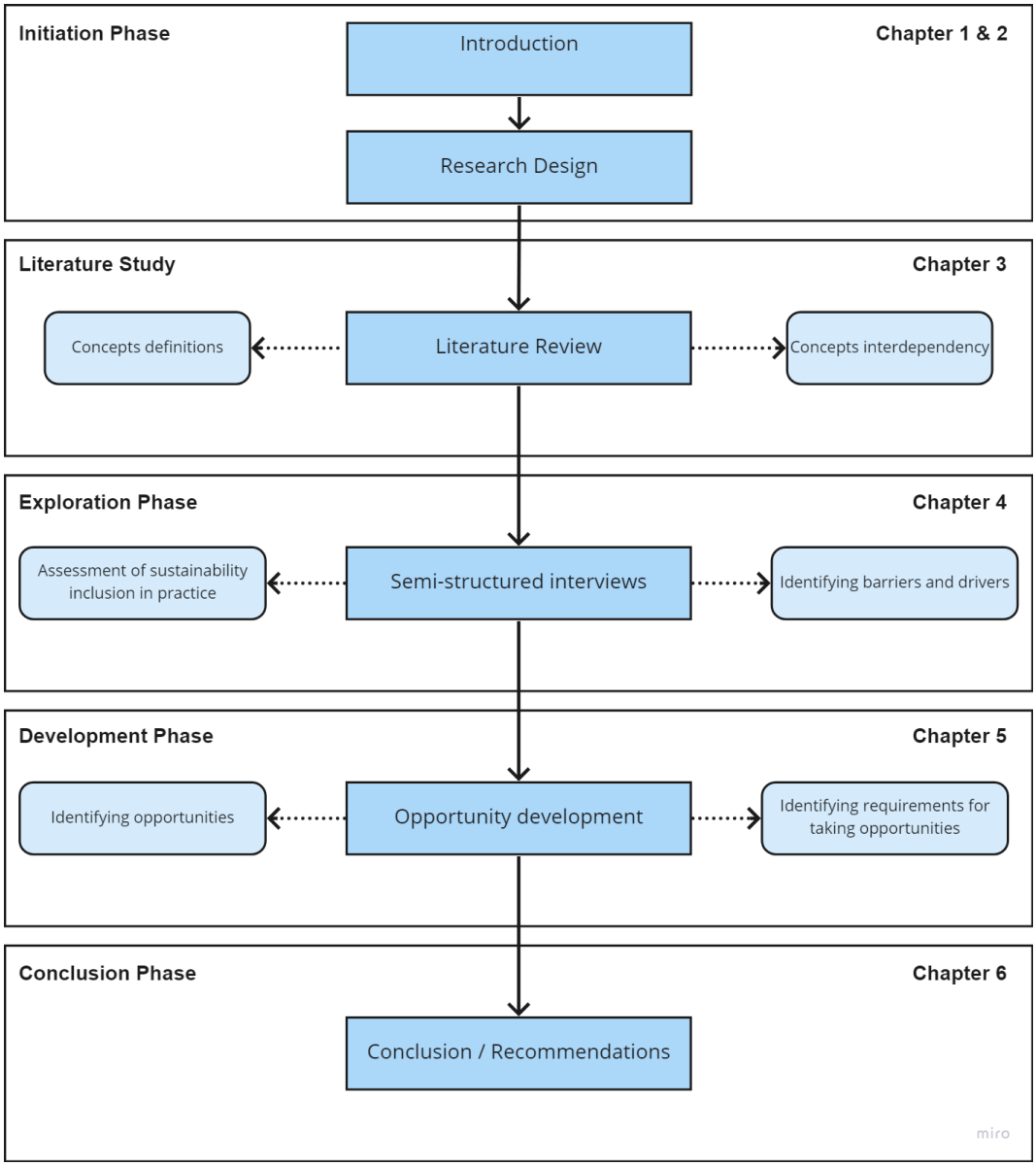

Figure 2.4: Research Outline (source:Author)

3 LITERATURE STUDY

The main concepts of this research are sustainability and ecopreneurial leadership, which, as previously explained, is a combination of environmentally oriented entrepreneurship and leadership. To understand the meaning of these concepts, this chapter considers several definitions, provided by academia. The chapter continues with reviewing the existing research on these concepts and where this research is positioned within the research field.

3.1 TERMINOLOGY

The first part of the literature study focused on defining the key concepts. In this section these definitions are provided. The concept of sustainability has been defined by considering the definitions of sustainable development and sustainable construction. This was done to ensure that a definition for sustainability, most suitable in relation to the scope of this research, would be adopted for this research. The concept of ecopreneurial leadership has been defined by reviewing research on the concepts of ecopreneurship and leadership separately, and the definitions provided for these separate concepts in the existing literature. As ecopreneurial leadership is a concept that hasn't been researched, nor defined, frequently. Thus, the definition for ecopreneurial leadership has been developed by combining the definitions of ecopreneurship and leadership.

3.1.1 Sustainability

Sustainability is almost always seen in terms of three dimensions: social, economic and environmental [Kuhlman and Farrington, 2010; Purvis et al., 2019]. Within these dimensions, several meanings are given to sustainability. So, to understand the meaning of sustainability, several definitions, that academia often refer to, thus are widely accepted, will be provided. Firstly, Dillard et al. [2008]; Heinberg and Lerch [2010] defined sustainability as being a composition of three mutually dependent goals. Namely, (1) to live in a way that is environmentally sustainable, or viable over the very long-term, (2) to live in a way that is economically sustainable, maintaining living standards over the long-term, and (3) to live in a way that is socially sustainable, now and in the future.

However, defining sustainability as broad as Dillard et al. [2008]; Heinberg and Lerch [2010] did, does not cover the meaning of sustainability relevant to the scope of this research entirely. So, definitions that focus on sustainability in relation to the construction industry, also need to be considered. These definitions are given to the terms Sustainable Development SD and sustainable construction (SC).

Sustainable development

Defining SD is difficult since it is a contestable concept that has a basic meaning that almost everyone is in favor of but is surrounded with deep conflicts on how it should be understood or fostered [Jacobs and Stott, 1992]. However, several academia have provided definitions for SD that do provide a better understanding of what it means, thus why the term is often used when referring to sustainability

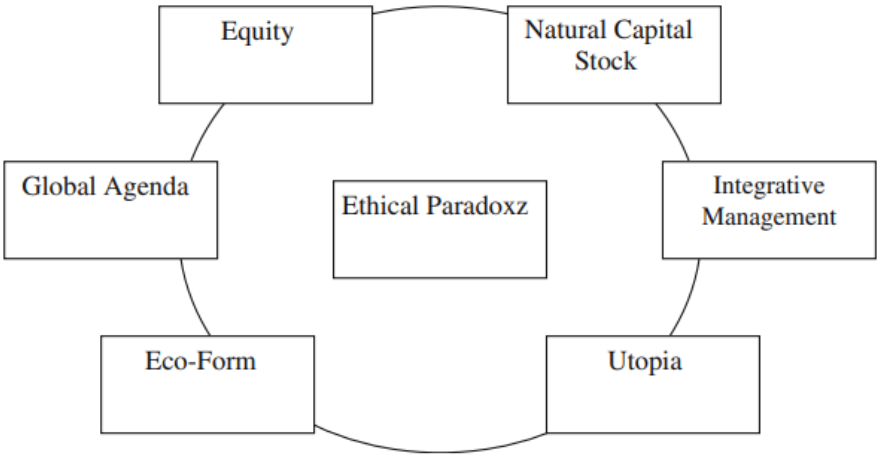

Figure 3.1: Conceptual Framework Sustainable Development (source: Jabareen [2008])

in construction projects. Some of these definitions are:
The definition of SD by Brundtland et al. [1987], was proposed by the UN World Commission on Environment and Development as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The Brundtland report in which this definition was given also was mentioned that development and the environment need to be reconciled. So, sustainability is needs versus resources, or short versus long term [Brundtland et al., 1987; Kuhlman and Farrington, 2010].
The definition for SD has also been proposed by Jabareen [2008] through creating a conceptual framework for SD. This framework visualizes seven concepts that jointly represent the meaning of SD. It shows, as can be seen in Figure 3.1 that SD is the synthesis of Equity, Natural Capital Stock, Integrative Management, Utopia, Eco-Form, Global Agenda, and Ethical Paradox.

A third definition of SD was given by Rogers et al. [2012]. They stated that the literal meaning of SD is maintaining development over time. Further on they sought a definition for SD by comparing various definitions. They also included the linkage between SD and environmentalism. Their conclusion on the definition entailed that the concept of SD nowadays "embraces a comprehensive critique of the 'governance' of environment and development that includes substantial rethinking of the processes of decision making and the values underpinning the actions of international institutions, governments, bankers and individual consumers".

Sustainable construction

Another elaboration relevant for this research is on the meaning of sustainable construction projects (SCP), as this explains what is in theory considered as sustainability with regards to construction projects. This is a necessary addition to the meaning of SD as development and construction are not identical. With the meaning of construction referring to: "the process or method of building or making something, especially roads, buildings, bridges, etc." [Dictionary, 2009; Stevenson, 2010]. While development refers to growth or overall progress [Dictionary, 2009; Stevenson, 2010]. The difference also comes forward in research by Drewer [1980], in which he stated: "Building and infrastructural works are essential to the satisfaction of many development objectives; therefore, the importance of the role of construction in a coherent development strategy is self-evident.". So, this explains why SC requires further specification of its meaning. SC has principles that can be

divided into four dimensions: social, economic, biophysical and technical [Hill and Bowen, 1997].
SC has also been explained by [Kibert, 2016]: "Considering the role and potential interface with ecosystems to provide services in a synergistic fashion. With respect to materials selection, closing loops and eliminating solid, liquid, and gaseous emissions are key sustainability objectives."
A third, very suitable, definition of SC was given by Bajjou et al. [2017]: "Sustainable construction is mainly defined by the industry that ensures the conservation of natural resources throughout the life cycle of the building (energy, water, non-renewable materials), optimizing the consumption of raw materials in purpose to reduce the deterioration of the environment and to ensure social and economic comfort". Bajjou et al. [2017] also explained that a construction project which is both sustainable and ecological, has to take the objectives of SD into account at every state of decisions: design, construction, use, and demolition. Which further proves the purpose of explaining both SD and SC.

3.1.2 Ecopreneurial leadership

Ecopreneurship

Ecopreneurship is the recognition and enaction of opportunities for creating and sharing multiple forms of value [Rae, 2016; Rae et al., 2014].
As has been mentioned in Section 2.1 is ecopreneurship also often explained as sustainable entrepreneurship or environmentally orientated entrepreneurship. So, ecopreneurship is a type of entrepreneurship with the core motivation and main goal of: "earning money through contributing to solving environmental problems." Schaltegger and Wagner [2011]. For ecopreneurs: "Economic goals are the ends of the business, whereas environmental goals are considered as an integrated part of the economic logic of the business." Schaltegger and Wagner [2011]. What is said about sustainable entrepreneurship, or ecopreneurship, is that it is based on long-term values, but is likely to be unsuccessful if it solely entails unconnected, individual actions [Rae, 2016; Greenberg et al., 2013]. Ecopreneurship has to become a movement for systemic cultural, social and economic transformation, collectively. It needs to progress from the foundations of communities and social enterprises, not solely on a local and immediate scale, but also on a global scale, to enable change at corporate, governmental and international levels [Longhurst and Chilvers, 2019; Rae, 2016].

A given addition to this is that the organizational challenge of ecopreneurs is better integrating environmental performance into the economic business logic [Klein Woolthuis, 2010]. When using the concept ecopreneurship in this research, what is meant is thus running a business, or managing a project, with not solely the purpose of generating financial benefit, but also contributing to a reduction of environmental impact, so environmental benefit.

Leadership

Defining leadership is difficult, it has even resulted in a statement by Stogdill [1974] that "there are almost as many different definitions of leadership as there are persons who have attempted to define the concept" (p. 7).
To provide understanding on what is meant when using the term leadership, a reference will be made to several definitions. The first definition that will be considered for this research is given by Silva [2016]: "The process of interactive influence that occurs when, in a given context, some people accept someone as their leader to achieve common goals."
Another definition was given by Kruse [2013]: "Leadership is a process of social influence, which maximizes the efforts of others, towards the achievement of a goal."

Winston and Patterson [2006] concluded that leadership is about two things, process and behaviours. They also stated about a leader that in the process of leading, a leader: "enables the follower(s) to be innovative as well as self-directed within the scope of individual-follower assignments and allows the follower(s) to learn from ones own, as well as others' successes, mistakes, and failures along the process of completing the organizations' objectives."
The focus of this research is on multinational construction projects. Such projects involve multiple leaders, at different positions within organisations [Von Billerbeck, 2022]. Because, on a project level there is at least one project manager, but this manager operates within an organisation that also includes higher management [Von Billerbeck, 2022]. Another reason for this is that this research covers not only organisations that are project owners, but also external, consulting, organisations. So, when referring to a leader or leadership, the definitions provided are accepted, but who this leader is of who these leaders are, depends on the size of the project and the organisation that owns the project.

Leaders within multinational organisations: "can influence member state preferences and policy making and shape the overall strategic direction of the organization." Von Billerbeck [2022] and they are thus crucial for maximizing efficiency, but can also be crucial for steering towards more sustainability [Oyarzún Serrano, 2006; Reinalda and Verbeek, 2014; Cox, 1969; Von Billerbeck, 2022]. So when referring to leaders, people with certain responsibilities and influence are meant.

A last elaboration on the meaning of leadership is the distinction between top-down and bottom-up leadership. Bottom-up leaders are individuals that have no position of authority, but make change without formal power [Kezar, 2012]. These leaders can make relevant contributions to improving institutions and organisations through meaningful change [Kezar, 2001; Kezar et al., 2006; Conger and Pearce, 2003; Astin and Leland, 1991]. Top-down leaders are the people in positions of authority, that define the change agenda and direction of the organisation. They only include others in the leadership process when seeking advice or for implementation. This type of leadership revolves around the will of the ones in positions of authority and sees followers are working at that will [Kezar, 2012].

When keeping this in mind, leadership will be referring to the behaviour of leaders in organisations, on all levels, so both of top-down and bottom-up leaders, that influences the inclusion of sustainability in projects.

Conclusion

What can be retrieved from previous research into ecopreneurship and leadership and was also explained by Rae [2016] is that successful ecopreneurship depends on the development and interconnection of three aspects. Namely, leadership, learning, and a supportive cultural, political and economic context. Leadership in this context does not refer solely to the levels of the individual organisation, but also to intellectual and political levels. As leaders on all these levels need to interconnect to articulate the essential vision and longer-term ambition for change [Bagheri and Pihie, 2011; Rae, 2016]. As was also stated by Rae [2016], ecopreneurial leadership should be seen as a "socially responsive, shared responsibility, analogous to the notion of distributed leadership where people at different levels and roles within an organization assume and demonstrate leadership towards a common set of goals." [Ancona et al., 2005].

When combining the definitions of ecopreneurship and leadership, the joint definition of ecopreneurial leadership comes forward. It is being a leader while also being an ecopreneur. It is leadership with an ecopreneurial vision. So, it is using your authority, or influencing bottom-up people with authority, to enable business continuation with not solely the aim of generating financial benefit, but also aiming for environmental benefit.

3.2 MANAGEMENT OF CONSTRUCTION PROJECTS

In this section a review is provided on management of construction projects in theory. This review focused on previous research into the challenges, risks and strategies both general and sustainability related, present during management of construction projects.

The knowledge gaps this research aims to fill are which factors influence the inclusion of sustainability in multinational construction projects as well as what can be done to increase this inclusion. Next to that the aim includes to increase the understanding of how an ecopreneurial leader can drive this. Which is why also the relation between ecopreneurial leadership and (sustainable) management of construction projects in theory, has been part of the focus. So this could be extended to the relation in practice, done in the next research step.

3.2.1 Risks in project management

Risk is "uncertain event or condition, that if it occurs, has a positive or negative effect on a project's objectives" Richardson and Jackson [2018].

Management of these risks is thus a very important process for achieving project's objectives, not only in terms of time, costs and safety, but also in terms of environmental sustainability [Befrouei and Taghipour, 2015].

The main risk encountered during project management are related to complexity, and as sustainability inclusion increases the complexity, sustainability inclusion increases the risks for management of construction projects [Gareis et al., 2013; Wang, 2021]. To cope with such risks, and to cope with project management and decision making becoming more challenging when including sustainability, a different way of managing such projects is required [Armenia et al., 2019; Awuzie and McDermott, 2013; Gareis et al., 2013]. Otherwise the sustainability inclusion wont result in benefits, or opportunities for increasing value, but will result in undermined project performance [Awuzie and McDermott, 2013; Wang, 2021].

When reviewing theory on the definition of risk, risk includes both threats and opportunities, so in the risk management process, thus for understanding risks involved with management of construction projects, both threats and opportunities should be addressed [Denney, 2020; Hillson, 2019; Johansen et al., 2018; Olsson, 2007].

Threat

"Threats have unwelcome or adverse effects on achievement of objectives" Hillson [2019]. As mentioned in Section 1.1 several factors can increase the degree of complexity of a project and its environments and when these are not properly managed, they can undermine the project performance [Awuzie and McDermott, 2013; Wood and Ashton, 2010]. So, previous research has proven that during management of construction projects, the biggest challenge, and potential threat, is complexity [Crawford, 2006]. Project complexity determines the appropriate project organizational form as it influences the selection of project inputs, such as the required expertise and experience and it affects the project objectives, mainly of time, cost and quality. The degree of project complexity also influences the project outcomes, and the higher the degree of complexity, the greater the time and cost [Baccarini, 1996; Tatikonda and Rosenthal, 2000]. Thus high complexity is often one of the main threats, as it can result in unwelcome or adverse affects on achievement of objectives, especially when complexity increases throughout the project process [Williams, 2005].

Opportunity

When defining opportunity in terms of risk, it can be stated that opportunities have helpful or beneficial effects on achievement of objectives [Hillson, 2019].

Opportunities for project management are diverse, and different for each project. The main requirement for opportunities is noticing them and managing them in a suitable way to enable the opportunities. In this research the term opportunity mainly refers to the opportunities for improving sustainability inclusion. So opportunities for overcoming barriers through enabling drivers with the help of ecopreneurial leaders. However, sustainability is not always an objective in construction projects, which is why for this research the term opportunity mainly refers to a possibility, or possible actions to undertake.

3.2.2 Challenges of Sustainable Project Management

Conventional practices for management of projects, construction projects included, are not suitable for sustainable project management [Chofreh et al., 2019]. So, academics are starting to focus on how to integrate sustainability principles into project management, thus with the aim to preserve natural resources while generating positive societal and economical impacts [Armenia et al., 2019; Dobrovolskienė and Tamošiūnienė, 2015]. A main challenge with this is that conventional project management often has short-term economic profitability as a main priority, while sustainability can interfere with that [Marcelino-Sádaba et al., 2015]. The objectives of life-cycle economic, social and environmental aspects are also usually competing, so it is necessary to find a solution for this, by making compromises on all these aspects, not just on environmental aspects (sustainability related) [Sabini et al., 2019]. Even though this makes the implementation of sustainability in management systems even more difficult [Azapagic, 2003; Carvalho and Rabechini Jr, 2017]. So, different types of problems, barriers and obstacles are present, significantly limiting sustainable project management and the inclusion of sustainability in construction projects [Fellows and Liu, 2008; Hwang and Tan, 2012; Kiesnere and Baumgartner, 2019; Robichaud and Anantatmula, 2011].

3.2.3 Overcoming sustainability barriers

Many academics have attempted approaching the sustainability barriers, by doing research on sustainability in project management, with many different approaches.

Such as Brook and Pagnanelli [2014] who developed a framework for integrating sustainability in project portfolio management processes, based on a case study in the automotive industry. Marcelino-Sádaba et al. [2015] proposed a framework aimed at assisting project managers when dealing with sustainable projects. Carvalho and Rabechini Jr [2017] developed a new model that adopted both project and product approaches, for project sustainability management. Silvius and de Graaf [2019] approached the role of project managers when addressing sustainability issues, by identifying the main factors that trigger project managers to discuss sustainability issues with higher management. Silvius and Schipper [2020] did similar research, but identified the main factors that trigger project managers to include sustainability issues in their projects. Dobrovolskienė et al. [2021] approached the difficulty of assessing sustainability in projects by proposing a new index, which was also done by Dobrovolskienė and Tamošiūnienė [2015], however that one aided in decision making. While other research focused on determining the skills and knowledge required among project managers for achieving sustainability in project management [Toljaga-Nikolić et al., 2020].

So, many studies exist on managing sustainability ambitions, during management of (construction) projects, but results of these studies in practice are lacking. This proves the existence of sustainability barriers, and the urgency to overcome

them. Nonetheless, most of the research focuses on the environment, what is lacking in the conventional management approaches or how to modify the management functions (scope, time, cost, etc.).

Even though this won't add much value to project management in practice, as it doesn't provide clarity or recommendations on how to use theory to overcome sustainability barriers in practice.

3.2.4 Strategies

When reviewing existing research on sustainability ambitions or strategies, both on a project and organisational level, it becomes clear that the ambitions and strategies are currently lacking. For example, [Pinelli and Maiolini, 2017] highlighted that sustainability agendas often lack 'strategic thinking'. To which was added that sustainability agendas are "the set of all the actions and strategies that an organization designs in order to have some positive impact on social-environmental challenge" Pinelli and Maiolini [2017]. These agendas thus turn out to be ineffective and inadequate, which forms a barrier for the fulfilment of SD [Baumgartner and Ebner, 2010; Porter and Kramer, 2011]. To conclude, most strategies are currently still lacking on sustainability performance. As they create the illusion that a positive environmental impact will be achieved, even though they are insufficient to truly achieve that, making the existence of current strategies a barrier for sustainability inclusion instead of a driver.

3.2.5 Ecopreneurial leadership

Even though Adams already stated in 2006 that: "Sustainability needs to be made the basis of a new understanding of human aspiration and achievement.". And even though ecopreneurship and its benefit, as well as how it can contribute to achieving environmental change, has been researched extensively over the years [Dixon and Clifford, 2007; Moon, 2013; Underwood et al., 2012]. There is still insufficient knowledge on how to incorporate it properly within organisations to achieve that interconnection and benefit [Rae, 2010].
So, several conclusions can be drawn from the existing literature. Both on the theoretical meaning of ecopreneurial leadership, but also on the opportunities linked to ecopreneurial leadership. Namely, that ecopreneurial leadership means that leaders on different levels, behave in a way that is aligned with the ambition of not only generating financial benefit but also environmental benefit. And that ecopreneurial leadership can help organisations with their transition, as well as that it can contribute to achieving sustainability, but that there is still insufficient knowledge on how to enable the theory in practice [Rae, 2016].

Sarabia et al. [2020] mentioned that "Entrepreneurs as innovators and leaders create their own knowledge creation, their own learning processes and own their culture's construction." So, the knowledge gap on how they can create that, thus how ecopreneurial leaders can drive change needs to be solved.

3.3 CONCLUSION

The literature study has focused on researching management of construction projects in theory. The findings have been used as the input for the next research steps. The key findings of the literature study are discussed in the subsections.

3.3.1 Knowledge gap

The main gap between theory and practice that came forward in the literature study, lies in knowing, but not doing. As the theory does not provide clarity on how to use it in practice. Such as that Toljaga-Nikolić et al. [2020] provides theory on the skills and knowledge, managers need to have to enable sustainability inclusion, but it doesn't explain how to provide managers with these skills and knowledge. Another example of this is that Dobrovolskienė et al. [2021] proposed a new index for assessing sustainability of real estate projects, and adopted a simple additive weighing approach to aggregate the criteria they selected. A new sustainability index was also constructed by Dobrovolskienė and Tamošiūnienė [2015], primarily for the construction industry, to help decision-makers with resource allocation and project portfolio selection. However, these studies on sustainability indexes do not include how to incorporate them within standard management practices, or within entire organisations.

3.3.2 Barriers

It can be concluded that a lot of research has been done into both sustainable and general project management. The main challenges or barriers that can be found in theory are:

Complexity: Which is seen as a threat and something to deal with, even though sustainability is complex, thus this approach or perception reduces the sustainability inclusion.

Strategies: Sustainability agendas with insufficient strategic thinking, making them ineffective and inadequate for including, and maintaining the inclusion of, sustainability.

Conventional project management practices: They are not suitable for sustainability inclusion, as the focus then lies on short-term economic profitability, which sustainability is not (yet) able to deliver. The factors to manage then remain the standard ones, which are scope, time and cost, even though more sustainable options are unable to come out at best when comparing options based on those factors.

Limited understanding of sustainability: Because many different meanings are given to sustainability, there is limited consensus on the meaning of sustainability. Even the sub-definitions of sustainability, thus of sustainable development and sustainable construction, lack consensus. With research proving that they are contestable concepts, surrounded with deep conflicts. Having limited understanding of what sustainability means, is a barrier for sustainability inclusion, as this makes considering options and opportunities even more challenging.

What also comes forward is that existing research lacks useful actions and leadership. This, at best, leads to small sustainability improvements to projects and products [Goel et al., 2019]. Therefore, general conclusions of the current state of knowledge are not flattering [de la Cruz López et al., 2021]. Which is why further research into project management in practice is necessary.

4 RESULTS EMPIRICAL STUDY: INTERVIEWS & DATA ANALYSIS

This chapter provides the results from the empirical study. So the results that were retrieved by interviewing employees of RHDHV and clients of RHDHV. In the first section, Section 4.1, a description of the interview guide is provided with the general line of questioning. In Section 4.4 the findings are presented, for the barriers and the requirements for enabling opportunities. Then in Section 4.5 conclusions are drawn on the most common barriers and requirements for improvement opportunities.

