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Mapping social context of sustainable attitudes using stakeholder analysis with discourse analysis

Investigating the maritime sector in order to provide knowledge about future technological pathways

TU Delft

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Investigating the maritime sector in order to provide knowledge about future technological pathways.

By

A.M.W. (Bram) de Vree

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TU Delft

CLEAN SHIPPING PROJECT
Towards sustainable biofuels in the maritime sector

Foreword

Management of Technology graduates learn to explore and understand how firms can use technology to design and develop products and services that contribute to improving outcomes, such as customer satisfaction, corporate productivity, profitability and competitiveness.

For MoT the following criteria would be considered to indicate a 'typical' MoT thesis:

- The work reports on a scientific study in a technological context (e.g. technology and strategy, managing knowledge processes, research & product development management, innovation processes, entrepreneurship).
- The work shows an understanding of technology as a corporate resource or is done from a corporate perspective.
- Students use scientific methods and techniques to analyze a problem as put forward in the MoT curriculum.

This thesis is in line with the ‘typical’ MoT thesis as it is demonstrating a way to improve outcomes for biofuel based technology. It is part of research & product development by assessing stakeholders involved in the (clean