4.1 INTERVIEW SET-UP

To understand the opportunities for implementing more sustainable elements in projects, focusing solely on theory does not suffice. It is necessary to consider the theory and the most common management challenges throughout the project process, but due to the uniqueness of each project, it is also important to increase the understanding of project management in practice by gathering knowledge based on experiences from practitioners.

This increases the understanding of how the decision making takes place throughout the projects process, which challenges are involved, and which factors and actors, influence the decision making. This jointly contributes to developing a better understanding of the project process and the decision making process. Thus, where the causes lie for limited sustainability inclusion, what is required to overcome these limitations and how to enable opportunities for driving the inclusion of sustainability in multinational construction projects.

Several questions were set up to form a red thread throughout the interviews, this ensured that comparable input was generated during the interviews and prevented straying from the subject. The interviews also allowed for open conversation on relevant subjects, to ensure that the benefit of interviews over surveys would not be lost. The standardized list of questions can be found in Appendix A. In preparation of the interview an invitation letter was send to the interviewee Appendix B, as well as a consent form Appendix C. This form was signed before the start of the interview to ensure that the interview data could be used with consent.

4.2 INTERVIEW GUIDE

1. Job specifics and work experience: This question was posed to verify that the upfront knowledge on the position of the interviewee was correct. It also provided context on the perspective from which the interviewee would answer the questions.

2. Managing the decision-making throughout the project process: This question related to the theory on how stakeholders manage decision-making in general construction projects [Yang et al., 2014]

3. Challenges that are often encountered related to the decision-making: This question was posed to make a distinction between sustainability and non-sustainability related challenges. As the decision-making process is often chal-

lenging with, or without inclusion of sustainaility [Gareis et al., 2013; Wang, 2021]

4. Whether authorization is often required, potentially delaying on complicating the decision-making process: This question also related to general management of projects and how that involves several stakeholders, throughout the process [Klinger and Susong, 2006]

5. How sustainability is encountered and perceived: This question was to understand the perception and understanding of sustainability, as sustainability is often given several meanings and ones perception and understanding can influence ones experiences [Jacobs and Stott, 1992; Kuhlman and Farrington, 2010; Silvius et al., 2017]

6. Experience with sustainability inclusion: This question was to build upon the understanding of sustainability by starting the conversation on how practitioners encounter sustainability in practice [Gareis et al., 2013; Schipper and Silvius, 2012; Wang, 2021]

7. Management of and drive for sustainability: This question focused on understanding to what extend practitioners push for sustainability and to what extend they have the opportunity to do so [Baba et al., 2021]

8. Intend & outcome misalignment: This question helped the understanding of the extend to which sustainability ambitions are also achieved in practice [Pinelli and Maiolini, 2017]

9. Challenges of sustainability inclusion: This question was to steer the conversation towards their experiences on including sustainability and what they consider as reasons for excluding or limited including sustainability.

10. Sustainability drivers: This question was to hear about experiences of projects in which sustainability was part of the ambition and what frequent reasons for those ambitions are [Silvius et al., 2017; Pinelli and Maiolini, 2017]

11. Influence leaders: Projects are initiated and owned by organisations, which have higher management or leaders at the top. These leaders are often not directly involved in projects but they can have influence. So this question focused on how practitioners experience the influence of such leaders and how they can potentially drive the transition towards more sustainability inclusion [Winston and Patterson, 2006; Sarabia et al., 2020].

12. Ecopreneurial leaders: This question focused on the leaders involved in organisations and whether they only focused on financial benefit or also on sustainability as a focus point in itself, as well as to what extend practitioners experience this as an influence [Schaltegger and Wagner, 2011].

13. Earlier inclusion of authorized leaders: To challenge the earlier input on the influence of leaders and potential of ecopreneurial leaders and consider the benefit and feasability of including leaders earlier on in the project process [Schaltegger and Wagner, 2011; Winston and Patterson, 2006].

14. Additions: This final question was posed to round up the interview and give the interviewees the opportunity to add anything. this also had the purpose to ensure they stood behind their statements.

4.3 CODING FRAME

As explained in Section 2.2, the analysis of interview data are performed according to the QCA approach. This method entails several steps, during which material segments are assigned to main and sub-categories of the coding frame [Flick, 2014]. The first step was preparing the data, which entailed transcribing the 16 interviews, familiarizing with the data and highlighting the "quotations"; segments that contained information relevant for this research. This first step resulted in the creation of 257 quotations. The second step was organizing, or describing the data, which entailed assigning codes to the quotations. Describing the data by coding is done to enable retrieving data segments by topic or subject in a later stage, to group them [Friese, 2019].

Code creation was done in a data-driven way using a subsumption strategy, which implies going through the quotations one by one following four main steps [Mayring and Fenzl, 2014]. These steps are:

1. Summarizing the quotations, by reading them and assigning them to concepts or ideas.
2. For each quotation reviewing whether a code that covers its concept or idea has already been generated.
3. If a code exists, adding the summary of the concept or idea to that code, if not, generating a new code that covers it.
4. Repeating the steps until all the quotations are summarized and assigned to a concept, and a list of codes is developed covering all the concepts or ideas, considered relevant.

The outcome of the coding process was a total of 266 codes. While the coding process was done in a data-driven way, the code groups were developed in a concept-driven way, so they were based on theory and knowledge from prior research [Schreier et al., 2019].

4.4 FINDINGS

The results of the coding process is a total of 40 open codes, each covering the content of multiple power quotes and proof quotes. These codes were assigned to 10 code groups, or axial codes, who jointly contributed to answering the two main research questions.

As has been shown in the coding pattern in Figure 2.3, several axial codes represent factors limiting the inclusion of sustainability in multinational construction projects and several axial codes represent factors that are required to provide opportunities for inclusion of sustainability in multinational construction projects. Two axial codes are partially a barrier while also being partially an improvement requirement as it shows that they can have a positive contribution to including sustainability, when the use is better safeguarded and they are improved. In this section each of the axial codes are substantiated with "Power quotes" and "Proof Quotes". Each quote is supported by mentioning the interviewee number, this has been done to prove that similar quotes came forward in different interviews.

4.4.1 Unawareness

In organisations and among the people involved in the process of projects, awareness of sustainability is insufficiently present. So, the lack of awareness, of the urgency for sustainability inclusion, the meaning of it, the possibilities for it, and what

is demanded when speaking of sustainability inclusion, is a barrier for including sustainability initially and maintaining the inclusion throughout the project process. As this results in less consideration of sustainability, and lack of management of sustainability, thus less inclusion of sustainability in the final construction projects.

As quoted from Interviewee 4 on lack of consideration :
"If the client doesn't consider it, then it's just not going to happen,"

Quoted from interviewee 1 on lack of awareness of what is demanded:

"We go from very high up to more and more detailed. So we start with the little information we have, and we need to work towards a final product that satisfies the requests of the client. And we manage along the way non-stop the aspects of money, time, quality and planning, so that everything stays clear for the client. To ensure it remains clear for each phase what that phase has delivered on those aspects and that it is continuously aligned with the plan in place."

This awareness is crucial for achieving sustainability inclusion, so this makes unawareness a major barrier for sustainability inclusion, regardless of the front on which awareness is lacking. Awareness thus needs to be created on all sustainability related aspects, to enable more ambitions for sustainability inclusion, as well as more achievement of those ambitions. As also stated by interviewee 7:
"We are in a transition, aren't we? So we also have to make this transformation, so it is very important that we also create a lot of awareness within our organization. And that we will also make project managers aware of the fact that these advisors have to step in and not just the standard advisors and this is actually possible on any project."

Awareness is also not something that can be created later on in the project process. It is crucial that it is present in the initial phases of the project, as developing sustainability ambitions throughout the process instead of early on, reduces the possibilities and opportunities. With interviewees 2 and 6 stating:

"Over the course of time, decisions have continuously less influence, so at the start of the project, you actually do most of the decisions, with the most impact, with the least amount of information."

"Sustainability has to be at the start of the conversation. It cannot be right in the middle or at the end, because again, it is too late to do so much, it can't happen in the end."

So this awareness needs to be present to even consider sustainability, and it needs to be present from the start.

The awareness of sustainability is mainly lacking on the significance of including it, what it means, what the possibilities are and what is demanded when aiming for sustainability inclusion. This lacking awareness of the significance results in including sustainability as an add-on, instead of as a main factor, incorporated within the project. This was also stated by interviewee 4:

"Normally we don't think like for example, let's not use concrete because that is better with the environment...Normally we will just think of what can we add on top of what we're doing to make it more sustainability."

There is also a lack of awareness on what sustainability means, so what is meant when talking about sustainability, and what it entails, so the requirements, such as the resources required. This results in wrong interpretations or different interpreta-

tions. Which was also quoted from interviewee 6 and 1:

"There is perhaps one component here of how people understand sustainability and therefore project managers understand sustainability. The way how I see project managers and construction work is that they have to be efficient and cost effective and whatever corner they can cut on one side, they can add it later on in the stage where its going to be needed, which is almost at the end. And there is a lot of failures I have seen that. So sustainability ranks very low because they might think, I have to rethink the whole process I have, I can not work with these materials. This is going to cost me a lot of time. People are not trained to work on this."

"There was a mismatch in that we had it clear that there was a sustainability ambition, but we couldn't precisely explain what that ambition was"... "And then the people that were working it out for us, were thinking from the limitation of return of investment, and then you notice that you don't have the same premise for sustainability in the design of the building"

A third and fourth point on which the awareness is lacking is what is possible, so how sustainability could be included and what organisations want, not due to wrong interpretations but due to lack of knowing what sustainability actually means so what they want when claiming to want sustainability. This was also stated by interviewee 4 and 11:

"Maybe it's my own lack of knowledge, I wouldn't know what I could do to make it sustainable... I don't know what I can do or maybe what I should be looking for or what I could be proposing."

"In practice you often see that they as an organization don't know what they want. Sometimes they don't even know what each others role and responsibility within the steering group is."

So due to lack of awareness, sustainability is included as an add-on, sustainability is considered but disregarded later on, or not considered at all. Overall awareness thus needs to be created on how sustainability can be included, what needs to be done to include it and how it can be ensured that everyone has mutual understanding.

Instance	Proof Quotes
Significance	"In the method of working from high up to detailed are also choices you can make in the beginning. Those can be influenced quite easily, but as you continue the decisions become more difficult to influence and more costly" (Interviewee 1)
	"It is like we should have foreseen this as well. But kind of our thought was like oh you didn't tell me, so I didn't think about it." (Interviewee 4)
	"Even if money wouldn't be a problem, because money is most of the time universally a problem, a constraint, even if it wouldn't be a problem, then it comes to the knowledge, to the awareness of the real internalization of the significance of sustainability. Most of them are not trained for that. They are trained for making strong structures... Many times the decision maker doesn't have that knowledge." (Interviewee 6)

Table 4.1: Proof quotes for Unawareness of the significance

Instance	Proof Quotes
Meaning	"We do encounter difficulties regarding the decision-making, a lot of times what happens is what they're asking for, we will interpret it as something else." (No. 12)
	"Pretty hard to think about it because I don't know what do I need to think about." (No. 4)

Table 4.2: Proof quotes for Unawareness of the Meaning of sustainability

Instance	Proof Quotes
Possibilities	"So sometimes we exclude sustainability because we don't know that it's there, we just don't know what they need to do." (No. 4)
	"The main barrier is that they don't know about sustainability, so that they are avoiding these kind of conversations because they don't have background, they don't have even the vocabulary sometimes to approach the topic." (No. 9)

Table 4.3: Proof quotes for Unawareness of the possibilities

4.4.2 Change

As has been mentioned throughout this research report, the construction industry overall and construction projects, need to become more sustainable, thus change needs to happen. But, change in itself, can be a barrier, as not everyone appreciates change. Which was also mentioned by interviewee 6 :

"So that is the reluctance to change, and those are the misconceptions that you might think it requires more time, it might be more expensive and all that....But there is also just reluctance to change like, I don't trust this."

This hesitancy stems for change being linked to uncertainty, something that organisations and project managers, often want to prevent, as they associate this with challenges and a potential threat for the project performance. Because changes happen all the time, due to the dynamic environment of projects, which is what management of projects focuses on; managing several aspects continuously and deal with changes that affect these aspects. This was also stated by interviewee 11, 10, 4 and 16:

"We often manage based on the GROTIK aspects, so that is money (Geld), risks, organization, time, information, and quality (Kwaliteit). And those also correspond with each other, so those 5 aspects, or sorry, 6 aspects, often are those triggers due to which you can come to scope changes."

"I think that is quite an issue with the network happened to kind of explain it to them that every day it's such a booming industry, that every day they come up with new data and new materials and things like that. And for us to assess them and give you good value, you need to constantly flush in that money as well, of course, so we can sort of give you that input."

"Then we need to review the cost for example and then go back to the client and say, hey, we are noticing the costs were going higher because this and this and this and this is what shall we do. Let's make a decision together. Do we implement changes, do we change materials?"

"I would say of course on the construction during the construction, little decisions are already made. So I would say in there, the freedom it's well, you stick to what you designed but but of course we start with the design where there's a lot of interest iterations, we have input from different stakeholders. So wherever it's a very long process. Because we wanna

Instance	Proof Quotes
Demands	"In practice it shows that it is very easy to set very high sustainability ambitions, but in that phase, it is sometimes difficult to estimate the financial impact of those, those sometimes become clearer later on, which can result in costs increases and then sometimes it is decided to reduce those ambitions." (No. 1)
	"When you're really at that ground level, sustainability is really the least of your concern. Like why should they do it you know? And that's yeah because it also doesn't have to be just material or change the way you build, it can just be things that you do on site as well, just the overall process of construction as well, and that awareness maybe is lacking somewhere." (No. 10)
	"The multi-criteria analysis actually just hasn't been filled in entirely, because you then well in the early phase haven't judged a certain aspect, and when you figure that out too late, well then I can't think of an alternative anymore, or the budget is already set and then there has to be said no." (No. 2)

Table 4.4: Proof quotes for Unawareness of what is demanded

make sure that the all the stakeholders provided their input and we have all the information from them that sometimes when we go to construction and we have somebody coming in and saying like ohh by the way, I actually for my equipment this, this, this and that. So that's the one we say. Well, that was like few months ago that's very we needed the information and he of course we are flexible because if they need it then as long as we can still provide it, we'll try to accommodate the the requirement. So I I would say because of the character of Nike where dynamic and the amount of stakeholders you have to stay flexible."

So, change towards more sustainability, is seen as a challenge, an additional complication for project management, instead of a main management aspect. This means that sustainability is often not included, or reduced later on. Because when scope changes thus happen, sustainability is often one of the first elements at risk of being reduced or excluded, either due to lack of support, or due to it being the easiest solution for overcoming challenges with resources. This also came forward from the interviews with interviewees No 7 and 11:

"Sometimes it is also difficult for them, because you can not always foresee every potential consequence. And that is not nice, because perhaps it is going to cost a bit more, but as I mentioned it will always add more value in the future, but we don't always express everything in terms of money, so the image isn't complete."

"Meanwhile it is for the people in operation, in the execution, often very difficult. Because, how are we going to jump over that incredibly high threshold of sustainability that is imposed on us. So they will say, yes, if we can take turns somewhere, then we can execute more easily, or then maybe we have more money available for other things in the project."

So, change needs to happen, but positive change, so change of behaviour, organisations, operations, a full transition, which also requires a mindset change, as mentioned by interviewee 6:

"If a project is not intended to be sustainability driven, it is very difficult to steer it, to change it. And again, its not just dictating just a couple of hours to it, no it is to work sustainably, and sustainable processes and sustainable products requires a lot of mindset change."

To enable this, change needs to be managed, not how it usually is managed in projects, but managed in how people deal with changes, how to align people on

including and maintaining sustainability in and throughout projects. With interviewee 7 stating:

"But how do you cope with that within an organization, and what impact does that have on management and maintenance? And what if we want to store those things ourselves and how? So the transition is not only on how to build a circular building, no it also has impact on the entire asset management, on the entire establishment matter."

So, change needs to happen, but it won't happen if it is not managed properly and if it remains to be seen as something negative. Otherwise, people prefer to continue doing things how they are used to doing them, as that is less uncertain and familiar. With interviewee 12 and 16 stating:

"The other challenge I see with these industrial type projects for multinationals is time is always under tremendous pressure and a lot of times the client or the project owner they typically don't have big appetite for experimenting with new things on such a project because this project is part of a whole portfolio or a whole program. It has to be up and running by a certain time, it's got to be predictable, you know, it's got to fit into a very specific frame of timing, cost requirements, deliverables, other criteria, so it's not that they aren't open to trying things, but those things have to be already tried and proven."

"We're not gonna use anything else because we know that this one works. This what has been approved by Nike. We know where it comes from. We know the sourcing and everything. So. Same with certain furniture. We know that we're gonna go with this producer because we know how they are sourcing and so they're just things like ohh we do it this way because already somebody has established it before. So maybe it's also because I just don't six months ago that I just like hey, I work with the tools that are already there."

To conclude, change is a barrier, as sustainability is not one of the main aspects that is focused on during project management. This makes sustainability the easiest aspect to do concessions on to compensate for changes affecting the main aspects. The opportunity is often taken as people are not eager to divert from standards, and sustainability does require a diversion from the standards. So, change is a barrier due to three factors: Firstly, the absence of internal change: when its needed, the mindset, the organisation. Secondly, the presence of external change: As it can reduce the ability or willingness for sustainability inclusion. Thirdly, the approach to change management, as it focuses insufficiently on sustainability, how to maintain it and what it brings about.

Instance	Proof Quotes
Management	"Also, just very simple, change management. How do people cope with the changes the project brings about? How do you ensure that people accept the end result?" (No. 11)
	"I think another challenge that comes with it is change management, basically putting everyone up to the same." (No. 4)
	"We go from very high up to more and more detailed. So we start with the little information we have, and we need to work towards a final product that satisfies the requests of the client. And we manage along the way non-stop the aspects of money, time, quality and planning, so that everything stays clear for the client. To ensure it remains clear for each phase what that phase has delivered on those aspects and that it is continuously aligned with the plan in place." (No. 1)

Table 4.5: Proof quotes for Change management

Instance	Proof Quotes
Absence	"Sustainability does not always bring money, it brings different type of intangible benefits and that's very difficult to link to KPI's. And if it's not measurable then they don't, they cannot manage it and then they get confused. Or, it's not an incentive." (No. 6)
	"If we continue with the behavior of acting as if everything is limitless, then you can make the most amazing models and promote those, but then sustainability is not going to be achieved." (No. 3)
	"The client also should get a different mindset, which he doesn't get at once, so the strength lies in repetition." (No. 7)

Table 4.6: Proof quotes for Change absence

Instance	Proof Quotes
Presence	"It requires a lot of changes in processes. It requires a lot of changes in supply chains and pretty much on business models. And not all companies and individuals are ready for that change yet." (No. 6)
	"What you often see is that the market, materials, staff capacity, that they interfere. Inflation, scarcity of products, logistic obstacles." (No. 11)
	"Depending upon the level of impact that a given decision has, usually money related, it can require escalation to other people... The challenge that comes with that is sometimes when the escalation happens to the next person, you're bringing in somebody who hasn't been as close to the topic of discussion as yourself and the other person. So you have to catch them up, which is OK but then what happens is, you need more time. So time is going by and you're not making benefits but also you're now bringing in another set of perspectives and sometimes with more decision making power, and what can happen is the requirements might actually be readdressed." (No. 12)

Table 4.7: Proof quotes for Change presence

4.4.3 Alignment

Part of standard project management is not only coping with change, but also continuously ensuring everyone and everything is aligned. Alignment is thus also crucial for sustainability inclusion. But, as has come forward, sustainability inclusion is not a standard yet, which makes the absence of alignment a large barrier for achieving sustainability. Without alignment, knowing that sustainability should be included, will not result in including sustainability. Interviewee 9 also explained this:

"Knowing and doing are the best and the worst enemies sometimes. I know I have to do it, but I don't know how to do it, so I'm procrastinating the whole time and also the system, it is a cost, it has to be embedded in my PNL, profit and loss, so at the beginning it is only seen as a cost. Sometimes its seen as an investment. But in the end, you don't see immediate results they submitted, doesn't provide short term results. Of course, you can have some low hanging fruit, but its more sustainable development and it means long term strategies, it means long term commitment."

To aim for inclusion of sustainability, and also to ensure this aim is achieved, organisations need to become mobilized, to ensure everything and everyone is aligned on the sustainability ambition. This thus requires alignment on several aspects. Firstly, alignment of actions, so the actions need to be aligned with sustainability inclusion, to ensure this ambition can become a reality, secondly, stakeholders, without support and consensus from stakeholders, no decisions can be made, thirdly, expectations, everyone's idea of the project, so what is expected when agreeing on something, needs to be aligned with what is possible, and also the same should be

expected among the involved parties, finally, resources, if the resources (made) available, are not aligned with the demanded or aimed level of sustainability inclusion, then it won't be possible. This also came forward in statements from interviewee 4, 1 and 10:

"I think the way that I experience it, where I have the most challenges is scope demarcations, there is a way that we understand what we're doing and there is a way that they expect the deliverable to be or there's their expectations and there is our expectations. And then I think at the beginning of the project, we don't have so much time for clarifying exactly what is it that we're delivering, exactly what is it that they expect to receive."

"The main challenge is deciding how to achieve the requests and ambitions, because sometimes people involved are not aligned or the resources are insufficient to achieve the ambitions, causing conflicts. This sometimes is caused by insufficient leadership from the client side, and can require higher up leadership involvement, so getting them on board."

"People can care about like sustainability and the environment on an individual level, but if your company is not aligned with the same thinking, even though they say so, then it can be really hard also to find that balance, because then you're limited with what you can do."

This is partially because without organisational support, the resources will be limited, either because the budget is to limited or there isn't enough time for example. Alignment is thus essential to enable sustainability inclusion. Which was stated by interviewee 6, 4 and 12:

"Projects are not meant to take time and reconsider things, not they are meant to start one day and finish the other one, and if they have delays, somebody has to pay for that."

"I think the biggest challenge is money, I think or investment costs. . . so its always a little mismatch on their own end, that they want to do it fast, they want to do it cheaper and they're thinking about the initial investment and a lot of times, they're not thinking about the operational investment."

"But then, quality of information about, OK, how does this solution actually work and where does it actually fit into our supply chain. . . .Show me data, show me financial data about how much it actually costs. . . So having more information, higher quality information and strong leadership will definitely help out, that's all got to be aligned."

Instance	Proof Quotes
Ambitions and actions	"If you have not included in your real estate strategy your ambition that this is an important point, then it remains a lot of chit chat without actions." (No. 7)
	"A lot of the companies, the way that I see it, this is a high management decision and I think that happens with other companies as well, it's a high management decision but to the day-to-day employee it's a bit hard to translate." (No.4)
	"If you haven't linked it to the organizational objectives, it can disappear very easily, and then it is more difficult, or more expensive, when you pick it up later on." (No. 5)

Table 4.8: Proof quotes for Action nonalignment

Instance	Proof Quotes
Stakeholders	"When it comes to applying it in the real world, you have to take into account that a lot of people have to be aligned and brought to the same table." (No. 1)
	"There are some clients that have an approval process in which a lot of different stakeholders have vote. And the problem is when not all those stakeholders are involved from the start, then sometimes later on in the process there come demands or wishes to the table, that we just can't implement anymore. So stakeholder management at the client side is very important for an effective process." (No. 2)
	"There are of course the first agreements that have to be written down by both parties, and some clients understand that, while the other client might be less organized, or there might be a lot of people in the steering group who all see themselves as partial client, and you see that they are not aligned" (No. 11)

Table 4.9: Proof quotes for Stakeholders nonalignment

Instance	Proof Quotes
Resources	"But it's often really limited by how much money they can spend, and I think that that balance is not really out there in the industry at where you can get your Schmitz building, and still make it sustainable. And that's where I think sustainability ends up taking a hit." (No. 10)
	"So they have only freedom within certain boundaries, especially financially, that have been set, and that is where you often encounter problems, that those boundaries just don't fit." (No. 2)
	"I think we have very structured approach to the project scale. So depending on the project budget, basically it's budget related. So up to that budget you need only approval from let's say one or two level above you then next budget would goes up. So we try even purposely to keep the project under certain thresholds because that just makes things easier. So if you have the estimation for like slightly over the that budget you say OK now we have to find. To bring it down just under that line, because that will make everybody's life simpler" (No. 16)

Table 4.10: Proof quotes for Resource nonalignment

4.4.4 Incentives

Decision-makers are performance driven. So, they have several incentives on which they base decisions. These incentives are Data, risk mitigation, compliance, costs, benefits and image. So as long as these factors are not showing the benefit of sustainability, then it won't be considered, thus these incentives will remain a barrier. In practice, some ecopreneurial people are present. These are also incentivised to think outside the box and with a more sustainability oriented focus. However, often doesn't enable enough incentives and support from others and leaders, as they need to run entire operations, which requires them to be performance driven. So these leaders require proof of benefit before going for sustainable options. As was also mentioned by interviewee 12 and 6:

"I would say, for the level of people that I've been exposed to the most over my career, are usually the operations leaders and the business leaders for individual branches or groups of factories and things like that. So most of them are usually performance driven, like they have targets that they have to hit. Not just to make money and keep themselves going, but to really stretch and grow and get better in all things, performance efficiency, sustainability,

environmental impact, everything. So most of them are performance driven. But also for their position, they have to be, because they're in charge of running whole operations, so they rely on people who can really focus and do the research and set good targets for those leadership people to execute and at the same time I have also worked with people who research and set the targets, and I think to do that job well and enjoy it you have to have that kind of mindset of ecopreneurial, you have to be thinking well outside the box, not constrained by operations nor constrained by money or legality or politics or whatever, but really about what is possible, what is the right thing to do and how far can we really push it?"

"Sustainability does not always bring money, it brings different type of intangible benefits and that's very difficult to link to KPI's. And if it's not measurable then they don't, they cannot manage it and then they get confused. Or, it's not an incentive."

So, as has come forward, decisions are made with as much certainty as possible, to mitigate any potential risks. This is required for leaders as they can't risk the operations. So the more unknowns an option has, the less likely it is that that option will be selected. This was also mentioned by interviewee 7 and 3:

"Sometimes it is also difficult for them, because you can not always foresee every potential consequence. And that is not nice, because perhaps it is going to cost a bit more, but as I mentioned it will always add more value in the future, but we don't always express everything in terms of money, so the image isn't complete."

"I think there is only one bottom line, actually only one type of driver, that is that we don't enforce it, it's not going to happen."

That decisions are made based on the investment vs return of investment. So with the focus on comparing investments with the added value. The result of this is that when benefits are not visible, not backed up by data, numbers or other proof such as examples, the investment won't be made. As is then is a gamble they are not willing to do. Interviewee 5, 6, 10 and 13 stated about this:

"You always need to be able to reference everything you do to how it benefits the organization and the goals and benefits that they have, and then only the organization but also their context. If you can't refer your decisions to that, then you're on drift sand.... If you do that, but you don't know why or how you can link that to the organization goals, then that decision can easily be written out later on."

"The standards are also being used like, ok, this is my medal of honor, and now this allows me to just flaunt it how good it is, while the standards are not perfect at all."

"So I'll be awfully brutal here. It is definitely. It's not one of the requirements. It is like one of the requirements and they have really stringent requirements sometimes put what they want to do because a lot of it is like related to, you know them getting approvals. The municipality saying, yes you can go ahead with this project. So there is a driver behind it. How it also reflects o their company."

"So that is also often a driver, budget, so bankability of sustainability... So we seek the shared interests between funding and developing, which we called the tripe value... Banks should start to see that sustainable objects become more valuable over time and more profitable, because they get reused. "

Instance	Proof Quotes
Data	"There has to be enough reason for everybody, who needs to be at the table, to get some skin in the game and keep working together... To really back it up and follow it through, we need to have real world proof of it actually happening and not just one or two instances, but it needs to be happening everywhere. " (No. 12)
	"You can't get EPDS, which are environmental production data, or something like that, that come with every material.....So if I was to tell someone to replace the rooftop with something else, I have nothing quantifiable to show them and then how do I convince someone, because there's just no data out there." (No. 10)

Table 4.11: Proof quotes for Data as an incentive

Instance	Proof Quotes
Risk Mitigation	"It is also a question of training finance people because you have to reflect these costs from a sustainability point of view. So it is not only the business activity of the company, it is also how the company is impacting environment and society and you have to be able to measure this impact to allocate this costs or impact in your PNL or in you risk assessment." (No. 9)
	"The other challenge I see with these industrial type projects for multinationals is time is always under tremendous pressure and a lot of times the client or the project owner they typically don't have big appetite for experimenting with new things on such a project because this project is part of a whole portfolio or a whole program. It has to be up and running by a certain time, it's got to be predictable, you know, it's got to fit into a very specific frame of timing, cost requirements, deliverables, other criteria, so it's not that they aren't open to trying things, but those things have to be already tried and proven." (No. 12)

Table 4.12: Proof quotes for Risk mitigation as an incentive

Instance	Proof Quotes
Compliance	"The second one is that our project managers and also designers and engineers, there are enough people that say, yes but it isn't legislation yet, and they only do what must, and they don't cross or exceed that." (No. 5)
	"Some just want to comply with laws and regulations and don't really feel the need to put more money into it than necessary" (No. 2)

Table 4.13: Proof quotes for compliance as an incentive

Instance	Proof Quotes
Finance	"In my experience, finance has always been the decision-maker." (No. 10)
	"I'm not going to say that it's limited, but all the infrastructure is there they all we're always opt for the I don't know. I think the cheapest solution. And they already took the decision." (No. 4)

Table 4.14: Proof quotes for finance as an incentive

Instance	Proof Quotes
Benefits	"The alternative would have been profitable, but no, they wanted their office building there and weren't prepared to invest in more sustainability than they needed for their own benefit." (No. 13)
	"We do have like the options, but the implementation cost versus gain is something that we don't have just yet" (No. 15)

Table 4.15: Proof quotes for Benefits as an incentive

Instance	Proof Quotes
Image	"So you have to adapt your offices, you have to adapt the way you look, your stores, your showrooms. So it needs a very often refit that is not driven by the fact that the office is outdated or something really needs repair. It's just that well. The passion change the the way we approach this, our clients change the strategy of the company change so you're Adapting something that was maybe renovated four years ago, again so on what that that site, let's say this is maybe not the most sustainable approach." (No. 16)
	"The standards are also being used like, ok, this is my medal of honor, and now this allows me to just flaunt it how good it is, while the standards are not perfect at all." (No. 6)

Table 4.16: Proof quotes for image as an incentive

4.4.5 Constraints

Experiences of practitioners explained that one of the barriers for the inclusion of sustainability, is the presence of constraints. Which are factors constraining the possibilities for inclusion. This was also explained by interviewee 2:

"Sometimes you need a very long breath to achieve things. It can occur that when you have explored the possibilities and then conclude that its not possible, that you have to wait for a new project or innovations in the technique because the stakeholders aren't ready for it yet. So you sometimes have to come up with a lot of proof and arguments to say clearly like these are all the limitations for everyone and to take those away, to get everyone on board."

These constraints can be divided into Four types, (1) market constraints, meaning the market is just not enabling enough opportunities or enough stimulus. (2)

Resource constraints, meaning the resources required for including sustainability (more) are just not present sufficiently. (3) Power constraints, meaning that the people aiming for sustainability inclusion lack the power to do so. (4) Expertise constraints, meaning there just isn't enough expertise, so knowledge and experience, present throughout the project process, to achieve sustainability inclusion. These different constraints were mentioned by interviewee 6, namely budget constraints, interviewee 11, mentioning market constraints, interviewee 10, mentioning multiple constraints and interviewee 1, mentioning power constraints:

"So it is budget, it is the availability of materials that perhaps there are very little options, and the disconnection between design and implementation, even if a designer will design something with lets say wooden beams, then it comes to that the client actually wants a high rise building and this is not possible to embed it, so we have to go back to steel. So kind of that mismatch of the intentions and reality is also another thing."

"Those are things you are now confronted with, that not everything is common good yet, in terms of the high sustainability ambitions, not everyone has set up their business operations and their network of sub-suppliers for that."

"So, it's like there is the corporate ambition and the money and time. But there's also that the sustainability industry has not progressed and if you take concrete as an example, like how many years that we've been working with concrete."

"What you also see, is the level of trust. You see that a lot is involved when constructing a building, and there are a lot of details, so if you then have to report on that, about the progress and also the extend to which sustainability is being considered, then often for the top-level management, it is being brought back to an abstraction level quite broad, even though that sometimes detracts what is involved."

The fourth element, constraining the possibilities, is the lack of expertise available. This expertise absence is also linked to the other constraints, as they each make the impact of the other constraints higher. Without expertise there are less means to influence people with power, to enable sufficient resources and to find executors on the market that are able to execute sustainable projects. This also came forward in statements from interviewee 9 and 11:

"People that we are talking to in our clients and this is a disadvantage because normally our people, our engineers, they talk to mainly technical people. So they don't have access to sustainability managers or decision making managers within sustainability field. So they are either commercial people because our bids, our account manager, they talked to commercial people in our clients. So sometimes they don't have any access to the right people, and this is something that we are trying to force. How can we get the right people to the table? We need people with power, with enough power to make decisions and we really want to have this kind of conversation with people that are making decisions to inform them and to help them to make conscious decisions."

"On the side of the execution there are often companies that have less domain knowledge... So some market parties say yes but such a high ambition, we can do some, but we cant do everything and we don't have the network yet to do that. So not every market party is suitable to join at the highest level of ambition. "

So to conclude, four types of constraining factors are present during project management and also throughout the project process. As they influence the affect of each other, it is crucial to overcome all constraints, but already very beneficial to overcome or limit the presence of one or several constraints.

Instances	Proof Quotes
Market	"Or when such a high ambition is set that it has never been tested in the market at all. How can you get this feasible at all?" (No.11)
	"I don't see a lot of major innovations that are also cost effective that we can use on multinational projects like that." (No. 12)

Table 4.17: Proof quotes for market constraints

Instances	Proof Quotes
Resource	"I always see the assignment as a puzzle, and it never fits, because there are always more ambitions, than what is possible for the available budget. So you always have to compromise. And the biggest challenge is when the client asks for very contrary things, that are technically impossible... the second challenge is when we say it is all possible, but not within the budget, then I need to prioritize as well, what is more important for him?" (No.2)
	"So one is the material. The other one is resources, because I think you're well aware that right now the contractors are in a very good position like the market is still very hot. I know it's been hot already for I know a few months, maybe even a few years. It is a, it is still a reality. So you see that they are not pushed to lower their prices because they know they will have work and you are in a tender when they say well actually you have to make decisions over you want us or not because we are running free our 10 there's at the same time and if you don't appoint us the work we'll go somewhere else, so it's quite competitive also to get good partners, yeah." (No. 16)

Table 4.18: Proof quotes for resource constraints

Instances	Proof Quotes
Power	"If you are the constructor, and you want to steer towards one thing, you can propose it. You can work very much, you can have the supply chain in place, but if your employer doesn't want it, the one who pays us, then that's it." (No. 6)
	"Depending upon the level of impact that a given decision has, usually money related, it can require escalation to other people... The challenge that comes with that is sometimes when the escalation happens to the next person, you're bringing in somebody who hasn't been as close to the topic of discussion as yourself and the other person. So you have to catch them up, which is OK but then what happens is, you need more time. So time is going by and you're not making benefits but also you're now bringing in another set of perspectives and sometimes with more decision making power, and what can happen is the requirements might actually be readdressed." (No.12)
	"And in all honesty, the decision of the sustainability for this type of work is that I'm working on at the moment they come from the client side. Normally the decision is already made way before we come into the table. And we are trying to push this behavior to change and we're trying to position our own sustainability in there a bit more. But for a project they will already hosted the design the define themselves, because they have already their own sustainability target." (No. 4)

Table 4.19: Proof quotes for power constraints

Instances	Proof Quotes
Expertise	"I'm lacking experts in sustainability, of course, and experts in business management. Because you really, the financial also needs to understand what the client is saying, to understand how you can help them in a different way, so you really need to have some structure about how a business works." (No. 9)
	"I think where the issue lies currently, is what delays it, is that we have to many people in the design teams that are very good in one area.... but they can't provide a more holistic concept. We only have a few of those and then you notice that such a design takes more time, and we cannot provide that effectively and efficiently to the client." (No. 5)
	"Meanwhile it is for the people in operation, in the execution, often very difficult. Because, how are we going to jump over that incredibly high threshold of sustainability that is imposed on us. So they will say, yes, if we can take turns somewhere, then we can execute more easily, or then maybe we have more money available for other things in the project." (No. 11)

Table 4.20: Proof quotes for expertise constraints

4.4.6 Vision

When the vision of people with decision-making power, leaders, is not in favour of sustainability, either due to focus on financial benefit and being ignorant for environmental benefit, due to the focus on being as much risk averting as possible, so non-innovative, or due to the focus being solely on short-term benefit and not on long-term benefit, the vision functions as a barrier. As the environmental benefit or the financial benefit of sustainable options and constructions, are often uncertain and present in the long-term, not short-term. This causes projects to include sustainability only to the extend that is required, or enables the appearance of sustainability, such as with sustainable add-ons. This came forward from statements from interviewee 7, 9 and 5:

"From the business community and especially from the industry, that incentive is even less. There it is also more on the window dressing, so the problem is that there is not yet felt in all those board rooms the urgency to really take big steps here now and that starts with a vision and an ambition".

"So it's something that has to get some internal buy in and this is the question of being influencing but also open minded to make it happen because if there is no policies, if there is no real commitment, if there is no understanding of what this systematic entails, the company is not going to embed sustainability into the corporate strategy and this is instrumental."

"People are often focused on the assignment in front of them, for that year of perhaps also the second year, and that might be part of ecopreneurship, that you look a bit further across the horizon, and see how you can bring that into the world of today, because only having dreamers is also useless, but yes that means that also our project managers in such teams, so having professional, that are also open to ideas and that they say, before we start, lets first review the program of requirements to see whether it is future proof."

When leaders are focused on mitigating risks as much as possible, and want to follow innovations instead of initiating them, sustainability also remains limited. As sustainability inclusion comes with uncertainties, requires a transition, and requires innovative, because the current approaches don't enable sustainability enough. This also came forward from statements from interviewee 12, 1, and 6:

"When considering how to make being innovative more attractive, it's all about the perception and the mitigation of risks. So the first one to go through the gate, always gets beat

up the worst, but the one who follows him, he has an easier time so when you're on the global stage with these big multinationals unless they have a very high tolerance for risk and they have really deep pockets to cover it up and not worry about it in case something does go wrong nobody wants to be the first one through the door. They wanna wait and see. OK. Somebody else tried this. This is what happened. Let's look at the data and let's figure out if this makes sense for us. Especially nowadays where everything is more expensive. Supply chains are tighter. There's more disruptions out there. The people who are willing to take the calculated risk and not lose too much, they could potentially gain a lot. They might go for it. But if the risk reward is more even or more shifting towards greater risk and not as good a payoff, they're not gonna have too much of an appetite for it."

"As clients, you might have two types, you have the accountants and the believers, and the believers they make an internal connection from personal motivation and drive... they are people often not difficult to convince. With them its more about how can I facilitate those people in an optimal way so they can convince their internal network to provide the resources. With accountants they are approaching it in a business case kind of way, so you have to prove on the one side the benefits, and those are complicated because its difficult to express the benefits in terms of money which is something you often end up with, costs are quantitative, while the benefits are qualitative, which makes them difficult to convince."

"Sometimes clients are the ones that want the high mark, they say no I want this certificate. I want to look into my adversity and this and that and then the story changes, because i'm just following the client. The client sometimes has such high UMA standards of sustainability, and not just, environmental, but also social and governance, and again, the client pays you, we just have to follow and even learn from them."

So, the vision needs to be noticed, approached suitably and managed properly. As different visions require different approaches and not all visions and type of leaders are suitable for all opportunities of sustainability inclusion.

Instance	Proof Quotes
Ecopreneur	"I have worked with some of those people before, but for me, they are less common than the people who are operationally in charge." (No. 12)
	"The people I work with have this to a large extend. Yes, they have broader scope on that more has to be measured than just costs... But that is then I think at this moment because I am involved with a client who is unfortunately not decisive for the market. " (No. 15)

Table 4.21: Proof quotes for Ecopreneurial vision

Instance	Proof Quotes
Type of organisation	"In my understanding, the very high tech developed companies, they have that profile of innovating... they tend to adopt this because they are the ones that, perhaps see a niche market, and they want to be there, but for the rest of the construction company, so the builders or whatever, they just want to do the traditional thing." (No. 6)

Table 4.22: Proof quotes for innovator vision

Instances	Proof Quotes
Type of ambitions	"Its two-sided, either companies want to comply with the legislation, so its mandatory, so they have to do it, there is no more procrastination. Or they are taking voluntary actions just to be ahead of the game." (No. 15)
	"Some have certain corporate ambitions for sustainability, entire separate from the laws and regulations" (No. 2)
	"There is a part that do not want to be ahead, but they want to be ahead of the laws and regulations, so they have somewhat sustainability in their core" (No. 1)

Table 4.23: Proof quotes for Client Vision

4.4.7 Transparency

Transparency can be a good thing when it stimulates inclusion of sustainability, as transparency can enable things such as benefit by satisfying the incentive of image, better management, more awareness and more data on impact. But, currently transparency is limited, so these "pro's" of transparency are not sufficiently achieved. Also, to achieve the "pro's" full transparency and tools to enable that are required, but the existing certifications and measuring tools are not able to provide that yet. Interviewee 1 also mentioned this by mentioning that the current system provides insufficient visibility of environmental impact, and that certifications are often missused:

"If we do business in the usual way, then our system is made in such a way that a lot of the impact, negative environmental externalities, is just not visible."

"Even though in the initiation it was explicitly discussed to not surrender this, to not buy CO_2 certificates, it was the escape plan, to say there are two expensive designs and one so much cheaper than the difference with the CO_2 we emit, we solve it with a certificate. And you then don't choose for the optimal design, but it is actually to buy off your guilt."

So, certifications are being used to appear sustainable, while the certifications are not able to show the full sustainability performance. These certifications also become a driver to construct more when that's not necessary, which defeats the purpose, as also stated by interviewee 6 with the following 2 quotes:

"The standards are also being used like, ok, this is my medal of honor, and now this allows me to just flaunt it how good it is, while the standards are not perfect at all."

"How I see this is that these aren't little arguments, you know, it still helps the narrative, we have to keep on building because we can make things amazing, yeah, and tell me how about all those materials, that were used in the glass, in the stell, in the sand, in like everything, even the materials of the solar panels... It is pretty much greenwashing to say, this amazing building, it is diligent and all that. Now tell me all the carbon footprint, of every single component of that building, and then you make the assessment."

Nonetheless, the existing certification methods do prove that having certification methods can drive sustainability, as was explained by interviewee 13:

"Sustainability has also become more measurable and comparable, thus tradable with the introduction of several measuring tools, standards for sustainability. In the beginning we had the green calc method, then BREEAM, LEED so several methods. And all these methods have of course created a certain level of transparency in the concept of sustainability"

This proves that certification methods provide opportunities for driving sustainability inclusion, but until the methods improve, they remain a barrier for sustainability as some organisations will use them to pretend transparency, while the true impact is not visible. To enable the benefit of certification methods it is required that they become a standard. This means that it should become an obligation or necessity for every construction project to have a certification, which either requires a governmental push, or a reduction of costs. Interviewee 11 also made a statement about this:

"Where I also see turns in certification, so for example if you have a sustainability label on your building such as BREEAM or LEED, that companies say, you know we are going to meet all those requirements, but we leave the certification out of it, so we approve for the certificate, but we don't receive it. Because they say, we are using it for ourselves, so we can answer for ourselves that it is good, and the outside world won't be able to see the label. Because sometimes we are talking about tons of certification costs, and what is the advantage of a piece of paper."

When more organisations start to report about their sustainability performance, it will become a bigger driver, as it will enable competition on sustainability performance. Which is also what happens already for some organisations. As added by interviewee 11:

"You also have more often that a company adds a layer to that, especially with multinationals. They nowadays have to answer for themselves for their social and their eco footprint. I believe they even have to report about that in their annual reports."

So, to conclude, transparency can be a good thing, when there is full transparency and not only the appearance of transparency. But, to overcome the barrier of apparent transparency, certification methods and measuring tools need to be improved and more and better visibility of overall performance should be enabled and stimulated.

Instance	Proof Quotes
Certifications	"Some are a step below and they especially want certain certification " (No. 2)
	"What helps are the certification methods such as BREEAM and LEED, to measure sustainability in a way of, you want a building with BREEAM outstanding, or excellent, or very good, then you can place the costs alongside it which is very clear for someone from the board of directors. " (No. 1)

Table 4.24: Proof quotes for Transparency via certifications

Instances	Proof Quotes
Visibility of Performance	"I personally think that most of it is greenwashing. . . It looks amazing on the photo, but tell me what is the real benefit of it." (No. 6)
	"Those measuring tools are of course still very far from ideal, so I hope that an update of that comes soon." (No. 7)
	"These details of adding sustainability features into buildings, it is just a way how companies can present themselves to society, to the competitors, to the community around." (No. 6)

Table 4.25: Proof quotes for Transparency as visibility of performance

4.4.8 Leadership

As was stated by interviewee 5 in two statements is one of the key elements for successfully including sustainability in construction projects, to have leadership. Not just high level leadership but mobilization of leadership, so leadership on all levels of an organisation:

"If there is either no ambition or no leadership, or not the right people in the team, then it can quickly fail."

"Leadership needs to do that themselves, they need to jump on stage and say, for our business, this and this and this is important and that is why these 3 points are crucial for our new project. . . ..And leadership needs to say this and preferably also on every level."

This means that someone with decision-making power and influence needs to be involved, to enable the requirements for sustainability inclusion and to overcome the presence of barriers. This was also explained by interviewee 12:

"So having someone involved with enough authorization to make decisions that are not only financially beneficial has potential. Especially if they're involved at the steering committee level from the very early stages of a project. So I'm talking prefeasibility even just like business case justification, so fail zero or fail one if they're present and they're part of the team who sets down the main project requirements, the main restrictions and assumptions. And if they stay connected. But that's still kind of a high level, I think that's got a good chance of success. Because the further you get in the in the in the engineering development, you know fell to fail 3 you sort of have to minimize the amount of discussions and increase the amount of decisions and execution, especially when you get to the point where full funding is released, you're buying equipment, you've bought land, you're breaking ground, a building is going up, then it's all about execution time, time for discussions is almost over. You can't really be doing that anymore."

One statement of interviewee 6 and two of interviewee 3 also stated that leaders have to lead the way, not only by driving sustainability and using there power in favour of sustainability inclusion, but also by positioning themselves accessible. Both for transparency and for input on sustainable options. So providing direct leadership and accessibility to leadership:

"They are the ones that are supposed to be, they are leaders for a reason, leaders got to lead, because project managers are just executors. They have so little room to reengineer, to rethink, to rework our concept, even to change drawings, it is so difficult. Those decisions are made by higher management. These people have to move towards ecopreneurship. They have to see the value of it or either they have to be forced by the market or by the regulation or by society or by the values of the company in itself."

"So higher management needs to position themselves admissible for transparency, everything about this I want to know, because I need to make a decision, and everything that is under it, shouldn't feel shouldn't feel burdened to put anything there, so eventually a decision can be made."

"If you know all this, and you know the impact, and you don't pass it on to your boss, what will your boss think of that? Because in fact your depriving him of information on the basis of which he can make good decisions. So you should say, this is coming towards us, that is going to cost this much, which will have this impact, and you need to make the decisions. But he never does. So there are two things. You present my decision and he makes the decision, or you present my decisions and he decides differently, but at least it will be his decision. So you need to be careful that you don't deprive higher management of

decision-making, and higher management should also line up as I want to be informed, even if it costs 100 million, I want to be informed on what this is about, I don't want you to filter for a decision I have to make."

But, the challenge with this requirement is that having leaders involved with the right intentions, there is still no guarantee of success. As they can only provide good leadership when other requirements are met. Which was also explained by interviewee 9 and 6:

"And this is where the challenge comes. So how to train mindsets about always including environmental impacts in every final statement that they are doing, even though in terms of funding, so you can also bet in blue bones, green bones and all these kind of things of finance I think is the main mistake holder in a private company to get their buy in. Because otherwise you are completely lost. So first you don't have visibility. Second, you don't measure and 3rd you can't communicate on a trust-able basis. So finance is super important to get on board. "

"If you are trained to embed sustainability, to speak sustainability and to identify sustainability opportunities with your clients, with your contractors, with your suppliers, you are very likely to make a very impacting project, but if you are not enabled to have those conversations, so even to have those ideas, to embed into projects, then its working very blind. How do you get to this point of company policies, you have to be empowered to do that and also clients have to be willing to understand."

Instance	Proof Quotes
Top-down	"You need a market segment and a client, that is leadership, that is exemplary behavior, that is someone that just says, I know I won't earn it back, but I don't have the heart to do it differently." (No. 3)
	"Higher management is like the brain, of everything, and they are the most important stakeholders in construction projects, and in the end, they are the ones that are going to sign the checks to be paid, for construction contractors and subcontractors. I see the role of project managers very powerless." (No. 6)
	"I see mainly when considering sustainability, a positive influence from the top, so because at a corporate level it is so high on the agenda, that top-down it is being pushed into projects. " (No. 11)

Table 4.26: Proof quotes for top-down leadership

Instance	Proof Quotes
Bottom-up	"So when you pick it up to late, than it dies, then it is much more of a struggle. . . parallel to that its important that by leadership in several levels within the organization, that the organization is mobilized. That people create awareness, this is what we want for this reason, and that a sort of community and drive develops to do it." (No. 5)
	"This is really a big conversation because you have to have many people on board. Double top down and bottom up."(No. 9)

Table 4.27: Proof quotes for Bottom-up Leadership

4.4.9 Instruments

As also followed from the findings on leadership, several instruments are required, to enable successful leadership, and to enable opportunities and capabilities for including sustainability. This was also explained by interviewee 13 and 1:

"So I think that what has come forward is answer to that it's not about one thing or one owner of that, but it's about creating a sort of spiderweb in which everyone has their own role, and thus that the government needs to ensure with laws and regulations that buildings become more durable for longer... So the interest analysis should ensure that the instruments are being used optimally to enforce sustainability."

"If the sustainability ambition is recognized at a high level, and the added value of a project, makes it easier to realize those ambitions."..." They have the resources, those are needed for it, and they are ultimately about that, so resources in the form of time, of people, but also the special form of money and resources in terms of planning, and if they find that very important, that contributes significantly."

Right leadership thus requires instruments, and instruments require leadership. However, management, not necessarily by top-leaders, but project leaders or managers, can also be instrumental for including sustainability. As this can enable more consideration and more awareness on the possibilities and opportunities. This was also mentioned by interviewee 7 and 11:

"You can frame it in a lot of ways, and sometimes you should really frame it as a sustainability assignment, but more as: you want good advice and its useless to give real estate advice while only looking a few years ahead, while you have a real estate portfolio that lasts longer, and you don't want to spend your money three times because you took the wrong decision right, so what's your plan?"

"Actually, at every step in the process you should take it with the sustainability question in mind. So that with each step that you take, you check again, have I done everything of sustainability. So, you should actually add that to each checkbox in your process, could I have done more about sustainability here. And if not, adjust. That is then the follow-up question, if you feel you have not done enough or yes you have made yourself too easy, then you really just have to do that phase again."

Another instrument that is required is a strategy. Not just an ambition, but also an action plan on how to achieve that ambition. As this makes sustainability more a requirement instead of an option. This was also mentioned by interviewee 9 and 3://

"You need to have a strategy, so the ambition can be there, but if you don't have the sustainability study embedded in the corporate strategy, this is not going to happen....You can't be open with the strategy, you need to stick to a plan, stick to KPI's, stick to measurement tools."

"The second is what are the sustainability ambitions of the company, and those ambitions are often quite ambitious, but regarding timeline they are often quite far ahead....So those companies need to get more serious ambitions and they need to start acting on it, they need to be transparent about it."

Another instrument that is required is for making organisations more incentivised to include sustainability. Which requires measuring tools to make the benefits visible, and a legal framework. As also mentioned by interviewee 3:

"Almost all multinationals I know have shareholders, almost all of those multinationals have as a goal so much percent EBITA, so much percent profit targets, If we reach that, then the shareholders are satisfied, if the shareholders are satisfied, money gets invested into that company, and then they can continue with investing... So indirectly your making a legal framework, or sort of economic conditions, for which it becomes more interesting to invest in preservation and sustainability."

Information should also become more accessible, all information, so information about materials, about sustainability performance, of buildings but also individual elements, about possibilities, for more sustainability and reuse, about costs and benefits, short and long-term, about experiences, so people can use those experiences to learn from them or use them as examples, etc. So an improved information network is required, but also material passports should be made for every material. To increase both the knowledge and the access to knowledge. As mentioned by interviewee 7 and 3:

"For example, you also want material passports, because you want to know what do we have later on in our buildings. Because then we can also, because that then has value, if you can remove that, you can reuse or sell it."

"Sustainability is, how can we detach ourselves from our behavior of pretending that everything is limitless, and also developing constructions as such... how can achieve the same thing you want to do, in a different way, and sustainability is for me that those limited-edition materials, become available again, so that we can then do other things with them." Gerard

What also came forward is how organisations are often driven by the incentive of image. It can be their way of marketing, publicity, recruitment or part of their brand. As also referd to by interviewee 1, 9 and 5:

"You have the leader of the pack... they want to be ahead, because for those companies it is also of importance because it is part of their image, but also because it is their way of recruiting people."

"So marketing is also key and instrumental for sustainability....Its corporate reputation and brand equity."

"Yes it can be about branding, or also talent attraction, you often see that for more and more young people it is relevant to not work at a company anymore who don't have their things in order."

Thus when publication of performance becomes a requirement, this incentive will push towards sustainability inclusion. It does require full transparency to achieve success, as otherwise it can be miss-used and apparent sustainability can be enabled again. But, the benefit of publication of performance and ambitions is already proven, as it already happens in some organisations. As mentioned by interviewee 13:

"Most of the big multinational players, they have mapped out their sustainability journey quite well, of course they broadcast it to the public so their shareholders are aware of it. So they have motivation."

Instance	Proof Quotes
Managing	"We need to also come up with the value case, so why do we do it, and what is going to bring is compared to costs, so cost benefit analysis. " (No. 5)
	"It will never become a trick where you can check things off. The dialogue always remains very important." (No. 15)
	"You really need to remind people to use it. So if they are working on the quotation phase, there should have been a lot more guidance of hey, here you have our purpose matrix and you have already spoken with this customer and here you have the 4 questions, have you already done something with that? " (No. 7)

Table 4.28: Proof quotes for Management as an instrument

Instances	Proof Quotes
Strategy	"Yes I think so, not that they have to be involved in a specific way, but that can also be in the way of having a sustainability vision and having a sustainability ambition. So with ambitions and having a clear direction, that it can also be in the form of I have been able to derive this from your sustainability framework, and our project fits into that in this way, so you can prove to management that its in line with their ambitions." (No. 1)
	"It is very helpful, it has a huge benefit, if there is a target set by the boardroom, on what needs to be achieved, so if on a corporate level it is being said, we have this ambition and we want to accomplish at least this, that helps a lot, because it gives people that have to execute it a focus, boxes that have to be ticked, so there automatically comes attention for it." (No. 7)
	"It should be our corporate goal, of course, and this is precisely what I'm saying, that we don't have a strategy. So right now the risk is the risk of not doing sustainability or not approaching sustainability from the very beginning is there and we are missing commercial opportunities because of that. So if our top management will think differently, like OK sustainability is a tool to be sold. That's it. We will increase our profit for sure. Because it is an additional commercial tool to sell. So why we are not doing that? Why? Why there is not a commercial manager saying hey guys out of the discussion, sustainability is mandatory. That's it is not just something that you feel inside. It is something that is in the protocol in the checklist, in the whatever you name it, but it has to be there. This is why I'm saying until we don't have sustainability KPI's because this affects money. Of course, our salaries, our payrolls, until this is not going to happen." (No. 9)

Table 4.29: Proof quotes for having a strategy as an instrument

Instances	Proof Quotes
Measuring Tools	"When looking at what sustainability measuring tools really measure, then they measure at most the sustainability of a given artefact, of the given product. . . .We need to give everyone plank, ever brick, every screw, a passport, so that when we demolish a building after 50 years, the plank with that passport should resurface, so it won't be an anonymous piece of trash." (No. 13)
	"You have to make a lot of assumptions, because you actually don't know perhaps what materials you are using, so what you choose becomes a benchmark, so if you change things, you see okay this has a more positive impact than that. And you can know that in your gut, but if you really start measuring it, then you become able to substantiate that and that's what we want." (No. 7)

Table 4.30: Proof quotes for measuring tools as an instrument

Instances	Proof Quotes
Legal framework	"The law is improving... But enforce more legally." (No. 13)
	"There is actually only one main driver, and that is especially for multinationals important, you need to make a law which says that you have to....I think the law, and the legislator, has the responsibility to ensure things happen that need to happen right now." (No. 3)
	"You notice with multinationals, such as with Shell, that they now have to give an energy label to their offices, so that in that sense laws and regulations work." (No. 7)

Table 4.31: Proof quotes for Legal framework an instrument

Instances	Proof Quotes
Information Network	"But having a differently structured database that would be a good one, I think for me that would be interesting because if if a client comes to me and asks a question that they have of have you tried out this, it'd be nice if I could go look somewhere in a in a simple database for a previous example like that. Now of course I can go ask anybody in my network and hey, have you done this before and and I will continue doing that. But if I can go find it would save a lot of time. It's never a problem of people not being willing to help out. Everybody's always willing to help and share their stories. And Oh yeah, we did this and this and they and they get excited about it because they did it but then you know I have go to them for information and hope that they have it. And I'll still do that because that's how you build and maintain your network. But if there was another alternative, where if I just needed to go and look up a quick solution example by myself in 5-10 minutes, man that would save me some time." (No. 12)
	"We encounter a lot of things that don't work yet, that's not an issue, some things indeed don't work, which is not a bad thing, as long as we can get to the surface what we run into, and what does not work, so we can take a decision on how to progress. Because it is also an awareness process." (No. 7)

Table 4.32: Proof quotes for an information network as an instrument

Instances	Proof Quotes
Material passports	"Everything should be detachable and separable so that it can be reused again." (No. 3)

Table 4.33: Proof quotes for Material passports as an instrument

Instances	Proof Quotes
Training	"Our finance people have to be trained in knowing how to measure costs related to sustainability." (No. 9)
	"If the decision makers, if those high managers, have a cost effective saving mentality, it recalls out all the way to that and its reflected in quality... It is how those decision makers are trained. What are the visions and the innovations." (No. 6)
	"We need a bit of support. There's a project manager to put these things on the table. We have experienced it and put in the digits that are transformation that we started already with the company two or three years ago. That all this is happening top down, but we still don't know what we need to do as project manager." (No. 14)

Table 4.34: Proof quotes for Training an instrument

Instances	Proof Quotes
Publication of performance	"That often is also what happens in the corporate industry that they see their competitor doing something like, oh I got to get on to this trend, because surely he's doing something that there's a benefit. And so yeah like that definitely helps, giving them examples of like where, you know things have been done like this and everything, but at the end it's always helpful to be able to show them what it means for them." (No. 10)
	"The main driver is there, there's quite a marketing and PR and all these things involved here." (No. 4)
	"Who also want to do this kind of storytelling... it is more often for companies also a sort of way of communicating to the world, look at us and how sustainable we have our operations in order." (No. 11)

Table 4.35: Proof quotes for Publication of performance as an instrument

4.4.10 Institutions

Not all leaders can enable or enforce all instruments. It is required that each institution takes responsibility, thus operates as a leader or has a leader within the institution, providing, enabling and enforcing the required instruments. So everything needs to come together. This need for involvement of different institutions is also mentioned by interviewee 16:

"I think it's always a mix, of course, from the business, from the business perspective.Yes, there was a push. The social push. So the moment somebody makes any mistakes, it will be in the news. So there is a societal push for the sustainability that's. Not questionable, but I have to see the people I have to send the people I work with are also like I think we are that's in the society. That is aware that if you don't act sustainable you will just cross ourselves. So I think everybody is aware that there's no other option either we act like this or or we're not gonna have much more time on this earth so."

The required involvement of the government has come forward multiple times during the interviews. It was also stated by interviewee 13 an 6:

"If you want sustainability improvements in projects, then everyone has their own interests. So in a project context, well I'm not sure about the difference between push and pull factors, but the drive in project context should be very close to the primary goals of an organization. So only with the business process. With the government that should lie in safeguarding certain future focused qualities of the building stock, and set those market ambitions high....I think the government is actually the quality manager in the triangle."

"I don't think there is going to be substantial change in this until governments really step up and make really tough regulations because, the standards are mostly voluntary."

The outcome that co-creating is required, thus that every institution needs to take responsibility was also mentioned by interviewee 3:

"If we're going to put the dialogue that we have into practice, if they're going to innovate and digitize that innovation and things like that. That means that we need the capabilities and training that we need for that, that we're going to continue that, right? And that means that we have to co-create more instead of managing single and say, we're going to do something beautiful. How fantastic is that for you?"

The required involvement of organisations and the industry has also come forward in statements of interviewee 9 and 12:

"So for me the global report that they produce together with the benchmark of the sector, they are operating in like 2 strategic tools that has to be in the first stages of the conversation with the client before the project is even discussed in terms of scope. "

"Status is one thing, and that's part of it, but I would say that a lot them are displaying some of their own initiative to say, OK, we can do this better for ourselves it's going to save money, maybe it's even going to make our processes more efficient. It might even make some of them safer. It's better for our clients. Our clients are watching us very closely. So we need to be responsible about that and there are also some of them are really taking their roles as big businesses that they're taking a role of stewardship over resources."

Instances	Proof Quotes
Government	"If there is say incentive, I think everybody is happy to receive subsidies, to receive tax cuts, if they adopt certain technology. For example heat pumps, the government is paying for it, so then it's less risk, so that's exactly the point that you are making and the adoption of all these innovations. There is a transition and well, there is a reward for the front runners. But also, there is a lot of followers, and then we have to speak about those transitions and innovations. " (No. 6)

Table 4.36: Proof quotes for government as an actor

Instances	Proof Quotes
Industry	"So I think concretely that If the value of materials goes up terribly. Then making that construction, costs a lot of money. Only if that construction is reactivated or disassembled again. Then all that money will be released again. So then the cost for housing is almost nothing. So I think you have to make material like that and labor a lot cheaper, so tax on material up, tax on labor down considerably." (No. 3)
	"For example your building system eventually falls out, but if there is a type of coolant in there that suppliers don't deliver anymore, then you wont be able to start it back up again. So you will have to make the step towards a more sustainable, cleaner, system. So there are several triggers, also just very simple the technical side, to take that step." (No. 11)

Table 4.37: Proof quotes for Industry as an actor

Instances	Proof Quotes
Organisation	"The project manager needs to have it in there dna that what is demanded is a new attack on those limited materials." (No. 3)
	"From a personal drive I have tried to increase that ambition"...."You can challenge the ambitions of the client also throughout the process." (No. 1)
	"Lately its really been almost more a given. But that's also because of the type of clients, multinationals are often clients who have more budget to spend, so they can more easily make it possible" (No. 11)

Table 4.38: Proof quotes for an organisation and their employees as an actor and actors

Instances	Proof Quotes
Society	"With the power of (social) media, with the power and speed of how we are communication now with each other, the most important stakeholder that needs to be managed for this kind of large projects, is the public" (No. 3)
	"You see exponentially that clients are saying, we want to have the lead position, because then we can distinct ourselves from the competition or because they are pressured by society." (No. 5)

Table 4.39: Proof quotes for Society as an Actor

4.5 CONCLUSION

It is already clear that multinational construction projects are not sustainable enough and that this has multiple causes. This fact is explained by the existence of multiple major barriers. Many barriers were mentioned more than once by different practitioners, which resulted in the identification of 7 major barriers. An explanation of each barrier is provided in Table 4.40.

So, there are 7 major barriers present in multinational construction projects, limiting the inclusion of sustainability. These 7 barriers are not mutually exclusive, as they enforce the extend to which other factors limit inclusion of sustainability. Such as that without awareness, change can be managed worse, alignment can be even less, which will make people less incentivised on sustainability. And, also, without incentive, transparency will not be required and without transparency awareness will be less.

To conclude on the barriers; During project management and throughout the project process awareness is often lacking. This entails awareness on several aspects, such as what the possibilities are for including sustainability. This is mainly caused by lack of knowledge available, lack of expertise or lack of experience. It also entails awareness on meaning and demands of sustainability, so what is expected when talking about sustainability inclusion, and what is required. So when people express a sustainability demand or ambition, they often aren't aware what this requires, such as the resources and investments necessary, and other people often misunderstand what is meant. Lastly, awareness on urgency is also lacking, which results in that people don't see sustainability inclusion as a necessity, or a requirement, reducing the consideration of sustainability inclusion.

The changes happening during the project process influence the project. Such as the possibilities, the demands, the availability of resources and the duration. This often results in scope changes, which allows for a reduction or exclusion of sustainability. The change that is needed towards more standard inclusion of sustainability is not yet happening enough, and also not managed properly, as people are reluctant to change and change has a huge affect on several aspects of organisations.

The alignment of stakeholders, resources and actions, on, and to enable ambitions, is a challenge for standard project management. However, for inclusion of sustainability this performance a bigger challenge as more uncertainties, less capabilities and less clarity is linked to sustainability inclusion. This results in more frequent non-alignment which forms as a barrier for the opportunities to include sustainability, as often the extend of inclusion is reduced to achieve the necessary alignment for what is perceived as successful project performance, thus successful on the main project requirements but not successful on sustainability inclusion.

The decisions made for projects are driven by several incentives. Data shows that these incentives exclude sustainability and are also unable to successfully incorporate the benefit of sustainability within one of the present incentives. The result of

this is that decision-makers are not incentivised to include sustainability as a target, or at least not include it higher than what is enforced. Which is why the present incentives form a barrier for the inclusion of sustainability.

The market, availability of resources, availability of expertise and the access to or ownership of power constrain inclusion of sustainability. By limiting the possibilities, reducing the need and decreasing the overall capabilities for including sustainability in projects.

Organisations and people within organisations, involved directly and indirectly with project management, have a vision that is often not sustainability oriented and also limits the ability to push for (higher) inclusion of sustainability. As long as a short-term vision can't be shifted towards a long-term vision, the focus on financial benefit and/or risk aversion can't be compensated with data in favour of sustainability inclusion and the lack of willingness to innovate can't be overcome by sufficient examples, such visions remain a barrier for the inclusion of sustainability.

Sustainability performance, or aspects of that such as environmental impact, are not visible enough, as they don't provide full transparency of the overall performance of organisations and construction projects, but only on specific aspects. This makes decision-making in favour of sustainability difficult and less urgent, while also reducing the benefit of the existing certifications and the meaning of what is made public about performance. The current level of transparency provided and possible is thus a barrier for sustainability inclusion, as it enables miss-use and apparent sustainability.

What has also become clear is that multinational projects are not sustainable enough, but that there are already some trends happening towards more sustainability and that some projects do have an ambition and perform better than most on sustainability inclusion. This fact is explained by the existence of multiple major opportunities, which are based on examples of projects that did aim for sustainability inclusion. These projects proved the presence of several drivers for sustainability inclusion and also why inclusion was achieved, or what could have been done differently to achieve (higher) inclusion. This thus resulted in the identification of 5 major opportunities. An explanation of each opportunity is provided in Table 4.41.

Improvement requirements	Explanation
Enabling visions accordingly	An opportunity for sustainability inclusion lies in realising that there are different types of visions that can be present among stakeholders. As this understanding enables a more suitable approach to influencing the decision-making. If the visions are short-term and focused on benefit, provide the long-term benefit to make them understand why the sustainable option is still beneficial and in the long-term potentially more beneficial. If the vision is more ecopreneurial, and an organisation is not hesitant for innovations, use this by pushing for sustainable innovations, as these are the organisations and projects able to provide examples for less visionary organisations and people.
Improving Transparency	The sustainability performance is already something that organisations broadcast and certifications are already being used. So the opportunity lies in improving the transparency of how organisations perform on sustainability and by improving the certifications. This can then prevent miss-use and make transparency of sustainability performance a standard, instead of an option.
Leadership	Leadership is required to push for sustainability, as decision-making power is crucial for enabling inclusion of sustainability. Thus mobilization of leadership is needed with both top-down and bottom-up leadership to help decision-makers and to make decisions in favor of sustainability.
Use of instruments	Several instruments are needed to enable the inclusion of sustainability. These instruments are mostly present already, but they need to be improved to be of use for higher inclusion of sustainability.
Actors	There are several actors who each have a key role in enabling sustainability inclusion. Either because they need to enforce the use of instruments, enable the availability of resources and instruments, or push for sustainability inclusion.

Table 4.41: The requirements for effectively including sustainability in multinational construction projects

So, there are 5 major requirements in multinational construction projects, that could enable (higher) inclusion of sustainability in multinational construction projects. These requirements are also not mutually exclusive, as they are the tools required, how they should be acquired and by who they should be used as well as by who enforced. So the requirements are now explained as separate elements, but they are actually sub-elements who jointly can enable opportunities for (higher) inclusion of sustainability in multinational construction projects.

The first requirement thus is understanding the vision of the organisation and people involved with a project, to use the right approach for project management and providing the right arguments for realistic sustainability ambitions.

The second requirement is improving transparency of sustainability performance, of both organisations, their operations and of projects.

The third requirement is having leadership directly involved, so people with power or access to power. This means better mobilization of leadership, both top-down and bottom-up and also having leaders that push for sustainability on all levels of an organisation, and not just with words, but also with actions.

The fourth requirement is having the right instruments available. This means better management of sustainability, having clear organisational strategies, not just ambitions but also actions included on how those ambitions will be achieved so projects can be related to strategies, developing measuring tools able to measure and quantify sustainability, having more and better legislation to enforce sustainability, having a better information network to make the available information more accessible, giving passports to materials so they can be reused and will become of

value, providing more training so expertise available will increase, and having more transparency and publication of performance.

The fifth and final requirement is having the right actors involved. So organisations, the market, the industry and the government, all have a role in the transition towards higher inclusion of sustainability in multinational construction projects, and they should all, jointly, push for sustainability.

To conclude, the results provide an answer to the first main research question: *What are the barriers for inclusion of sustainability in construction projects?*

This answer can be summarized as:

- *Lack of awareness*
- *Change*
- *Non-alignment*
- *Non-incentivised*
- *Constraints on availability*
- *Unsuitable approach to managing different visions and lacking presence of ecopreneurial visions*
- *Insufficient transparency*
- *Not meeting the requirement of leadership mobilization*
- *Insufficient availability and existence of required instruments*
- *Required but insufficient involvement and cooperation of institutions*

Barriers	Explanation
Lack of awareness	The people involved in the decision-making process and throughout the project process lack awareness on several sustainability related matters. This lack of awareness results in unwillingness and/or inability to include sustainability (more) in projects. Either by not or limited aiming for sustainability or not undertaking actions to achieve the aim.
Change	Changes are always present when managing projects, as they take place in a dynamic environment. The type of changes currently present and how they are managed, form a barrier for inclusion of sustainability. As the management of changes isn't to enable change of people and change of operations, to enable sustainability inclusion, but it is to manage changes in preferences and circumstances. The focus of change management is thus not on enabling the absent change, towards sustainability, but is on mitigating the present change. Thus, not putting the focus on sustainability.
Non-Alignment	Part of standard project management is aligning all stakeholders and aligning the ambitions with resources and actions. This alignment is always a challenge during project management, but when sustainability is involved, alignment on these aspects is frequently lacking. This thus forms a barrier for inclusion of sustainability.
Not incentivised	Sustainability is rarely one of the incentives. The incentives that are driving the decision-making are not sufficiently able to drive decision-makers towards (more) sustainability inclusion. This thus makes the incentives a barrier for inclusion of sustainability until sustainability becomes one of the incentives or sustainability can be better included in the incentives.
Present constraints	To enable sustainability inclusion market support is required, resources and expertise needs to be available throughout the project process, and power to make decisions on how to enable sustainability inclusion is necessary. Currently these four factors are constraining the possibilities for including sustainability in projects, making them a barrier for sustainability inclusion.
Wrong Vision	To include sustainability (more) in construction projects, people and organisations need to have a certain vision, namely a long-term vision, one that welcomes innovation and one that does not only focus on financial numbers but also on environmental benefit. Currently organisations and people involved in projects have a short-term vision, are hesitant to innovate and solely focus on how their investments benefits them, not the environment.
Insufficient Transparency	To achieve more inclusion of sustainability, it is necessary to have full transparency of the impact of materials, operations and processes. Without transparency, comparing options does not guarantee the decision for higher sustainability, and without transparency miss-use of available certifications and pretend sustainability is possible, which thus happens and remains a barrier until transparency is increased.

Table 4.40: The barriers for effectively including sustainability in multinational construction projects (source:Author)

5 OPPORTUNITIES

After findings were gathered both on management of projects in theory and in practice, the findings were analysed to find several opportunities. These opportunities are presented in this chapter.

5.1 MOBILIZATION OF TOOLING AND ENFORCEMENT

In this section is explained how the requirements for improving the inclusion of sustainability can enable opportunities for overcoming the barriers. You could consider referring to the requirements as drivers, but as they don't drive sustainability in itself, but need to be met by a leader in order to drive sustainability, the most suitable term is requirements.

First, for each requirement an explanation is provided on how this requirement once met, can enable opportunities for driving sustainability. So which barrier each requirement approaches. Then, in Figure 5.1 the full overview of relations between the requirements and barriers is provided.

5.1.1 Visions

When considering visions as a requirement, what is meant is understanding and approaching the different visions accordingly. So visions of people and organisations involved with, and of influence on, management of multinational construction projects, and the decision-making part of that.

As people and organisations with an ecopreneurial vision or with a vision to innovate, can drive sustainability more efficiently and successfully, compared to people and organisations without an ecopreneurial vision or with the tendency to be the crowd instead of the innovator, the barrier of change can be overcome by focusing on understanding these visions and approaching this accordingly. This will reduce waste of effort and resources and drive sustainability inclusion.

Changing management approaches based on the vision of people and organisations involved with construction projects, also improves the understanding on what awareness is lacking, as people without an ecopreneurial vision lack more awareness. When this is approached accordingly with management, the level of unawareness can be better estimated and understood, thus overcoming this barrier will be made possible.

This ensures that when an ecopreneurial vision is present and an innovative organisation is the project owner, the project is approached with a higher sustainability aim, so such projects can become an example. This enables that the limited resources available will be used more consciously and more efficiently. Which also aids in overcoming the barrier of constraints. Next to this, this also contributes to overcoming the barrier of non-alignment. As the project intentions will be set based on people and organisations involved, which will improve the alignment.

5.1.2 Transparency

When increasing and improving transparency, apparent sustainability is reduced. Because it reduces the opportunities and possibilities for having apparent sustainability as true performance and impact will be made more visible. This then reduces the waste of resources on apparent sustainable options, thus makes resource use more efficient and effective, which reduces the barrier of constraints.

In addition to this, when the sustainability performance becomes more transparent, the demand for sustainability will increase among project initiators and owners, which will make the executing parties more eager to increase their expertise, as they need to comply with demand. Thus, confirming the benefit of transparency to overcome the barrier of constraints.

It also approaches the barrier of unawareness, as transparency makes the impact and performance of options, operations and projects more visible, which thus increases the visibility of the significance of sustainability and where the possibilities lie for improvements.

Next to that, it will transform the incentives from barriers into drivers for sustainability, such as that the data accessibility that comes from increased transparency overcomes the issue of decisions being data-driven, makes sustainability less uncertain and risky and can enable higher requirements from shareholders, government or the public, increasing compliance. Transparency will also make the incentive of image being a true driver instead of a trigger for miss use and apparent sustainability.

Lastly, the barrier of non-alignment will also be approached, as having people and organisations more incentivised, more aware and more capable to deal with change, all improves alignment.

5.1.3 Leadership mobilization

Mobilizing leadership within organisations makes access to power easier, thus overcoming the power constraint. This enables opportunities for sustainable innovation and increases the ability to challenge ambitions and push them towards higher sustainability inclusion.

Mobilized leadership also increases communication and information sharing, which thus benefits the access to, and use of, the information network, while also creating more alignment, as misconceptions and misinterpretations will be reduced. It thus contributes to overcoming the barrier of nonalignment.

It also enables more clarity on sustainability ambitions, as well as the significance and demands for sustainability, which helps with overcoming the barrier of unawareness and enables more efficient and effective strategies for achieving ambitions via sustainability inclusion in projects.

5.1.4 Instruments

Refers to improving the existence and use of instruments that enable sustainability. Each of the instruments make sustainability either more enforceable, manageable or measurable. Which each drives sustainability inclusion, and jointly will enlarge the driving capabilities exponentially.

Each of the tools make sustainability more accessible and less uncertain. Thus mitigating the threats and enabling opportunities.

The instruments also approach the problem of material constraints as the instruments can reduce waste of materials, increase reuse of materials, while also increasing the demand for more sustainable materials, which makes materials and especially sustainable materials more valuable and tradable.

Also approaches the other constraints as information and expertise on the market will also become more valuable and tradable. Thus making organisations and people more incentivised to meet the demands.

The barrier of unawareness will also be approached with the instruments, as they either create awareness due to legal enforcement, due to more data presence, more focus on sustainability or more information sharing.

Finally, the instruments approach the barrier of change, as the instruments either make change a necessity, or easier to manage due to having more information, data or examples available, limiting threats.

5.1.5 Institutions

Having several institutions involved, and collaborating, helps to increase coherence within the construction industry and ensures that the right parties provide and enforce the right instruments to enable the opportunities for sustainability inclusion.

Collaboration and cooperation of institutions thus supports the benefit of the other requirements, making it a way to overcome all of the barriers.

Each institution overcomes different barriers, but jointly, they can increase awareness, enable the required change, make alignment easier, make organisations and people incentivised, overcome constraints and provide good management of visions and improve transparency.

So collaboration or cooperation of institutions indirectly helps to overcome all barriers, but, directly, even with only limited collaboration or cooperation, it contributes to overcoming the barrier of limited transparency, as more information is shared when collaboration or cooperation takes place.

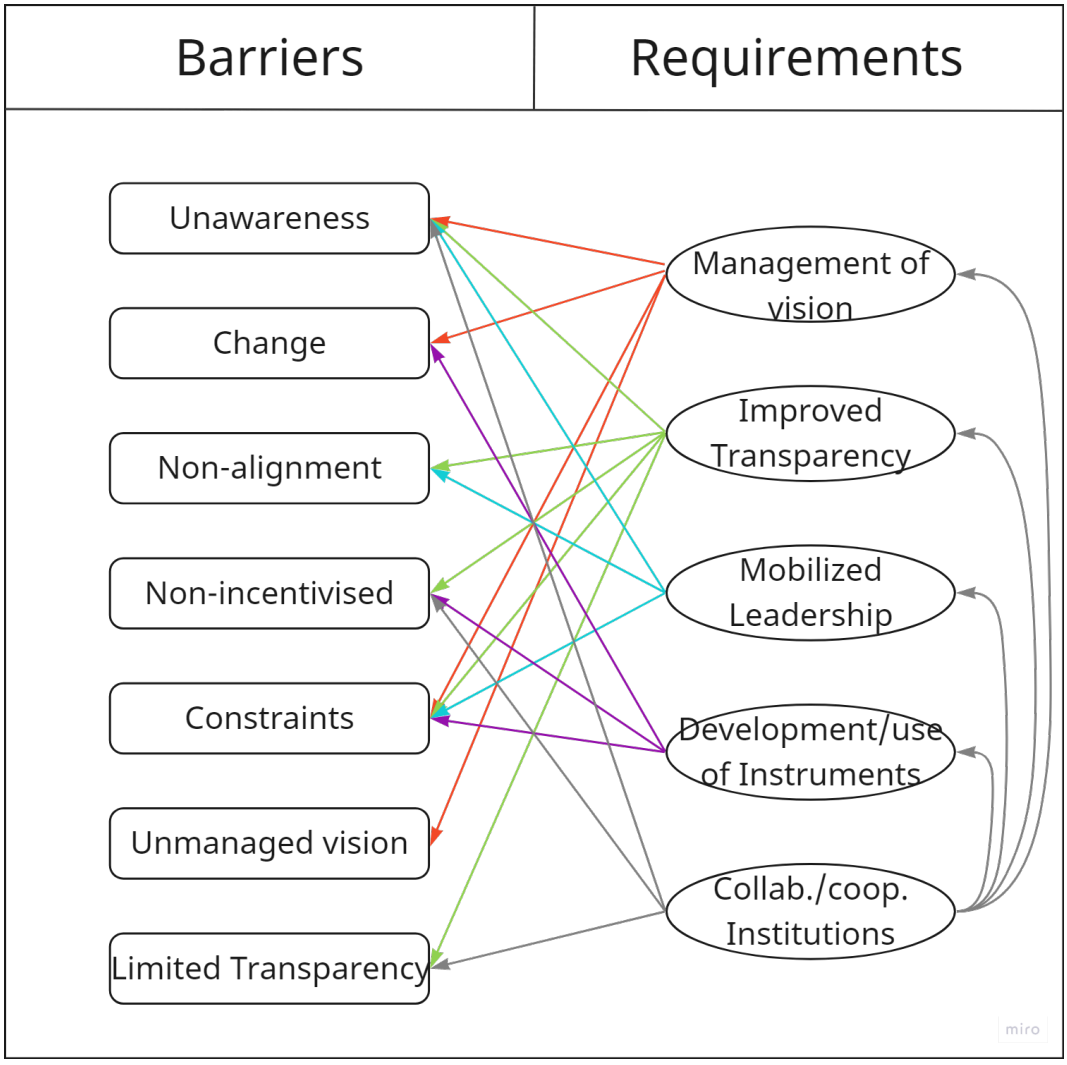

Figure 5.1: linking requirements and barriers (source:Author)

5.2 THE PROJECT PROCESS

For management of projects, the early phases of the project process are crucial for increasing sustainability of multinational construction projects. As most of the decisions are made at the earlier phases of the project. Decision-making is not only based on project requirements, but is also influenced by several factors, as possibilities are not limitless, and each project takes place in a dynamic environment. So, the opportunities lie in increasing the understanding of, not only what barriers are present, but also on what is required to enable opportunities and who needs to provide those requirements for overcoming that barrier.

This means that the opportunities are positioned in a spiderweb, or framework, as everything is coherent with each other. So, the extend to which requirements are provided depends on the enabler. This means that opportunities increase exponentially as the number of institutions and leaders contributing, and collaborating, increases, and as the degree to which requirements are met, increases. This doesn't mean that opportunities can only be enabled when everyone takes their responsibility, but the extend to which opportunities result in increased inclusion does depend on it.

5.3 DISCUSSION AND EVALUATION

As has come forward from the results and has been explained, is the limitation of the opportunities that their benefit depends on the involvement of multiple leaders and the presence of several instruments. As it all works together and with one leader driving the inclusion of sustainability in multinational construction projects, the sustainability performance of projects will increase, but multiple barriers will remain, thus the inclusion of sustainability will remain to encounter many challenges. In addition to this, having ecopreneurial leaders driving sustainability, compared to non-ecopreneurial leaders, increases the benefit, but doesn't generate benefit in itself, as they as well need to meet the other requirements to overcome the barriers.

So, to enable the opportunities for leaders to drive sustainability inclusion, mobilization of leadership is also required, within organisations and also among institutions within the construction sector, so all organisations, the industry, the government, and society.

Next to the limitation linked to dependency among leaders and the construction sector, there is also a limitation linked to dependency among instruments. As management can be used as an instrument, but it requires training, strategies to manage, an improved information network to enforce the expertise gathered with training and to have easier access to data which benefits the management approach, as well as that it is beneficial for management to have material passports, improved legislation and more publication of performance.

This all means that the opportunities should be taken with awareness of them not being a quick-fix or a one size fits all solution. Challenges will remain, and time is required, as transitions take time.

5.4 CONCLUSIONS

A conclusion can be drawn on what the opportunities entail and what should be done by which leader, to drive sustainability inclusion. The opportunities thus lie in meeting the requirements, which entails provision and enforcing use of several instruments, by several leaders, who need to mobilize leadership within and between organisations, the industry, the government and society.

So, with the results on opportunities, the second research question can now be answered:
How can an ecopreneurial leader drive sustainability in construction projects?

The answer entails several sub-answers, entailing which leader, and how different leaders can drive sustainability inclusion in multinational construction projects. So, firstly, *Which leader?*, is for leaders within organisations a combination of top-down and bottom-up leaders, and refers to leaders with power or easy access to power.

In addition to this, leaders do not need to be ecopreneurial, but ecopreneurial leaders can drive sustainability better, thus overcome barriers more successfully. As involvement of top-down ecopreneurial leaders, reduces the need for quantification of sustainability elements, and makes bottom-up leaders, reporting to such top-down leaders more incentivised to aim for sustainability inclusion. Nonetheless, lack of ecopreneurship can be compensated by the presence of instruments, and presence of ecopreneurial leaders is no guarantee for success, as it reduces barriers but doesn't overcome them, as long as not every stakeholder and leader with decision-making power involved is ecopreneurial.

Secondly, *How can a leader drive sustainability in construction projects?*, can be answered identical to *How can an ecopreneurial leader drive sustainability in multinational construction projects*.
Namely, by (1) Managing sustainability better to maintain inclusion of it, (2) Developing a clear strategy, with not just a sustainability ambition but also how to achieve that ambition, (3) Developing measuring tools to quantify sustainability and environmental impact as well as benefits, (4) Improving and enforcing legislation, (5) Improving the information network to make knowledge and experiences more accessible, to enable provision of examples and to draw lessons for future improvements, (6) Developing passports for materials to make them reusable and valuable, (7) Provide training to increase the availability of, and access to, expertise and knowledge on sustainability, and make following the training a requirement, (8) Require that sustainability performance gets published in a fully transparent way.

Which institution is supposed to enable, enforce or use which instrument is shown in Figure 5.2.

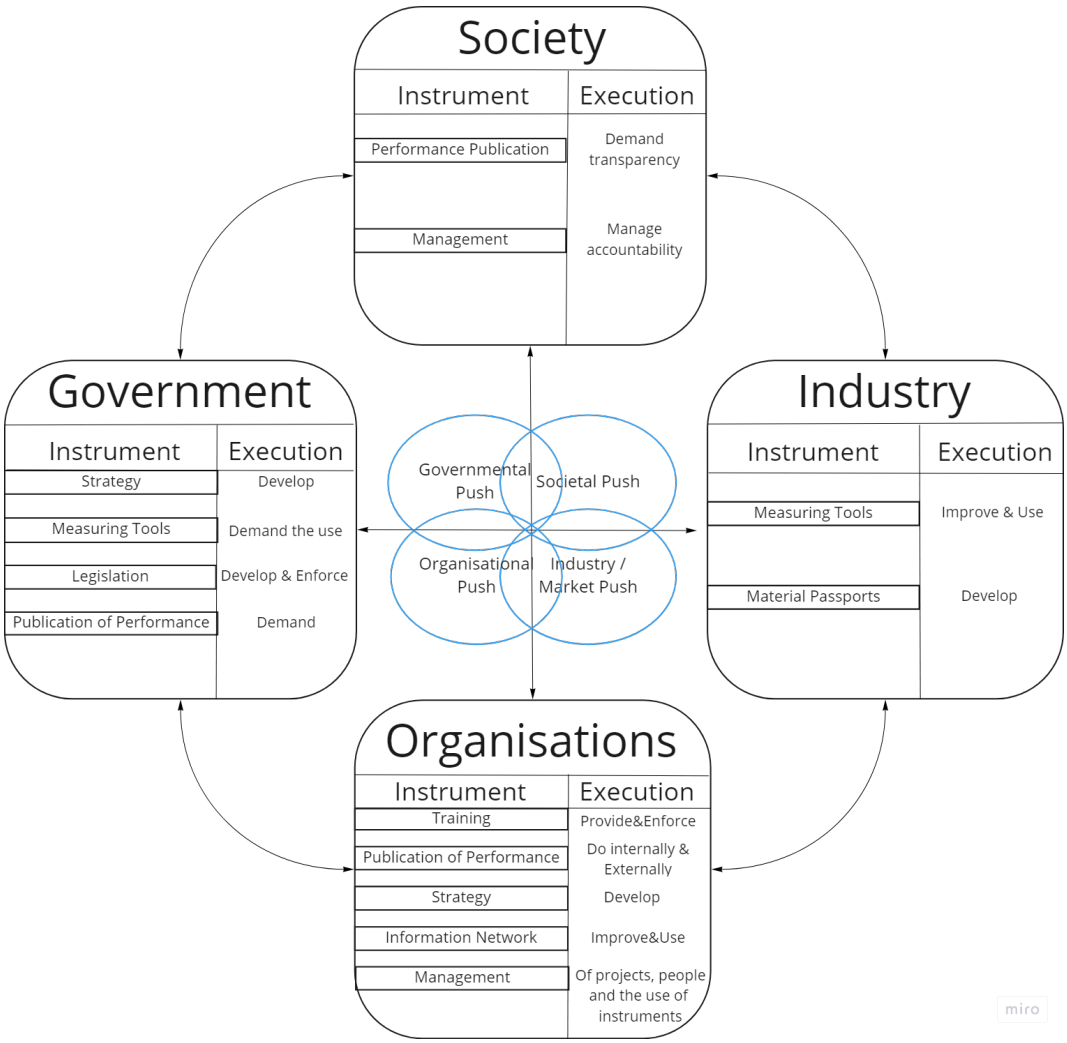

Figure 5.2: Opportunities Framework (source: Author)

6 THEORY VERSUS PRACTICE

After researching management of construction projects in theory, during the literature study, and researching management of construction projects in practice, during the interviews, the findings can be compared. This fills the knowledge gap between theory and practice, and is the final step to enable the development of recommendations, both for future research and for practice.

6.1 BARRIERS IN THEORY

The main barriers found in theory have been mentioned in Section 3.3, and are the following:

- *Complexity*
- *Inadequate and insufficient strategies*
- *Non-sustainable project management practices*
- *Limited understanding*

6.2 BARRIERS IN PRACTICE

As was summarized in Section 4.5 are the barriers encountered in practice the following:

- *Lack of awareness*
- *Change*
- *Non-alignment*
- *Non-incentivised*
- *Constraints on availability*
- *Unsuitable approach to managing different visions and lacking presence of ecopreneurial visions*
- *Insufficient transparency*
- *Not meeting the requirement of leadership mobilization*
- *Insufficient availability and existence of required instruments*
- *Required but insufficient involvement and cooperation of institutions*

6.3 LINKING THEORY AND PRACTICE

6.3.1 Barriers

When comparing the findings on sustainability in management of projects, in theory and practice, several conclusions can be made:
Firstly, the barriers found in theory, are also found in practice.
In addition to this, in practice, multiple other barriers were found as well, so practice increased the insights into influencing factors, compared to theory.
Thirdly, in practice more external influences came forward, proving that the focus should not only be on management of projects, but also on the indirect and external

influences. Such as organisations involved and governmental support.
To elaborate on this;
Complexity was mentioned specifically, in theory. In practice it came forward more indirectly, such as that it is part of the barrier of **non-incentivised**. As dealing with complexity happens in a risk averting way, which is also part of the barrier non-incentivised encountered in practice.
Complexity is also overlapping with the barrier of **change**, as change is seen as a challenge, something to mitigate, and as complex. Which is also why change is a barrier for sustainability in practice. Changes, complexity, and uncertainties, need to be mitigated, as they are seen as a threat, more than as an opportunity.
Inadequate and insufficient strategies came forward in practice as part of **non-alignment**. Which includes non-alignment between ambitions and actions.
Non-sustainable project management practices was mentioned as part of **non-incentivised** as this included that in practice management and decision-making the focus is on several factors, incentives, such as risks, costs and benefits, which are the standard project management elements, and not on sustainability.
Limited Understanding is part of **lack of awareness**, as the lack of awareness in practice is also on the meaning and possibilities of sustainability.

6.3.2 Ecopreneurial leadership

In theory ecopreneurship is the recognition and enaction of opportunities for creating and sharing multiple forms of value [Rae, 2016; Rae et al., 2014]. This has been linked to leadership, which in theory refers to a process of influence, with which the effort of others is stimulated, or maximized, towards the achievement of a goal [Winston and Patterson, 2006]. In theory ecopreneurship and leadership are of positive influence on achieving higher sustainability inclusion. Also, the positive influence of ecopreneurial leadership, on improving sustainability inclusion by project management has been stated in theory. However, in practice, this positive influence doesn't come forward. The findings of the interviews do prove that in practice the focus is mainly on financial benefit, which proves a non-ecopreneurial perspective. This thus shows that the barrier for sustainability inclusion is a non-ecopreneurial vision, which confirms theory. But, the findings also include that when working with ecopreneurial leaders, the benefit is limited, as this can only overcome some barriers, but not all.

6.3.3 Requirements

As came forward in theory, are several tools required, some of which already exist but require improvement, and some of which need to be developed [Oke et al., 2019; Sertyesilisik, 2017]. In addition to this, it came forward in theory, that the requirement for effective application of instruments, thus for sustainability, commitment and collaboration of involved parties. For which stated that each of them needs to "act as components of a broader system and affect the outcomes" Xue et al. [2018].

This thus aligns with the requirements that came forward in practice. Namely, the involvement of several institutions, the several instruments and mobilized leadership.

6.4 CONCLUSION

As already came forward, there are many barriers, which is the consequence of that each project and organisation, faces many external and internal influences. So, to significantly improve the sustainability performance of the construction industry, each institution needs to take their responsibility. However, each and every organisation can contribute, regardless of the contribution of other organisations and institutions. So, a more in-depth conclusion can be drawn from both the theoretical and practical findings.

As this research focused on management of multinational construction projects, the findings do not enable in-depth conclusions on other institutions. But, for organisations a so called action-plan can be developed. Which entails a proposal on how to prioritize the steps for meeting the requirements and driving sustainability. Even though some steps should have higher priority than others, it is advised that the steps mostly occur simultaneously, as they influence each other and this will generate the highest probability that significant sustainability improvement will be achieved, even when other institutions are taking their responsibility less or delayed.

Action-plan

1. Prioritize management of visions, so start to implement consideration of visions of people involved, within project management. Which means project management should involve analysing whether people influencing the decision-making are ecopreneurial and/or innovative. As well as whether organisations, collaborating with on projects, are ecopreneurial and/or innovative. As this enables more efficient and effective inclusion of sustainability within project management.

2. Use the knowledge of which visions are involved, thus of influence, to assign expertise and resources to projects. Which means assigning project managers with sustainability expertise, to projects with higher sustainability potential. As sustainability inclusion will increase overall, when the innovators are enabled in setting examples, that less innovative organisations and people can follow.

3. Provide training on what sustainability means or what it can entail, first as an option, and over time as a requirement. This also provides insight in who is ecopreneurial or at least driven on sustainability, which helps with assigning the right people to the projects with the highest potential.

4. Make sustainability a standard topic in each negotiation and decision-making related conversations. So don't only discuss the standard project elements, such as budget, time and project requirements, but make the consideration of sustainability a standard. This will increase awareness and help with understanding the visions involved.

5. Keep track of the transition and progress, as sustainability inclusion won't increase over night, keeping track of the process is important. This provides stimulus to everyone aiming for improvement of sustainability inclusion.

6. Mobilize leadership, by starting to connect bottom-up leaders and top-down leaders more. To provide easier access for bottom-up leaders to top-down

leaders, so easier access to power. This will also benefit top-down leaders, so higher management, as it will provide input and feedback on what systems and instruments are insufficient or absent, and what is needed, to make the inclusion of sustainability more efficient and effective.

7. Make sustainability performance transparent, first internally, and either secondly or simultaneously, externally. This will help with making sustainability a selling point and also motivate people within the organisation.

8. Improve the information network, to improve capabilities of also non-ecopreneurial or non-sustainability experts. As this enables access to examples and possibilities. Which also increases the efficiency of managing sustainability inclusion, because it reduces the duration of finding the right information.

7 LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

In this final chapter, the limitations of the research are discussed in Section 7.1, and the final conclusions are drawn and used to provide answers to the two main research questions in Section 7.2. Finally, recommendations for the application of the results in practice and recommendations for further research are provided in Section 7.3.

7.1 RESEARCH LIMITATIONS

The methodology that was used in this research, so the qualitative methods of literature review, interviews and data-analysis, provided many insights. Namely, insights into the most frequent encountered barriers for sustainability inclusion during project management, the requirements for overcoming these barriers, as well as the relation between these requirements and enablers, to create opportunities for increasing inclusion of sustainability in multinational construction projects.
However, the research has some limitations:

- The participants of the interviews were mainly employees of RHDHV, which is an engineering and construction consultancy firm. Therefore, conducting similar interviews with practitioners from a contractor's side or with practitioners from another consultancy firm, could result in different findings, as they might have different perspectives.
- The participants that weren't employees of RHDHV were clients of RHDHV, which resulted in additional perspectives, namely from the client side. However, as this research didn't focus on comparing perspectives, the number of practitioners providing this additional perspective was very limited. Which is why conducting similar interviews with more practitioners from a client's side could also result in different findings, as this perspective could then add a more extensive contribution to the findings.
- The participants of the interviews all worked at multinational firms and also mainly worked on multinational construction projects in the private sector. Therefore, conducting similar interviews with practitioners of national firms or with more practitioners involved in projects in the public sector, could also result in different findings, as this could also add new perspectives.
- Due to the three aforementioned limitations, the results of this research might need some additional consideration before applying them in a different organization, if any new gap is identified that was not already considered in the list of recommendations.
- When data-analysis is performed on qualitative and subjective data, the findings are always influenced by the analyst. As this research entailed analysis on this type of data, the findings can be different when another analyst performs the data-analysis with the same results.
- The risk of using interviews as a research method is that the interviewer can influence the results. This risk has been mitigated by solely using quotes from interviewees as data and being considerate of this risk by posing the questions as open as possible, to limit the possibility of steering the answers towards a certain direction. However, this risk can never be fully mitigated which is why this remains a limitation.

- In addition to the previous limitation, the personal perception of me, the researcher, was that sustainability is very relevant and an urgent matter, thus should be a main focus point in project management. This could have resulted in performing the analysis with much scepticism on the current sustainability inclusion, thus with a potential negative view. The limitation of this is that the outcome of the analysis thus could have been different when it was done by someone with a more optimistic, ignorant or positive perception on the current sustainability inclusion in project management.
- The proposed recommendations were not tested in practice to check or prove their effectiveness. Hence, it cannot be concluded that the proposed recommendations, such as meeting the requirements for inclusion of sustainability, are sufficient or a guarantee for success, when trying to apply them in practice or in a different organisation.

7.2 CONCLUSIONS

This research has been executed with the goal to answer the two main research questions:
Firstly, what are the barriers for inclusion of sustainability in construction projects? Secondly, how can an ecopreneurial leader drive sustainability in construction projects?

The answers to each of these questions have partially been provided in Section 4.4 and Chapter 5. However, to provide a clear and concise conclusion on this research, the answers are also provided in this Chapter.

7.2.1 Barriers

To answer the first research question, seven barriers were found. These barriers are:

- **Unawareness**, of the significance of sustainability inclusion, of the meaning of sustainability, of the possibilities for sustainability inclusion, and of the demanded sustainability.

- **Change**, the presence of change, related to changes reducing the willingness to include sustainability, the absence of change, related to changes increasing the possibilities and opportunities for sustainability inclusion, and management of change, related to how change is managed as a threat, that needs to be mitigated, instead of as an opportunity.

- **Non-alignment**, of ambitions and actions, so a strategy unsuitable for meeting the ambitions, of stakeholders, of expectations, and of resources.

- **Non-incentivised**, due to decisions being driven by incentives that do not include sustainability and also are insufficient in including sustainability indirectly. Namely the incentives: Data, Risk aversion, compliance, costs, economic benefit, and image.

- **Constraints**, so the presence of four main constraints, which are market, resource, power and expertise.

- **Unsustainable vision**, so having people and organisations, influencing the decision-making, that are not innovative and/or non-ecopreneurial as well as having no consideration of this.

- **Limited transparency**, which is the existence of certifications, and methods for making impact and sustainability performance visible, that provide insufficient transparency. Enabling apparent sustainability and miss-use of certifications.

7.2.2 Opportunities

The second research question has a more multidimensional answer, as different ecopreneurial leaders can drive sustainability in different ways. So, in Section 7.2.2 to Section 7.2.2, it is explained how leaders of each institution can drive sustainability inclusion. But first, is there a difference in how an ecopreneurial leader can drive sustainability, compared to a non-ecopreneurial leader. As came forward in Chapter 5 is one of the conclusions that there is no necessity for ecopreneurial leadership. Among the findings ecopreneurship came forward as sometimes being present among leaders, and that having ecopreneurial leaders involved with project management can have a positive influence on the inclusion of sustainability in projects. So, involvement of ecopreneurial leaders, compared to ecopreneurs and non-ecopreneurial leaders, already drives sustainability inclusion. But, what also came forward, both in theory and in practice, is that decision-making is often influenced by multiple stakeholders and parties. Which makes the involvement of ecopreneurial leaders a benefactor, but not a solution for the present sustainability barriers, as ecorpeneurial leaders are facing the same barriers.

So, to overcome these barriers, the requirements need to be met, and an ecopreneurial leader is not one of these requirements. Although, meeting these requirements will be easier, and more successful, when they are enabled or met by an ecopreneurial leader. As ecopreneurial leaders will be more incentivised to use and enable the required instruments and will require less, to drive a transition towards more inclusion of sustainability in multinational construction projects.

Organisations

A leader within an organisation that is involved with management of construction projects can drive sustainability by meeting the required instruments management, strategy, information network, training and publication of performance. In addition to this an organisational leader should also aim to meet the requirement of material passports, although this requires involvement of other organisations and institutions, thus collaboration or cooperation.

Management

Leaders within organisations need to enable and improve more focus on sustainability during project management. They should also manage sustainability inclusion better, to ensures that sustainability is not only initiated but also maintained throughout the project process. This then approaches several barriers.

Management of sustainability should be used by top level leaders to: Manage mobilization of sustainability ambitions and awareness throughout the entire organisation, and enable management of sustainability in projects by earlier and more active involvement in projects.

Management of sustainability should be used by lower level/project level leaders to: Manage sustainability inclusion in projects by challenging ambitions, including

more expert knowledge, providing examples, approaching change as opportunities and pushing towards more sustainability inclusion and maintaining that decision. This enables more awareness, among the people involved in projects and ensures alignment as well as mutual understanding, contributing to not only initiating sustainability inclusion but also maintaining it as less unexpectedness's will occur due to this better and mutual understanding.

Management of sustainability and sustainability ambitions by leaders on different levels throughout organisations will thus contribute to mitigating the barrier of unawareness, will contribute to mitigating the barrier of non-alignment by this increased mutual understanding and awareness, will contribute to mitigation of change, as better management of sustainability inclusion reduces the reduction of sustainability ambitions after changes occur and it includes change management, and finally, it helps mitigate the power constraint, as higher management will be involved thus power is better accessible and more present.

Strategy

Top-level leaders within organisations need to develop a strategy on a corporate level, which entails an ambition, but also plans for achieving that ambition. This will enable the opportunity for project managers to link project performance to the strategy, which will enable more initiation of sustainability as well as better holding of the initiated sustainability inclusion, throughout the project process.

Bottom-up leaders within organisations need to use corporate strategies to gain support for inclusion of sustainability in projects. As they can link project performance than to strategies to create incentive.

The instrument of strategy will thus approach the barrier of unawareness, change, non-alignment, non-incentivised and insufficient management of vision.

Information Network

Top-level leaders need to provide financial resources for, and assign people to, the task of improving the internal information network.

Bottom-up leaders need to contribute to the improvements by providing their input based on experiences of the current information network, on what would work better. So that information can become more accessible for the people who need to access it.

This instrument will approach the barrier of unawareness and partially the expertise constraint.

Material Passports

Organisations and leaders on all levels within organisations need to start seeing materials as limited and demand innovation in the form of development of material passports. However, leaders within organisations have limited capabilities to develop these, so their responsibility is to demand them, and mainly to start using them once they become available, regardless of whether the use is enforced.

Training

Top-level leaders need to provide and demand training on sustainability inclusion, which needs to include elements such as several possibilities for sustainability inclusion, how to measure or compare sustainability and how to challenge sustainability ambitions.

Top-down leaders thus need to provide the resources required for training and they need to demand from everyone within the organisation, but primarily the project managers and consultants, that they follow the training. They should also position themselves approachable for feedback on how to improve the training.

Bottom-up leaders need to follow the training and provide feedback on what the training should entail, to improve the quality and use of it.

This way training will enable more awareness, will enable change and will contribute to managing present visions. It will also help to overcome the knowledge/-expertise constraint.

Publication of Performance
Top-level leaders need to demand internal publication of performance and bottom-up leaders need to publish the performance internally. This will increase awareness within organisations and improve the management capabilities.

Government

For the government as an institution no distinction can be made based on the findings between the type or level of leaders that is supposed to undertake the actions. So, when talking about leaders within the government a reference is made to legislators, so a leader or leaders being someone or people with the power to develop and enforce legislation.

Strategy
The governmental leaders need to develop a strategy for improving and enforcing legislation on sustainability in construction projects over time.

Measuring Tools
The governmental leaders need to enforce the use of measuring tools so that certifications become a requirement. This will approach the barrier of non-incentivised and will increase and improve transparency.

Legislation
The governmental leaders need to develop legislation aimed not only on the measurable sustainability performance, as sustainability is still limited measurable, but also on the overall performance of construction projects. So for example, including the environmental impact of the construction process, and the impact when the project is in use. They need to enable improved and increased legislation by positioning themselves open for, and actively requesting, feedback on the existing legislation, and learn from practitioners, to develop more suitable and effective legislation.

Publication of Performance
The governmental leaders should develop legislation that requires publication of sustainability performance. However, this legislation is, to a large extend, dependent on improved measuring tools. So, this instrument can only be enforced successfully by governmental leaders once the instrument of measuring tools is improved.

Industry

For the industry as an institution also no distinction can be made based on the findings between the type or level of leaders that is supposed to undertake the actions. So, when talking about leaders within the industry a reference is made to people within the industry with power and influence. This refers to a leader or leaders as someone or people with access to resources and that have power. For example, environmental committees within the industry or (groups of) leaders that have the largest stake, thus influence, in the industry.

Measuring Tools
The industry leaders should make the use of measuring tools a standard element of project management. That means that every leader involved in management of construction projects should push for use of such tools. As this will only become standard if there is an industrial/market push by making the use of measuring tools

a competitive element.

Material Passports
The leaders within the industry providing materials, so the leaders of the companies that are suppliers of materials, should provide material passports for all of their materials. This means that they need to take responsibility on not only providing the materials, but also the information on how to make reuse of them possible, as well as information about sustainability related elements such as the eco-footprint of each material and the environmental impact of the production of each material.

Society

The leader of society is not person, but when referring to a leader of society, what is meant is that society as a whole should take the lead, thus be a leader, on using the power that people of society jointly have. As society can push for sustainability inclusion with the power they have via social media and their power as customers. This can also be a spokesperson for members of society.

Management
Society should manage sustainability inclusion by demanding accountability of organisations, the government and the construction industry. So with demanding accountability they can manage the sustainability performance of the parties involved in multinational construction projects.

Publication of Performance
Society should demand the publication of performance and letting it become of influence on their purchases, use of products, support of companies and organisations, etc. This will approach the barrier of change, namely the absence of change, it will approach the barrier of transparency and it will approach the barrier of non-incentivised. As society can reduce the benefits linked to less sustainable options, thus less inclusion of sustainability in construction projects.

7.3 RECOMMENDATIONS FOR FUTURE WORK

From this research several recommendations can be provided. These recommendations are for practice, which are listen in Section 7.3.1, and for future research, which are listen in Section 7.3.2.

7.3.1 Recommendations for practice

As this research was aimed at improving sustainability inclusion in management of projects, by linking practice to theory, the findings already entail recommendations for practice. Namely, what different leaders can, thus are recommend to, do. As well as a recommendation on which actions to undertake in what order. Nonetheless, are there several recommendations for practice, related to these conclusions, and also recommendations for practitioners who aren't leaders and how they can still contribute to improvement of sustainability inclusion. These recommendations are:

- It is highly recommended to check the effectiveness of the proposed actions and instruments, by starting to use and apply them on several construction projects, and continuously provide feedback to make them most suitable for application in practice and most effective for increasing sustainability inclusion. To ensure full maturation of the suggested instruments and approaches.

- On the organizational level, it is recommended for RHDHV, but also for other consultancy firms in the construction sector, to set examples with internal projects, to provide a learning experience for employees, and to improve the ability of advising clients as well as prove to clients the positive impact of increasing the inclusion of sustainability. This can also contribute to the training instrument, as it creates experiences and awareness and it manages change. Possibilities for this are to start with projects of minimal risk and minimal complexity, as these have more ability to deal with the additional complexity of sustainability. Think of an office, or multiple offices at different locations, for internal use, instead of for a client.

- During the project process, there are always several moments of chaos during which time pressure is increased. To prevent that such moments result in going back to old habits and limiting the use of instruments, it is recommended to have additional people assigned to keeping track of the situation and how sustainability inclusion is being maintained. They can then either host sessions to get back on track, or provide insights afterwards on how to deal with similar situations in the future.

- From the results it also became clear that employees are often just inconsiderate of sustainability inclusion, as they do what is requested and nothing else. So, beside the use of instruments that are recommended, as the development and implementation of those will take time, it is recommended to have methods in place, or employees assigned, to keeping track and managing the sustainability performance of projects. This will enable oversight and better visibility of which types of projects or which project managers require more guidance on including and maintaining sustainability.

7.3.2 Recommendations for future research

- The scope of this research was multinational construction projects, because they often have more resources available, tend to be less risk averting and have higher appetite for innovating. However, it is recommended to extend the research into national construction projects, as especially educational projects can also be very innovative and have many resources available. This can provide new insights on the possibilities for sustainability.

- This research focused on project management, so mainly the barriers present in the initial phases of projects. But, it is also beneficial to focus on the execution phase in future research. As the findings of this research include that the execution is a barrier due to several reasons, such as resource availability and lack of expertise available. However, without further research into the execution barriers, so present at execution or construction companies, overcoming these issues remains difficult.

- It is recommended to do further research into several of the instruments, such as the measuring tools. As this research provides findings supporting the need for improved measuring tools, and that this improvement can enable more sustainability inclusion. However, what these tools should entail and how to develop them, requires further research.

8 REFLECTION

On a final note, I, the researcher and writer of this report, want to reflect on my research process. Sustainability is in my opinion a very fascinating and relevant topic. Researching this topic in combination with another one of my fascinations, construction, has ensured that I have been highly motivated and ambitious throughout this research. However, when reflecting on my affinity with the subject, this also resulted in a personal perspective on the subject, that could have been of influence on the outcome of this research. Nonetheless, I was aware of this potential influence and have continuously challenged the objectivity of the findings. This was a difficult task but I improved my ability to do research with the utmost objectivity, throughout the research process. Thus, when reflecting on my ability to perform research objectively, I can state with confidence that I have improved my research capabilities and I have delivered a research report with valid and relevant findings, useful for both the academic field as for practice. Regardless of my affinity and personal perceptions.

My fascination and personal affection with the research subject has provided me with much challenges though, as I wanted to research more than was possible in the given time period, and my perfectionist tendencies did not help.

Nonetheless, the result of the last couple months is a research report that I am proud to present. I believe that with the right people, intentions and tools, anything is possible, and I am very optimistic that this research can contribute to reducing the negative environmental impact of the construction industry.

I feel like the key to success of any necessary improvement, is to link the academic field to practice, to have grounded theory as well as knowledge on how to approach it in practice. I am thus happy to have been able to do research into one of the required connections between theory and practice. I also believe that my personal interests in the research topics has increased the value of this research. Even to such an extend that potential research limitations caused by my affection to the topic, has been compensated, as it kept me motivated and focused throughout the research process. This has increased the value of this research as it enlarged the scope and findings, compared to when the research would have been done with less motivation and drive.

The research journey has not only enabled this research report, but it has also taught me many lessons, some of which are:

- It is valuable to always balance faith in your own beliefs and thoughts, with the advice of others. I initially felt the need to either do what I believed was the right thing to do, and not ask for feedback on that, or to ask for feedback and do what others advised. Throughout the research, mainly as my faith in my research capabilities grew and as I had heard the comment:"It is your research, so you don't have to take my advise, you are able to make the right decisions" multiple times, I became better at discussing my thoughts and approaches with others, not to do solely what was told, but to challenge my thoughts, and reconsider them, but to still do what felt right. This was sometimes the same as my initial thought, but also sometimes not. So, this valuable lesson of challenging my own thoughts by involving others, without disregarding these thoughts without consideration of my own reasoning, is definitely one I am grateful for, and will continue to improve.

- Every problem encountered can be solved, as long as you put in the work to understand the root cause. Whether that is in professional life, such as with understanding why certain project decisions were made instead of accepting them, or in personal life, such as when I felt overwhelmed at times, and was able to overcome it by writing down sub-tasks and to do's instead of seeing this research as one main, and overwhelming, task. So, this was a lesson on how to tackle large and difficult problems and approaching them consciously instead of getting overwhelmed or discouraged by them.

- Reporting to 5 different people, my committee, all with different levels of involvement, was challenging and required good management. Over the months I believe my ability to manage this research process, thus the communication, the expectations and ensuring alignment among everyone, has improved.

To finalize my reflection and this research report, I would like to say that I hope there will be a future in which sustainability becomes a norm, an ongoing conversation topic and a standard part of all processes. We can develop instruments and have people take the lead, and many more others can research several aspects and perspectives of and on sustainability. But, eventually it should not be an option anymore and things such as lack of benefit shouldn't be an issue anymore. It should become a requirement and standard and everyone should make a contribution to delivering positive change.

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A INTERVIEW PROTOCOL

Interviewer: Juliëtte Valk
Current Title:
Interviewee: [Name]
Organisation: [Organisation Name]

Introduction
Firstly, I would like to thank you for your willingness to participate in this interview. As mentioned in my invitation letter, this interview is part of my graduation research, carried out for the MSc Construction, Management and Engineering at the TU Delft.
My research aims to develop strategies based on retrieved knowledge of the most common drivers for including or excluding sustainability in multinational construction projects. These strategies will aim to enhance sustainability in such projects. Previously, I have conducted a theoretical study which resulted in an extended definition of sustainability in general and sustainability in construction projects. It also provided understanding of the interrelations between leadership, project management, decision-making and achieving sustainability. The questions posed during this interview will thus focus on these concepts.

This interview is the subsequent step of my research, which aims to gather new data and insights on the researched concepts, namely data based on experience, which will form the main source of data of this research. The outcome of this qualitative research will be experience-, and evidence-based strategies, for each encountered category of drivers and causes, to improve sustainability in multinational construction projects.

This interview consists of four main sections, focused on your experience in the field of construction projects. The information gathered will be used for academic purposes only and will be treated confidential and in accordance with the FAIR guiding principle. The duration of this in-depth interview will be approximately 45-60 minutes. You may refuse to answer any of my questions, and you may withdraw from this study at any time.

Practicalities
To validate the data retrieved throughout this interview and used for my research, I would like to ask you if you allow me to record this interview. The recordings will be properly destroyed after confirmation of my supervisors of the transcription's validity.

[RECORD]
The recording has started, for confirmation I will repeat the question. Are you okay with this interview being recorded?

Part 1 - General
I would like to start by hearing more about your experiences as a Project Manager in general, what type of projects you mainly manage and the team you operate in.

- Can you tell me more about your role and experiences related to project management?

Part 2 - Construction projects

- How do you manage the decision-making throughout the project process?

- Can you highlight some of the challenges you encountered?

- Do you often encounter issues related to needing authorization from people outside the project teams?

Part 3 - Sustainability

Sustainability is a very broad term with a wide range of definitions. It can thus be included in projects in several ways.

- How do you encounter and consider sustainability in your work?

- What is your experience with including sustainability in projects?

- How do you manage and push for sustainability?

- Is there a difference, if so, what is it, between what is desired initially in the project and the outcome?

- Can you highlight some of the challenges you encountered related to sustainability?

- What are the main drivers for including or excluding sustainability?

Part 4 - Strategies

- What is your experience with the role or influence of leaders within organizations of clients you have worked with?

- Do you think they influence the decision-making of directly involved project managers?

- Do you think leaders within organizations you have worked with, are often entrepreneurial/ecopreneurial?

- What do you think, based on your experience, about including authorized people (leaders) earlier on, and stimulating them to be more ecopreneurial, so more open to including sustainability in projects?

Part 5 – Conclusion

- Do you have any additional experiences related to sustainability, project management, decision-making or entrepreneurial leadership, that you would like to share?

Closing

I would like to express my gratitude for making time for this interview and your contribution to my research. I gained valuable knowledge.

[Optional, if the interviewee ticked that they would like to receive my project update once it is finished]

I will share my results with you once my graduation thesis has been finalized.

B | INTERVIEW INVITATION LETTER

Dear [name],
With this letter, I would like to invite you to participate in my graduation research titled "Understanding the drivers and limitations underlying sustainability ambitions to increase inclusion of sustainability in multinational construction projects with strategic project management and ecopreneneurial leadership."
This research is carried out to fulfill my master's in Construction, Management and Engineering at the Faculty of Civil Engineering of Delft University of Technology. This thesis aims to provide strategies for increasing sustainability in multinational construction projects, which are developed based on knowledge gathered during the interviews, on what drives inclusion and exclusion of sustainability. The final output of this research will provide applicable suggestions to improve and maintain the inclusion of sustainability in construction projects.
This interview will last approximately 45 to 60 minutes. I would like to ask permission to record this interview for transcribing and analyzing the information. The transcript would be coded anonymously, and the original recording will be deleted once the accuracy of the transcript has been confirmed. It is possible to stop the interview at any time and you can always change your mind about participating. You can also change your mind at a later date and withdraw your participation. During the interview, you are free to omit any question.
If you participate, I ask you to sign this consent form at the next page and return a PDF to me. I will also sign the form and return the PDF to you. I do to ensure that I will treat your data and answers with confidentiality. Your organization will not be able to read the interview report. I only produce a general and anonymous report on the experiences of corporate real estate managers. When I quote your words, I promise not to use your name and make sure it is not clear who may have said this. I will erase your name and contact details immediately upon completion of the investigation.
Should you have any questions about this study, please do not hesitate to contact me (email: J.L.A.M.Valk@student.tudelft.nl).

Sincerely,

Juliëtte Valk

C INTERVIEW CONSENT FORM

Interview Consent Form

Interviewer: Juliëtte Valk

Title: *Sustainability in multinational construction projects: understanding the barriers and drivers, to increase sustainability inclusion via ecopreneurial leadership.*

Interviewee:

Organisation:

Please tick the appropriate boxes:

	Taking part in the study	**Yes**	**No**
1	I declare that I have been clearly informed about this research. I have been able to ask questions about the study, and my questions have been answered to my satisfaction.	◯	◯
2	I voluntarily participate in this study. I understand that I can refuse to answer questions, and I can withdraw from the study at any time, without accountability.	◯	◯
3	I understand that taking part in this study involves answering questions that will be audio-recorded, with the sole purpose of transcribing the interview and analyzing the information, after which, the recordings will be deleted.	◯	◯
	Use of information in the study		
4	I understand that the information I provide will be used only for academic purposes of the graduation project and corresponding presentation at TU Delft, unless indicated that certain information is confidential.	◯	◯
5	I understand that personal information collected about me that may recognize my identity [e.g. name and/or email address], will not be shared beyond the study team.	◯	◯
6	I agree that my information can be quoted in research outputs. In case of quotation, I will be able to review the relevant text chapters prior to its publication.	◯	◯
7	I understand in case that this research will be published, I will not be identified as a participant in this research in any publication.	◯	◯
	Future use and reuse of information by others		
8	I acknowledge the publication of graduation thesis results at the TU Delft educational repository to be used for future research and learning. The graduation thesis document will not provide my name or other personal details, unless agreed otherwise.	◯	◯
	Results		
9	I would like to receive a short summary of the results of the study at the end of the study. For this reason, I give permission to keep my name and address details until the end of the research.	◯	◯

Date (DD/MM/YYYY): _____

Full Name (in capital letters): _____ *Interviewer*: Juliëtte Valk

Participant's Signature: *Signature:*

_____ _____

Figure C.1: Interview consent form

D QUOTATIONS, CODES AND CODE GROUPS

This appendix provides a full overview of the code groups, so the axial codes and the code content of these groups, so the open codes. The code groups were generated in four steps:

1. Transcribing the 16 interviews;
2. Creating the quotations, by highlighted data segments, so segments of the transcripts, that are important, and a relevant contribution to the interview aim and research questions;
3. Assigning codes, descriptive labels for the content of the quotations, to each quotation;
4. Grouping the codes related to each other in code groups;

As explained in 4.4 the outcome of these steps is a total of 40 codes, belonging to 10 code groups:

1. Unawareness (4 codes)
2. Change (3 codes)
3. Alignment (4 codes)
4. Incentives (6 codes)
5. Constraints (4 codes)
6. Vision (3 codes)
7. Transparency (2 codes)
8. Leadership (2 codes)
9. Instruments (8 codes)
10. Institutions (4 codes)

In 4.4 the power quotes and several supportive quotes have been provided. To support the conclusions of this research, the full list of quotations are listed, per open code, in this appendix. First, in D.1, an overview of the Axial Codes, Open Codes and the no of quotations, is provided. Next, the full lists of these instances are explained per code group and per code.

D.1 BARRIERS

D.1.1 Unawareness

"I think quite often it's a matter of investment. And if the client doesn't consider it then It's just not going to happen."

"Because we don't think about it, we don't budget it. "

"We go from very high up to more and more detailed. So we start with the little information we have, and we need to work towards a final product that satisfies the requests of the client. And we manage along the way non-stop the aspects of money, time, quality and planning, so that everything stays clear for the client. To ensure it remains clear for each phase what that phase has delivered on those aspects and that it is continuously aligned with the plan in place."

Axial Codes	Open Codes	No. of Quotations
Unawareness	General	9
	Significance	3
	Meaning	6
	Possibilities	8
	Demands	4
Change	General	2
	Management	4
	Absence	7
	Presence	8
Alignment	General	1
	Ambitions and actions	7
	Stakeholders	3
	Expectations	1
	Resources	5
Incentives	General	7
	Data	5
	Risk Mitigation	4
	Compliance	7
	Finance	7
	Benefits	7
	Image	2
Constraints	General	4
	Market	6
	Resource	2
	Power	9
	Expertise	7
Vision	General	3
	Ecopreneur	2
	Type of Innovator	2
	Type of client	4
Transparency	Certifications	6
	Visibility of performance	6
Leadership	General	3
	Top-down	12
	Bottom-up	1
Instruments	General	1
	Managing	5
	Strategy	8
	Measuring Tools	10
	Laws and regulations	10
	Information network	3
	Material Passports	3
	Training	6
	Publication of performance	10
Institutions	General	2
	Government	3
	Industry	2
	Organisation	3
	Society	3

Table D.1: Codes & Code groups

"I wouldn't say it's the topic brought up just to to the table. We the three things, budget, scope and time. These are the things that are always, say, defined in the presentation decks. This is these are the three basics of the project. So that one is there's never a separate sustainability project."

"And also We are in transition, aren't we? So we also have to make this transformation, so it is very important that we also create a lot of awareness within our organization. And that we will also make project managers aware of the fact that these advisors have to step in and not just the standard advisor and. This is actually possible on any project."

"Over the course of time, decisions have continuously less influence, so at the start of the project, you actually do most of the decisions, with the most impact, with the least amount of information."

"Sustainability has to be at the start of the conversation. It cannot be right in the middle or at the end, because again, it is too late to do so much, it cant happen in the end."

"In the method of working from high up to detailed are also choices you can make in the beginning. Those can be influenced quite easily, but as you continue the decisions become more difficult to influence and more costly"

"we want to provide as much clarity on what the sustainability ambition is in the initiation phase and program of requirements, because introducing those aspects later in the process works very cost increasing."

"It is like we should have foreseen this as well. But kind of our thought was like oh you didn't tell me, so I didn't think about it."

Significance

"Even if money wouldn't be a problem, because money is most of the time universally a problem, a constraint, even if it wouldn't be a problem, then it comes to the knowledge, to the awareness of the real internalization of the significance of sustainability. Most of them are not trained for that. They are trained for making strong structures. . . Many times the decision maker doesn't have that knowledge."

"Normally we don't think like for example, let's not use concrete because that is better with the environment. . . .Normally we will just think of what can we add on top of what we're doing to make it more sustainable."

"So that's why you always end up going for things like, yeah okay I will plant a tree, or I will have a rainwater tank, or I will have permeable pavers because it's like, well, nobody cares."

Meaning

"There is perhaps one component here of how people understand sustainability and therefore project managers understand sustainability. The way how I see project managers and construction work is that they have to be efficient and cost effective and whatever corner they can cut on one side, they can add it later on in the stage where its going to be needed, which is almost at the end. And there is a lot of failures I have seen that. So sustainability ranks very low because they might think, I have to rethink the whole process I have, I can not work with these materials. This

is going to cost me a lot of time. People are not trained to work on this."

"There was a mismatch in that we had it clear that there was a sustainability ambition, but we couldn't precisely explain what that ambition was"... "And then the people that were working it out for us, were thinking from the limitation of return of investment, and then you notice that you don't have the same premise for sustainability in the design of the building"

"The definition of both parties is not exactly aligned, so that is something that can happen quite a lot as well."

"We do encounter difficulties regarding the decision-making, a lot of times what happens is what they're asking for, we will interpret it as something else."

"In practice it shows that it is very easy to set very high sustainability ambitions, but in that phase, it is sometimes difficult to estimate the financial impact of those, those sometimes become clearer later on, which can result in costs increases and then sometimes it is decided to reduce those ambitions."

"It is often initiated, so it is often mentioned in the beginning, but my experience is that with multinational clients, and that is 1,5 years ago, but it is being brought up initially, but never with specifics, and people don't really know what they want, and as soon as people feel like its going to cost them even the slightest more, then you lose them very quickly."

"When you're really at that ground level, sustainability is really the least of your concern. Like why should they do it you know? And that's yeah because it also doesn't have to be just material or change the way you build, it can just be things that you do on site as well, just the overall process of construction as well, and that awareness maybe is lacking somewhere."

Possibilities

"Maybe it is my own lack of knowledge, I wouldn't know what I could do to make it sustainable... I don't know what I can do or maybe what I should be looking for or what I could be proposing."

"So sometimes we exclude sustainability because we just don't know that its there, we just don't know what they need to do."

"The main barrier is that they don't know about sustainability, so that they are avoiding these kind of conversations because they don't have background, they don't have even the vocabulary sometimes to approach the topic."

"That's kind of the knowledge network that everyone talks about, how can I access it. So it's not just sustainability, but it's anything, it's not ideal, its more like asking around instead of being able to find it quickly somewhere."

"I know we are capable of executing all these different things that we talk about in our strategy, and there's proof of it out there. But if I look at myself and even some of the people immediately around me. We can't explain it as well as somebody who actually did it themselves. And that's kind of common sense too. So even if there was just a simple way to practice it or simulate it, so at least you can get that kind of experience. That would be better than just reading something we did. You got other things to do, but if you actually get to do it yourself, that will

stick with you."

"Availability of information I would assume is not a problem we have. We have more information than we know what to do with, but I think that also could be kind of the problem, there is so much out there, it can be hard to find exactly what you're looking for. Unless you already know where it is, or you know somebody who knows where it is so making it easier to find."

"Pretty hard to think about it because I don't know what do I need to think about."

"I don't know like besides putting the solar panels on the roof, then what else should I do in my daily processes to achieve my companies' ambitions"

Demands

"In practice you often see that they as an organization don't know what they want. Sometimes they don't even know what each other's role and responsibility within the steering group is."

"And I'll come to find out they're not looking to do a company wide sustainability initiative or something like that. No they were just looking for a simple yes no flow chart diagram for how to assess a given system... So it's actually not even a directly sustainability related effort."

"The multi-criteria analysis actually just hasn't been filled in entirely, because you then well in the early phase haven't judged a certain aspect, and when you figure that out too late, well then I can't think of an alternative anymore, or the budget is already set and then there has to be said no."

"So why certain decisions are made and how that relates to the organization goals and ambitions, I think that is the most important thing. Whether we do that? It starts with that we often already start with technical demands... so we are immediately going forward instead of asking the question, where do they come from."

D.1.2 Change

"The key of sustainability and sustainable construction mindset let's say, is to work with what you have, and then better and innovation and technology and also be mindful of that not every single answer is suitable for every place."

"It is that component that people perhaps are too scared to talk about with clients, but it's a duty, in the same way as you want to advise your client, don't do this its too expensive, you have to advise the client, don't do this because it's too harmful. I think that is a mindset change."

"We're not gonna use anything else because we know that this one works. This what has been approved by Nike. We know where it comes from. We know the sourcing and everything. So. Same with certain furniture. We know that we're gonna go with this producer because we know how they are sourcing and so they're just things like ohh we do it this way because already somebody has established it before. So maybe it's also because I just don't six months ago that I just like hey, I work with the tools that are already there."

Management

"I would say of course on the construction during the construction, little decisions are already made. So I would say in there, the freedom it's well, you stick to what you designed but but of course we start with the design where there's a lot of interest iterations, we have input from different stakeholders. So wherever it's a very long process. Because we wanna make sure that the all the stakeholders provided their input and we have all the information from them that sometimes when we go to construction and we have somebody coming in and saying like ohh by the way, I actually for my equipment this, this, this and that. So that's the one we say. Well, that was like few months ago that's very we needed the information and he of course we are flexible because if they need it then as long as we can still provide it, we'll try to accommodate the the requirement. So I I would say because of the character of Nike where dynamic and the amount of stakeholders you have to stay flexible."

"Also, just very simple, change management. How do people cope with the changes the project brings about? How do you ensure that people accept the end result?"

"But how do you cope with that within an organization, and what impact does that have on management and maintenance? And what if we want to store those things ourselves and how? So the transition is not only on how to build a circular building, no it also has impact on the entire asset management, on the entire establishment matter."

"I think another challenge that comes with it is change management, basically putting everyone up to the same."

"What I do in my assignments is looking at what is needed on an organizational level to aid you in reaching for your goals, because you are actually doing a project differently. You need to view an assignment differently because it is not a dressing you can poor on top of it later on, because that is window dressing, so you need to do other things to ensure that you get the sustainability into the design group."

Absence

"The client also should get a different mindset, which he doesn't get at once, so the strength lies in repetition."

"I think the more and more I think about this, it also implies a change of mindset. . . ..I think we are starting to come to, but have not gotten to the point of like, do we really need this. . . we need to reconsider the way how we live as a community and then we embed social change."

"If we continue with the behavior of acting as if everything is limitless, then you can make the most amazing models and promote those, but then sustainability is not going to be achieved."

"If a project is not intended to be sustainability driven, it is very difficult to steer it, to change it. And again, its not just dictating just a couple of hours to it, no it is to work sustainably, and sustainable processes and sustainable products requires a lot of mindset change."

"It is very difficult because you really need to look at things differently."

"It is economics, it is ignorance... it is that reluctance to change, that happens everywhere."

"So that is the reluctance to change, and those are the misconceptions that you might think it requires more time, it might be more expensive and all that....But there is also just reluctance to change like, I don't trust this."

"It requires a lot of changes in processes. It requires a lot of changes in supply chains and pretty much on business models. And not all companies and individuals are ready for that change yet."

"If we are meant to adopt new materials in construction, a new way of constructing even, then there has to be a change, and again it's a transition, policies are kind of heading towards that, but again, I see this in other industries and markets, but not in construction, not yet."

Presence

"I think that is quite an issue with the network happened to kind of explain it to them that every day it's such a booming industry, that every day they come up with new data and new materials and things like that. And for us to assess them and give you good value, you need to constantly flush in that money as well, of course, so we can sort of give you that input."

"So I guess money and time is one thing, but like, you know, when you work on a project for like 2 years, then by the end of the 2nd year, things have changed. The industry has evolved."

"That is indeed a theme that you know often see, but also very simple when projects have a long duration, then it makes sense that people change their minds... Sometimes a project is being overtaken by time."

"That is the tension field we are now in, because we need to start complying with the total cost of ownership, so you notice that that has a lot of impact on an organization, so the organization structure needs to follow along."

"We often manage based on the GROTIK aspects, so that is money (Geld), risks, organization, time, information, and quality (Kwaliteit). And those also correspond with each other, so those 5 aspects, or sorry, 6 aspects, often are those triggers due to which you can come to scope changes."

"You do subproject A, then by the time you come to subproject D, what the client wants is also changed because they are saying that they're buildings are running in a certain way. So, then you start again."

"When you are making a project, this project is based on a contract. So, the client has to agree ahead of time. If you make a change in those listed materials in those drawings that have been authorized, you need to go back to the contract and make an amendment. So, when you are in the construction implementation phase, you are too late. "

"Often are there 6 aspects, often they are triggers, due to which you can come to scope changes...Organization can be for example that very important players in the project organization go away...that can result in that you are going to do it

differently."

D.1.3 Alignment

"The main challenge is deciding how to achieve the requests and ambitions, because sometimes people involved are not aligned or the resources are insufficient to achieve the ambitions, causing conflicts. This sometimes is caused by insufficient leadership from the client side, and can require higher up leadership involvement, so getting them on board."

Ambitions and actions

"People can care about like sustainability and the environment on an individual level, but if your company is not aligned with the same thinking, even though they say so, then it can be really hard also to find that balance, because then you're limited with what you can do."

"If you haven't linked it to the organizational objectives, it can disappear very easily, and then it is more difficult, or more expensive, when you pick it up later on."

"A lot of the companies, the way that I see it, this is a high management decision and I think that happens with other companies as well, it's a high management decision but to the day-to-day employee it's a bit hard to translate."

"We have a company strategy, and its quite hard for us to know what we need to do as a project manager. Managing a project that includes sustainability targets, I think. "

"Knowing and doing are the best and the worst enemies sometimes. I know I have to do it, but I don't know how to do it, so I'm procrastinating the whole time and also the system, it is a cost, it has to be embedded in my PNL, profit and loss, so at the beginning it is only seen as a cost. Sometimes its seen as an investment. But in the end, you don't see immediate results they submitted, doesn't provide short term results. Of course, you can have some low hanging fruit, but its more sustainable development and it means long term strategies, it means long term commitment."

"It's about closing the gap between knowing and doing. We know it, but we don't do it."

"If you have not included in your real estate strategy your ambition that this is an important point, then it remains a lot of chit chat without actions."

"I know there is a document. I know that there is ambition written down, but I haven't really seen it like. When I joined the company like hey, this is what we are working with."

Stakeholders

"There are of course the first agreements that have to be written down by both parties, and some clients understand that, while the other client might be less organized, or there might be a lot of people in the steering group who all see themselves

as partial client, and you see that they are not aligned"

"There are some clients that have an approval process in which a lot of different stakeholders have vote. And the problem is when not all those stakeholders are involved from the start, then sometimes later on in the process there come demands or wishes to the table, that we just can't implement anymore. So stakeholder management at the client side is very important for an effective process."

"When it comes to applying it in the real world, you have to take into account that a lot of people have to be aligned and brought to the same table."

"I think the way that I experience it, where I have the most challenges is scope demarcations, there is a way that we understand what we're doing and there is a way that they expect the deliverable to be or there's their expectations and there is our expectations. And then I think at the beginning of the project, we don't have so much time for clarifying exactly what is it that we're delivering, exactly what is it that they expect to receive."

Resources

"So they have only freedom within certain boundaries, especially financially, that have been set, and that is where you often encounter problems, that those boundaries just don't fit."

"I think we have very structured approach to the project scale. So depending on the project budget, basically it's budget related. So up to that budget you need only approval from let's say one or two level above you then next budget would goes up. So we try even purposely to keep the project under certain thresholds because that just makes things easier. So if you have the estimation for like slightly over the that budget you say OK now we have to find. To bring it down just under that line, because that will make everybody's life simpler"

"But it's often really limited by how much money they can spend, and I think that that balance is not really out there in the industry at where you can get your required building, and still make it sustainable. And that's where I think sustainability ends up taking a hit."

"Number one is budget constraints. That there is no wiggle room, once that you are in the implementation phase. When you are in the design phase you can do a lot of things, but still budget constraints are a problem."

"Projects are not meant to take time and reconsider things, not they are meant to start one day and finish the other one, and if they have delays, somebody has to pay for that."

"What you often see is that the market, materials, staff capacity, that they interfere. Inflation, scarcity of products, logistic obstacles."

D.1.4 Incentives

"I would say, for the level of people that I've been exposed to the most over my career, are usually the operations leaders and the business leaders for individual branches or groups of factories and things like that. So most of them are usually performance driven, like they have targets that they have to hit. Not just to make

money and keep themselves going, but to really stretch and grow and get better in all things, performance efficiency, sustainability, environmental impact, everything. So most of them are performance driven. But also for their position, they have to be, because they're in charge of running whole operations, so they rely on people who can really focus and do the research and set good targets for those leadership people to execute and at the same time I have also worked with people who research and set the targets, and I think to do that job well and enjoy it you have to have that kind of mindset of ecopreneurial, you have to be thinking well outside the box, not constrained by operations nor constrained by money or legality or politics or whatever, but really about what is possible, what is the right thing to do and how far can we really push it?"

"It has to make good sense for people to put themselves out there and take what I will call political risk."

"So from my experience there is definitely motivation to do it, it's not just words, its always driven by incentives though."

"There has to be enough reason for everybody, who needs to be at the table, to get some skin in the game and keep working together... To really back it up and follow it through, we need to have real world proof of it actually happening and not just one or two instances, but it needs to be happening everywhere. "

"What the benefit is in euros, that is often very difficult. You see that for example there is an increasing inflow of young employees, so that way you see that it has brought you something, that apparently something has changes, so you can see it but not in terms of money"

"Sustainability does not always bring money, it brings different type of intangible benefits and that's very difficult to link to KPI's. And if it's not measurable then they don't, they cannot manage it and then they get confused. Or, it's not an incentive."

"From the business community and especially from the industry, that incentive is even less. There it is also more on the window dressing, so the problem is that there is not yet felt in all those board rooms the urgency to really take big steps here now and that starts with a vision and an ambition".

"The construction industry, it's not the core of the company. There is a very strong sustainability message that is on the product."

Data

"It's also like how much can you quantify, because when you work with improvements and things like that, you always say, this is my improvement target and it means this number of CO_2 emission or this number of cash, and if you can't show a number then I think the argument becomes really hard. So I would never go to someone and say, okay, lets do this just because it's going to save the planet."

"I can put the finance aside for some time and say, okay, we will purely do this because it's saving X amount of CO_2 emissions and that's it. But I think that it's still important to have that number and not just say, yeah okay I will change this to timber. I don't know what it's going to do, but it seems like it's a sustainable way. So it always got to have a quantifiable argument, I guess is what I was coming to."

"You can't get EPDS, which are environmental production data, or something like that, that come with every material. . . ..So if I was to tell someone to replace the rooftop with something else, I have nothing quantifiable to show them and then how do I convince someone, because there's just no data out there."

"I'm sure of 10 years from now, the industry would have drastically changed and then sustainability may be your main driver, but unless you can fully quantify everything that you're putting in a building, I don't think you can ever get a full representation of what your carbon impact is and how much you can save."

"Also they can share for themselves that, I made this decision because it was going to have this impact, and it just doesn't have to be financial impact."

Risk Mitigation

"Sometimes it is also difficult for them, because you can not always foresee every potential consequence. And that is not nice, because perhaps it is going to cost a bit more, but as I mentioned it will always add more value in the future, but we don't always express everything in terms of money, so the image isn't complete."

"It is also a question of training finance people because you have to reflect these costs from a sustainability point of view. So it is not only the business activity of the company, it is also how the company is impacting environment and society and you have to be able to measure this impact to allocate this costs or impact in your PNL or in you risk assessment."

"For example, the project can be called quite controversial, appears, or we see that it is difficult to find executing parties, so contractors, for it. Well then if that risk appears at a certain moment, and you cant get them out of the way, people can give the sign of well then we are going to do the project differently, or reduce it, or subdivide it into smaller pieces."

"The other challenge I see with these industrial type projects for multinationals is time is always under tremendous pressure and a lot of times the client or the project owner they typically don't have big appetite for experimenting with new things on such a project because this project is part of a whole portfolio or a whole program. It has to be up and running by a certain time, it's got to be predictable, you know, it's got to fit into a very specific frame of timing, cost requirements, deliverables, other criteria, so it's not that they aren't open to trying things, but those things have to be already tried and proven."

Compliance

"I think there is only one bottom line, actually only one type of driver, that is that we don't enforce it, it's not going to happen."

"What is mainly a challenge is that the current Laws and regulations aren't sufficient, a lot of steps need to be taken with that still."

"The second one is that our project managers and also designers and engineers, there are enough people that say, yes but it isn't legislation yet, and they only do what must, and they don't cross or exceed that."

"The rest is behind that. They need to be forced by the government, via laws and regulations, so they comply ."

"Some just want to comply with laws and regulations and don't really feel the need to put more money into it than necessary"

"Nowadays it is often just a given, because you have of course demands from the government, so then it becomes a requirement. If you don't meet that, then you have a useless product.... So you are just dealing with a very hard requirement that is just imposed in terms of durability. "

"If companies are procrastinating maybe another potential risk that we come up is that investors are not investing in your company because your are not meeting their basic requirements. So if you need funding you should be playing smart again, at least be a decent level of ESG criteria, otherwise maybe you will lose shareholders and this is an extra problem."

Finance

"If they just focus solely on costs, then its often not possible, and then you just do what is required due to laws and regulations."

"Then we need to review the cost for example and then go back to the client and say, hey, we are noticing the costs were going higher because this and this and this and this is what shall we do. Let's make a decision together. Do we implement changes, do we change materials?"

"I'm not going to say that it's limited, but all the infrastructure is there they all we're always opt for the I don't know. I think the cheapest solution. And they already took the decision."

"I think the biggest challenge is money, I think or investment costs... so its always a little mismatch on their own end, that they want to do it fast, they want to do it cheaper and they're thinking about the initial investment and a lot of times, they're not thinking about the operational investment."

"In my experience, finance has always been the decision-maker."

"I think it also has to do with the size of the project, so also the characteristics.... I think it also has to do with how is looked at real estate and in which part of the board of directors it belongs to, and what you see traditionally is that more on the operational side of the board of directors and that side is also commonly steering on costs instead of benefits. "

"It's like, as long as we get paid for what we do and you know it's adding value because I obviously, and I think I'm really a project manager in that sense, because like it really sometimes doesn't matter to me if the building is green or blue as long as they can pay for it."

Benefits

"You always need to be able to reference everything you do to how it benefits the organization and the goals and benefits that they have, and then only the organization but also their context. If you can't refer your decisions to that, then you're on drift sand.... If you do that, but you don't know why or how you can link that to

the organization goals, then that decision can easily be written out later on."

"But I don't have the number how much it is going to cost you less. So I cannot, I don't have the feeling that I have the tooling to push my idea a bit more, because normally they will ask again how much less, how much ore saving, and I don't have an answer for that."

"We do have like the options, but the implementation cost versus gain is something that we don't have just yet"

"When it is being build within the side that steers on costs, then there is automatically a trend, to always look at how much money its going to cost, while the value that is being created is actually at the chief human resource officer"

"I'm not going to say that it's limited, but all the infrastructure is there they all we're always opt for the I don't know. I think the cheapest solution. And they already took the decision."

"The alternative would have been profitable, but no, they wanted their office building there and weren't prepared to invest in more sustainability than they needed for their own benefit."

"So that is also often a driver, budget, so bankability of sustainability... So we seek the shared interests between funding and developing, which we called the tripe value... Banks should start to see that sustainable objects become more valuable over time and more profitable, because they get reused. "

Image

"So I'll be awfully brutal here. It is definitely. It's not one of the requirements. It is like one of the requirements and they have really stringent requirements sometimes put what they want to do because a lot of it is like related to, you know them getting approvals. The municipality saying, yes you can go ahead with this project. So there is a driver behind it. How it also reflects o their company."

"The standards are also being used like, ok, this is my medal of honor, and now this allows me to just flaunt it how good it is, while the standards are not perfect at all."

"So you have to adapt your offices, you have to adapt the way you look, your stores, your showrooms. So it needs a very often refit that is not driven by the fact that the office is outdated or something really needs repair. It's just that well. The passion change the the way we approach this, our clients change the strategy of the company change so you're Adapting something that was maybe renovated four years ago, again so on what that that site, let's say this is maybe not the most sustainable approach."

D.1.5 Constraints

"I always see the assignment as a puzzle, and it never fits, because there are always more ambitions, than what is possible for the available budget. So you always have to compromise. And the biggest challenge is when the client asks for very contrary things, that are technically impossible... the second challenge is when we say it is all possible, but not within the budget, then I need to prioritize as well, what is

more important for him?"

"I think normally most of the decisions, I think the strategic decisions for the product, happen at the beginning. So that's where we will have a bit more of a challenge of what is it that they want, can we do it in that way."

"Sometimes you need a very long breath to achieve things. It can occur that when you have explored the possibilities and then conclude that its not possible, that you have to wait for a new project or innovations in the technique because the stakeholders aren't ready for it yet. So you sometimes have to come up with a lot of proof and arguments to say clearly like these are all the limitations for everyone and to take those away, to get everyone on board."

"So it is budget, it is the availability of materials that perhaps there are very little options, and the disconnection between design and implementation, even if a designer will design something with lets say wooden beams, then it comes to that the client actually wants a high rise building and this is not possible to embed it, so we have to go back to steel. So kind of that mismatch of the intentions and reality is also another thing."

Market

"Or when such a high ambition is set that it has never been tested in the market at all. How can you get this feasible at all?"

"I don't see a lot of major innovations that are also cost effective that we can use on multinational projects like that."

"Those are things you are now confronted with, that not everything is common good yet, in terms of the high sustainability ambitions, not everyone has set up their business operations and their network of sub-suppliers for that."

"So, it's like there is the corporate ambition and the money and time. But there's also that the sustainability industry has not progressed and if you take concrete as an example, like how many years that we've been working with concrete."

"There's also a limitation just out there in the industry like we you know in so many years of construction have not found a replacement for cement. . . If you don't fix that problem on like a research or academia level, no one can do anything about it."

"The other one is availability of new materials, although you can if you want to do great things, like for instance sustainable steel, there are even one or two in the world, steelmakers, kind of moving towards that, but because there is not enough technology to make a blast furnace renewable, that is sustainable, that is impossible, and when it would be available, it would be very expensive."

"So one is the material. The other one is resources, because I think you're well aware that right now the contractors are in a very good position like the market is still very hot. I know it's been hot already for I know a few months, maybe even a few years. It is a, it is still a reality. So you see that. There are not pushed to lower their prices because they know they will have work and you are in a tender when they say well actually you have to make decisions over you want us or not because we are running free our 10 there's at the same time and if you don't. Don't. Uh point as the the work will go somewhere else, so it's a yeah, it's quite competitive

also to get good partners, yeah."

Resource

"Budget, and also maybe like some technical requirements like for example during the timber building it's probably not as expensive as doing a concrete, but like you can't do timber high rises, so that's already a technical constraint."

"This is the effort we are trying to make from our team, is like how can we do business in a different way now more strategic way, because during the project maybe you don't have any room to widen the scope because of budget restrictions or other resource constraints. "

"he obstacle is the delivery times of some items. I know that delivery of both recycled materials. It's also a long waiting line or you have to schedule up front saying like hey, in nine months, we're gonna be doing that project. Please book your production line for us. So yeah, but I think that's across the industry."

"Actually here European headquarters, the leaders from here. Yeah, I can name at least one person, I would say, yeah, I see him as a ecopreneurial. That I would feel fine calling him this way. Yeah. And it's a yeah, upper management person." When asked if that benefits sustainability: "I would say it's going somewhere not yet. Umm, I think the pace, the fact that the projects have to be done within few months, we have to meet the deadlines because of that. I think as a. Yeah. And our department and we don't have time to like, hey, let's stop. Let's look at how we're doing this, because it's always something always nonstop from project to project....Yeah, not yet. I hope that it's not yet that it will come. But at the moment it's so much going on and everybody is making sure that the projects are delivered and we just do things along the way as we as we know them."

Power

Power is a constraint if you don't have it, if you can't acces the ones that have it or if you can't / won't challenge the ones that have it. "If you are the constructor, and you want to steer towards one thing, you can propose it. You can work very much, you can have the supply chain in place, but if your employer doesn't want it, the one who pays us, then that's it."

The more intermediaries are amidst that, so the lower in the organization you come in, the less mandates remain. This can sometimes be difficult because you then have less influence within your role as project manager to influence those decisions.

"What you also see, is the level of trust. You see that a lot is involved when constructing a building, and there are a lot of details, so if you then have to report on that, about the progress and also the extend to which sustainability is being considered, then often for the top-level management, it is being brought back to an abstraction level quite broad, even though that sometimes detracts what is involved."

"So, on the one side you have to make decisions with them, but without getting the time and management attention to fully involve them. So, I think that there is a tension field that can complicate that."

"People that we are talking to in our clients and this is a disadvantage because normally our people, our engineers, they talk to mainly technical people. So they don't have access to sustainability managers or decision making managers within sustainability field. So they are either commercial people because our bids, our account manager, they talked to commercial people in our clients. So sometimes they don't have any access to the right people, and this is something that we are trying to force. How can we get the right people to the table? We need people with power, with enough power to make decisions and we really want to have this kind of conversation with people that are making decisions to inform them and to help them to make conscious decisions."

"So every client will bring their design managers and project managers as well. And those DMS are often really reluctant to get us directly in touch with the stakeholder at the client side because then it kind of makes them less relevant."

"Depending upon the level of impact that a given decision has, usually money related, it can require escalation to other people... The challenge that comes with that is sometimes when the escalation happens to the next person, you're bringing in somebody who hasn't been as close to the topic of discussion as yourself and the other person. So you have to catch them up, which is OK but then what happens is, you need more time. So time is going by and you're not making benefits but also you're now bringing in another set of perspectives and sometimes with more decision making power, and what can happen is the requirements might actually be readdressed."

"And in all honesty, the decision of the sustainability for this type of work is that I'm working on at the moment they come from the client side. Normally the decision is already made way before we come into the table. And we are trying to push this behavior to change and we're trying to position our own sustainability in there a bit more. But for a project they will already hosted the design the define themselves, because they have already their own sustainability target."

"You need to have the courage to challenge decisions, and that is an important point."

Expertise

"On the side of the execution there are often companies that have less domain knowledge... So some market parties say yes but such a high ambition, we can do some, but we cant do everything and we don't have the network yet to do that. So not every market party is suitable to join at the highest level of ambition. "

"Everything has to start by making the right questions, to get the right information, so if our BD is our frontline, is not trained to trigger them with the right questions, I can't do my job."

"I'm lacking experts in sustainability, of course, and experts in business management. Because you really, the financial also needs to understand what the client is saying, to understand how you can help them in a different way, so you really need to have some structure about how a business works."

"We don't have any experts in finance able and capable to do or to talk or to sell sustainability, sustainable finance, and this is a real issue."

"I think where the issue lies currently, is what delays it, is that we have to many people in the design teams that are very good in one area.... but they can't provide a more holistic concept. We only have a few of those and then you notice that such a design takes more time, and we cannot provide that effectively and efficiently to the client."

"Meanwhile it is for the people in operation, in the execution, often very difficult. Because, how are we going to jump over that incredibly high threshold of sustainability that is imposed on us. So they will say, yes, if we can take turns somewhere, then we can execute more easily, or then maybe we have more money available for other things in the project."

"This is something we are facing here in RHDHV, we have super expert people, super specialist in doing sustainable things, but they don't know how to sell it."

D.1.6 Vision

"If there is no vision, on the subject, then there is nothing for which you need to answer, so the pressure to do something with it become very small."

"If there is either no ambition or no leadership, or not the right people in the team, then it can quickly fail yes."

"So it's something that has to get some internal buy in and this is the question of being influencing but also open minded to make it happen because if there is no policies, if there is no real commitment, if there is no understanding of what this systematic entails, the company is not going to embed sustainability into the corporate strategy and this is instrumental."

Ecopreneur

"People are often focused on the assignment in front of them, for that year of perhaps also the second year, and that might be part of ecopreneurship, that you look a bit further across the horizon, and see how you can bring that into the world of today, because only having dreamers is also useless, but yes that means that also our project managers in such teams, so having professional, that are also open to ideas and that they say, before we start, lets first review the program of requirements to see whether it is future proof."

"I have worked with some of those people before, but for me, they are less common than the people who are operationally in charge."

Type of Innovator

"When considering how to make being innovative more attractive, it's all about the perception and the mitigation of risks. So the first one to go through the gate, always gets beat up the worst, but the one who follows him, he has an easier time so when you're on the global stage with these big multinationals unless they have a very high tolerance for risk and they have really deep pockets to cover it up and not worry about it in case something does go wrong nobody wants to be the first one through the door. They wanna wait and see. OK. Somebody else tried this. This is what happened. Let's look at the data and let's figure out if this makes sense for us. Especially nowadays where everything is more expensive. Supply chains

are tighter. There's more disruptions out there. The people who are willing to take the calculated risk and not lose too much, they could potentially gain a lot. They might go for it. But if the risk reward is more even or more shifting towards greater risk and not as good a payoff, they're not gonna have too much of an appetite for it."

"In my understanding, the very high tech developed companies, they have that profile of innovating... they tend to adopt this because they are the ones that, perhaps see a niche market, and they want to be there, but for the rest of the construction company, so the builders or whatever, they just want to do the traditional thing."

Type of client

"As clients, you might have two types, you have the accountants and the believers, and the believers they make an internal connection from personal motivation and drive... they are people often not difficult to convince. With them its more about how can I facilitate those people in an optimal way so they can convince their internal network to provide the resources. With accountants they are approaching it in a business case kind of way, so you have to prove on the one side the benefits, and those are complicated because its difficult to express the benefits in terms of money which is something you often end up with, costs are quantitative, while the benefits are qualitative, which makes them difficult to convince."

"The people I work with have this to a large extend. Yes, they have broader scope on that more has to be measured than just costs... But that is then I think at this moment because I am involved with a client who is unfortunately not decisive for the market. "

"There is a part that do not want to be ahead, but they want to be ahead of the laws and regulations, so they have somewhat sustainability in their core"

"Its two-sided, either companies want to comply with the legislation, so its mandatory, so they have to do it, there is no more procrastination. Or they are taking voluntary actions just to be ahead of the game."

"Some have certain corporate ambitions for sustainability, entire separate from the laws and regulations"

D.1.7 Transparency

Certifications

"Even though in the initiation it was explicitly discussed to not surrender this, to not buy CO_2 certificates, it was the escape plan, to say there are two expensive designs and one so much cheaper than the difference with the CO_2 we emit, we solve it with a certificate. And you then don't choose for the optimal design, but it is actually to buy off your guilt."

"What helps are the certification methods such as BREEAM and LEED, to measure sustainability in a way of, you want a building with BREEAM outstanding, or excellent, or very good, then you can place the costs alongside it which is very clear for someone from the board of directors. "

"Some are a step below and they especially want certain certification "

"Where I also see turns in certification, so for example if you have a sustainability label on your building such as BREEAM or LEED, that companies say, you know we are going to meet all those requirements, but we leave the certification out of it, so we approve for the certificate, but we don't receive it. Because they say, we are using it for ourselves, so we can answer for ourselves that it is good, and the outside world won't be able to see the label. Because sometimes we are talking about tons of certification costs, and what is the advantage of a piece of paper."

"Sustainability has also become more measurable and comparable, thus tradable with the introduction of several measuring tools, standards for sustainability. In the beginning we had the green calc method, then BREEAM, LEED so several methods. And all these methods have of course created a certain level of transparency in the concept of sustainability"

"Sometimes clients are the ones that want the high mark, they say no I want this certificate. I want to look into my adversity and this and that and then the story changes, because i'm just following the client. The client sometimes has such high UMA standards of sustainability, and not just, environmental, but also social and governance, and again, the client pays you, we just have to follow and even learn from them."

Visibility of Performance

"If we do business in the usual way, then our system is made in such a way that a lot of the impact, negative environmental externalities, is just not visible."

"I personally think that most of it is greenwashing. . . It looks amazing on the photo, but tell me what is the real benefit of it."

"How I see this is that these aren't little arguments, you know, it still helps the narrative, we have to keep on building because we can make things amazing, yeah, and tell me how about all those materials, that were used in the glass, in the stell, in the sand, in like everything, even the materials of the solar panels. . . It is pretty much greenwashing to say, this amazing building, it is diligent and all that. Now tell me all the carbon footprint, of every single component of that building, and then you make the assessment."

"Those measuring tools are of course still very far from ideal, so I hope that an update of that comes soon."

"These details of adding sustainability features into buildings, it is just a way how companies can present themselves to society, to the competitors, to the community around."

"You also have more often that a company adds a layer to that, especially with multinationals. They nowadays have to answer for themselves for their social and their eco footprint. I believe they even have to report about that in their annual reports."

D.2 OPPORTUNITIES

"But then, quality of information about, OK, how does this solution actually work and where does it actually fit into our supply chain. . . .Show me data, show me financial data about how much it actually costs. . . So having more information, higher quality information and strong leadership will definitely help out, that's all got to be aligned."

"Yes I think so, not that they have to be involved in a specific way, but that can also be in the way of having a sustainability vision and having a sustainability ambition. So with ambitions and having a clear direction, that it can also be in the form of I have been able to derive this from your sustainability framework, and our project fits into that in this way, so you can prove to management that its in line with their ambitions."

"You need a market segment and a client, that is leadership, that is exemplary behavior, that is someone that just says, I know I won't earn it back, but I don't have the heart to do it differently."

D.2.1 Leadership

"This is really a big conversation because you have to have many people on board. Double top down and bottom up."

"Leadership needs to do that themselves, they need to jump on stage and say, for our business, this and this and this is important and that is why these 3 points are crucial for our new project. . . ..And leadership needs to say this and preferably also on every level."

"So when you pick it up to late, than it dies, then it is much more of a struggle. . . parallel to that its important that by leadership in several levels within the organization, that the organization is mobilized. That people create awareness, this is what we want for this reason, and that a sort of community and drive develops to do it."

Top-down

"They are the ones that are supposed to be, they are leaders for a reason, leaders got to lead, because project managers are just executors. They have so little room to reengineer, to rethink, to rework our concept, even to change drawings, it is so difficult. Those decisions are made by higher management. These people have to move towards ecopreneurship. They have to see the value of it or either they have to be forced by the market or by the regulation or by society or by the values of the company in itself."

"They can give wiggle room for adoption of new ideas, new materials, new technologies."

"Higher management is like the brain, of everything, and they are the most important stakeholders in construction projects, and in the end, they are the ones that are going to sign the checks to be paid, for construction contractors and subcontractors. I see the role of project managers very powerless."

"So higher management needs to position themselves admissible for transparency, everything about this I want to know, because I need to make a decision, and everything that is under it, shouldn't feel shouldn't feel burdened to put anything there, so eventually a decision can be made."

"If higher management says to someone, sustainability, I won't spend any money on that, just so you know. Can you imagine if you then need to go back with sustainability, to that same man, to present it. There are people that will say, I am not even going to present it to my boss."

"If the sustainability ambition is recognized at a high level, and the added value of a project, makes it easier to realize those ambitions."..." They have the resources, those are needed for it, and they are ultimately about that, so resources in the form of time, of people, but also the special form of money and resources in terms of planning, and if they find that very important, that contributes significantly."

"I see mainly when considering sustainability, a positive influence from the top, so because at a corporate level it is so high on the agenda, that top-down it is being pushed into projects. "

"It is very helpful, it has a huge benefit, if there is a target set by the boardroom, on what needs to be achieved, so if on a corporate level it is being said, we have this ambition and we want to accomplish at least this, that helps a lot, because it gives people that have to execute it a focus, boxes that have to be ticked, so there automatically comes attention for it."

"(It also helps if it is clearly aligned to part of a company's mission, or it's mission statement or it's vision or it's long term goals. If there is a clear connection between whatever sustainability thing you're trying to go after, and how that matches up,) and then you've got a high level or even executive level leadership really pushing it and being serious about it, that helps."

"Yes they have a strong influence, indirectly because they determine the goals, and sometimes directly if they are also really involved on a project level."

"Having people from higher positions of authority within the company, being the you know champion of this initiative, whatever it is, yeah that helps."

"So having someone involved with enough authorization to make decisions that are not only financially beneficial has potential. Especially if they're involved at the steering committee level from the very early stages of a project. So I'm talking prefeasibility even just like business case justification, so fail zero or fail one if they're present and they're part of the team who sets down the main project requirements, the main restrictions and assumptions. And if they stay connected. But that's still kind of a high level, I think that's got a good chance of success. Because the further you get in the in the in the engineering development, you know fell to fail 3 you sort of have to minimize the amount of discussions and increase the amount of decisions and execution, especially when you get to the point where full funding is released, you're buying equipment, you've bought land, you're breaking ground, a building is going up, then it's all about execution time, time for discussions is almost over. You can't really be doing that anymore."

Bottom-up

"If you know all this, and you know the impact, and you don't pass it on to your boss, what will your boss think of that? Because in fact your depriving him of information on the basis of which he can make good decisions. So you should say, this is coming towards us, that is going to cost this much, which will have this impact, and you need to make the decisions. But he never does. So there are two things. You present my decision and he makes the decision, or you present my decisions and he decides differently, but at least it will be his decision. So you need to be careful that you don't deprive higher management of decision-making, and higher management should also line up as I want to be informed, even if it costs 100 million, I want to be informed on what this is about, I don't want you to filter for a decision I have to make."

D.2.2 Instruments

"So I think that what has come forward is answer to that it's not about one thing or one owner of that, but it's about creating a sort of spiderweb in which everyone has their own role, and thus that the government needs to ensure with laws and regulations that buildings become more durable for longer. . . So the interest analysis should ensure that the instruments are being used optimally to enforce sustainability."

Managing

"We need to also come up with the value case, so why do we do it, and what is going to bring is compared to costs, so cost benefit analysis. "

"It will never become a trick where you can check things off. The dialogue always remains very important."

"If it is going to cost them anything, and you lose them quickly, then that is where the opportunity lies for us to frame it differently and to make it more insightful. "

"You can frame it in a lot of ways, and sometimes you should really frame it as a sustainability assignment, but more as: you want good advice and its useless to give real estate advice while only looking a few years ahead, while you have a real estate portfolio that lasts longer, and you don't want to spend your money three times because you took the wrong decision right, so what's your plan?"

"Actually, at every step in the process you should take it with the sustainability question in mind. So that with each step that you take, you check again, have I done everything of sustainability. So, you should actually add that to each checkbox in your process, could I have done more about sustainability here. And if not, adjust. That is then the follow-up question, if you feel you have not done enough or yes you have made yourself too easy, then you really just have to do that phase again."

Concrete Strategy

"So what you need is a piece in which you tell, this is our ambition and this is what we expect from you and for that you need to do this differently than your used to."

"You want to find linking points . . . They can show within organizations in different ways, and so organizations sometimes commit to publicly communicated

initiatives . . . and when they do such an external expression, you can consider, how can I involve that in my project."

"So you try to search for the interests of an organization and how you can translate those into concrete ambitions for a project"

"You need to have a strategy, so the ambition can be there, but if you don't have the sustainability study embedded in the corporate strategy, this is not going to happen. . . .You can't be open with the strategy, you need to stick to a plan, stick to KPI's, stick to measurement tools."

"Sustainability could be a nice half, right now it's a must have and this is the interesting change. So how companies have to go from have to have, to act an play, and think close the knowing doing gap."

"It also helps if it is clearly aligned to part of a company's mission, or it's mission statement or it's vision or it's long term goals. If there is a clear connection between whatever sustainability thing you're trying to go after, and how that matches up, and then you've got a high level or even executive level leadership really pushing it and being serious about it, that helps."

"They can have a very big ambitions for sustainability. But looking at the reporting, you really see what the actions are they are taking. So if there is a gap between the ambition, the knowing, and the action plan, the doing, this is where we have our opportunity for doing business. It's like I know that you are aspiring, you are dreaming about this as your ambition, but you are articulating your real action into this, this and that, so to complete and to reach your ambition, maybe you can consider this, this and that and we are your ally."

"It should be our corporate goal, of course, and this is precisely what I'm saying, that we don't have a strategy. So right now the risk is the risk of not doing sustainability or not approaching sustainability from the very beginning is there and we are missing commercial opportunities because of that. So if our top management will think differently, like OK sustainability is a tool to be sold. That's it. We will increase our profit for sure. Because it is an additional commercial tool to sell. So why we are not doing that? Why? Why there is not a commercial manager saying hey guys out of the discussion, sustainability is mandatory. That's it is not just something that you feel inside. It is something that is in the protocol in the checklist, in the whatever you name it, but it has to be there. This is why I'm saying until we don't have sustainability KPI's because this affects money. Of course, our salaries, our payrolls, until this is not going to happen."

Measuring Tools

"(If we do business in the usual way, then our system is made in such a way that a lot of the impact, negative environmental externalities, is just not visible.) So, bringing that into the picture, for the client, like do you see what is linked to your business, the negative impact. That's the first way to convince them, to make decisions in an integral way so that can be part of ecopreneurship, so it can be part of actually seeing that its broader than just costs and benefits. "

"You have to make a lot of assumptions, because you actually don't know perhaps what materials you are using, so what you choose becomes a benchmark, so if you change things, you see okay this has a more positive impact than that. And you can know that in your gut, but if you really start measuring it, then you become

able to substantiate that and that's what we want."

"I am not sure who said it before, I belief Einstein, he said, what you cant measure, you cant steer towards....I think we need to, with each other, for the entire world, need to make one unambiguous measuring system, how to measure CO_2 emission, and material scarcity and that kind of things, and how to define that unambiguous and how do we detach from several lobby phenomena. When you have such a unambiguous measuring system, of which the entire world says they agree. And if we don't agree on that, then a less wide spread tool brings you already much further then when you have none. But your project managers then have to steer towards that as well, and they need to learn that that is a management tool for managing sustainability in projects. "

"Everything needs to become more transparent, more measurable."

"The magic is to combine short and long term challenges, but it always has to be reflected because it has a triple bottom line.... So how to make finance to understand and show what is the efforts that your company is making."

"When looking at what sustainability measuring tools really measure, then they measure at most the sustainability of a given artefact, of the given product....We need to give everyone plank, ever brick, every screw, a passport, so that when we demolish a building after 50 years, the plank with that passport should resurface, so it won't be an anonymous piece of trash."

"I think that there's also like operational costs. So even though in the short term it's going to cost them more money to build a building that meets a certain sustainability criteria, it's a lot cheaper....Because you build a building for three years and that's short term expense, but it's built for at least 100 years. And If you don't think about your operational costs then you lose money. And I find that that's a really good way to also negotiate sometimes with clients."

"If I have a feasible product out there, which I think that we could replace the current one to make a more sustainable option, then I would definitely present it. And then I would give them benefits in terms of well, its not costing you any more money or it's costing you X money but youre going to get X saving at the point in time. And we can do it within the same time that we've already committed and in usually in that case you get a yes, because it's not costing them anything, they still achieving them. But then like we've done our good bit."

"But having a differently structured database that would be a good one, I think for me that would be interesting because if if a client comes to me and asks a question that they have of have you tried out this, it'd be nice if I could go look somewhere in a in a simple database for a previous example like that. Now of course I can go ask anybody in my network and hey, have you done this before and and I will continue doing that. But if I can go find it would save a lot of time. It's never a problem of people not being willing to help out. Everybody's always willing to help and share their stories. And Oh yeah, we did this and this and they and they get excited about it because they did it but then you know I have go to them for information and hope that they have it. And I'll still do that because that's how you build and maintain your network. But if there was another alternative, where if I just needed to go and look up a quick solution example by myself in 5-10 minutes, man that would save me some time."

"I can envision a couple of challenges with having such a repository of examples that everyone can just go to and reference because we have confidentiality agree-

ments with basically every one of our clients. So, we have to be very careful about what information we share and with whom we share it. But there's ways to manage that too."

Laws and Regulations

"What I see with multinational clients is that there are 3 main subjects that belong to sustainability. Which has to do with the energy transition, there you also see that from a legal and regulatory framework that the demand from the central government is to still design more energy efficiently and that those are actually requirements real estate owners need to comply with."

"If we could enforce that all non-living buildings would have a minimal free construction height of at least 3m, for example, it wont be enough for a lab, but it is already something. This would therefore increase the future-proofness of our real estate stock."

"The law is improving... But enforce more legally."

"There is actually only one main driver, and that is especially for multinationals important, you need to make a law which says that you have to....I think the law, and the legislator, has the responsibility to ensure things happen that need to happen right now."

"You notice with multinationals, such as with Shell, that they now have to give an energy label to their offices, so that in that sense laws and regulations work."

"A large component of sustainability is that it is now legally enforceable... So there the law has developed a good baseline for sustainability."

"The number one option is the regulation, and that is the minimal threshold that people, the companies, have to meet, thresholds on regulations and permits, nothing beyond."

"Right now they can do it voluntarily, right now it's a decision that they can make themselves. But the trend that we also see in policy is that it's going to be more restrictive, more constraining, and they got to abide to that. So either they change or not. It is going to be there, change is going to be there."

"There are two drivers, that I recognize and which we always include in our approach. The first one is which we always call scenario zero, the bottom line, what are the legal frameworks, and everything that is within those framework has to happen anyway so doesn't revolve any discussion."

"Almost all multinationals I know have shareholders, almost all of those multinationals have as a goal so much percent EBITA, so much percent profit targets, If we reach that, then the shareholders are satisfied, if the shareholders are satisfied, money gets invested into that company, and then they can continue with investing... So indirectly your making a legal framework, or sort of economic conditions, for which it becomes more interesting to invest in preservation and sustainability."

Information Network

"The projects that I have worked on here have been started like years ago. So, the proposal that was made to do the work is so old that you really can't get any infor-

mation out of that. So, and then that's when the scope is really unclear or something is missed, and the proposal and to actually really figure that out, it's really challenging. "

"We don't know, so we should not fool ourselves into believing we know, and we should do something of which we can tell with dry eyes, what I made, if you don't need that anymore tomorrow, you will receive the instructions from me on how to detach and unscrew it."

"We encounter a lot of things that don't work yet, that's not an issue, some things indeed don't work, which is not a bad thing, as long as we can get to the surface what we run into, and what does not work, so we can take a decision on how to progress. Because it is also an awareness process."

Material passports

"For example, you also want material passports, because you want to know what do we have later on in our buildings. Because then we can also, because that then has value, if you can remove that, you can reuse or sell it."

"Sustainability is, how can we detach ourselves from our behavior of pretending that everything is limitless, and also developing constructions as such. . . how can achieve the same thing you want to do, in a different way, and sustainability is for me that those limited-edition materials, become available again, so that we can then do other things with them."

"Everything should be detachable and separable so that it can be reused again."

Training

"Our finance people have to be trained in knowing how to measure costs related to sustainability."

"And this is where the challenge comes. So how to train mindsets about always including environmental impacts in every final statement that they are doing, even though in terms of funding, so you can also bet in blue bones, green bones and all these kind of things of finance I think is the main mistake holder in a private company to get their buy in. Because otherwise you are completely lost. So first you don't have visibility. Second, you don't measure and 3rd you can't communicate on a trust-able basis. So finance is super important to get on board. "

"You really need to remind people to use it. So if they are working on the quotation phase, there should have been a lot more guidance of hey, here you have our purpose matrix and you have already spoken with this customer and here you have the 4 questions, have you already done something with that? "

"If the decision makers, if those high managers, have a cost effective saving mentality, it recalls out all the way to that and its reflected in quality. . . it is how do those decision makers are trained. What are the visions and the motivations."

"If you are trained to embed sustainability, to speak sustainability and to identify sustainability opportunities with your clients, with your contractors, with your suppliers, you are very likely to make a very impacting project, but if you are not enabled to have those conversations, so even to have those ideas, to embed into projects, then its working very blind. How do you get to this point of company

policies, you have to be empowered to do that and also clients have to be willing to understand."

"We need a bit of support. There's a project manager to put these things on the table. We have experienced it and put in the digits that are transformation that we started already with the company two or three years ago. That all this is happening top down, but we still don't know what we need to do as project manager."

Publication of performance

To use the image incentive: "You have the leader of the pack... they want to be ahead, because for those companies it is also of importance because it is part of their image, but also because it is their way of recruiting people."

"Who also want to do this kind of storytelling... it is more often for companies also a sort of way of communicating to the world, look at us and how sustainable we have our operations in order."

"The main driver is there, there's quite a marketing and PR and all these things involved here."

"So marketing is also key and instrumental for sustainability....Its corporate reputation and brand equity."

"Yes it can be about branding, or also talent attraction, you often see that for more and more young people it is relevant to not work at a company anymore who don't have their things in order."

"So when you have big clients, I think like someone like... will probably be really open to doing that because it's a brand image."

"That often is also what happens in the corporate industry that they see their competitor doing something like, oh I got to get on to this trend, because surely he's doing something that there's a benefit. And so yeah like that definitely helps, giving them examples of like where, you know things have been done like this and everything, but at the end it's always helpful to be able to show them what it means for them."

"I see clearly that in the last 10-15 years, attracting young talent has become a huge factor."

"Most of the big multinational players, they have mapped out their sustainability journey quite well, of course they broadcast it to the public so their shareholders are aware of it. So they have motivation."

"The second is what are the sustainability ambitions of the company, and those ambitions are often quite ambitious, but regarding timeline they are often quite far ahead....So those companies need to get more serious ambitions and they need to start acting on it, they need to be transparent about it."

D.2.3 Institutions

"If you want sustainability improvements in projects, then everyone has their own interests. So in a project context, well I'm not sure about the difference between

push and pull factors, but the drive in project context should be very close to the primary goals of an organization. So only with the business process. With the government that should lie in safeguarding certain future focused qualities of the building stock, and set those market ambitions high. . . .I think the government is actually the quality manager in the triangle."

"If we're going to put the dialogue that we have into practice, if they're going to innovate and digitize that innovation and things like that. That means that we need the capabilities and training that we need for that, that we're going to continue that, right? And that means that we have to co-create more instead of managing single and say, we're going to do something beautiful. How fantastic is that for you?"

Government

"I don't think there is going to be substantial change in this until governments really step up and make really tough regulations because, the standards are mostly voluntary."

"If there is say incentive, I think everybody is happy to receive subsidies, to receive tax cuts, if they adopt certain technology. For example heat pumps, the government is paying for it, so then it's less risk, so that's exactly the point that you are making and the adoption of all these innovations. There is a transition and well, there is a reward for the front runners. But also, there is a lot of followers, and then we have to speak about those transitions and innovations. "

"So I think concretely that If the value of materials goes up terribly. Then making that construction, costs a lot of money. Only if that construction is reactivated or disassembled again. Then all that money will be released again. So then the cost for housing is almost nothing. So I think you have to make material like that and labor a lot cheaper, so tax on material up, tax on labor down considerably."

Industry

"So for me the global report that they produce together with the benchmark of the sector, they are operating in like 2 strategic tools that has to be in the first stages of the conversation with the client before the project is even discussed in terms of scope. "

"For example your building system eventually falls out, but if there is a type of coolant in there that suppliers don't deliver anymore, then you wont be able to start it back up again. So you will have to make the step towards a more sustainable, cleaner, system. So there are several triggers, also just very simple the technical side, to take that step."

Organisations

"From a personal drive I have tried to increase that ambition". . . ."You can challenge the ambitions of the client also throughout the process."

"Lately its really been almost more a given. But that's also because of the type of clients, multinationals are often clients who have more budget to spend, so they can more easily make it possible"

"The project manager needs to have it in there dna that what is demanded is a new attack on those limited materials."

Society

"With the power of (social) media, with the power and speed of how we are communication now with each other, the most important stakeholder that needs to be managed for this kind of large projects, is the public"

"Status is one thing, and that's part of it, but I would say that a lot them are displaying some of their own initiative to say, OK, we can do this better for ourselves it's going to save money, maybe it's even going to make our processes more efficient. It might even make some of them safer. It's better for our clients. Our clients are watching us very closely. So we need to be responsible about that and there are also some of them are really taking their roles as big businesses that they're taking a role of stewardship over resources."

"You see exponentially that clients are saying, we want to have the lead position, because then we can distinct ourselves from the competition or because they are pressured by society."

"I think it's always a mix, of course, from the business, from the business perspective.Yes, there was a push. The social push. So the moment somebody makes any mistakes, it will be in the news. So there is a societal push for the sustainability that's. Not questionable, but I have to see the people I have to send the people I work with are also like I think we are that's in the society. That is aware that if you don't act sustainable you will just cross ourselves. So I think everybody is aware that there's no other option either we act like this or or we're not gonna have much more time on this earth so."

COLOPHON

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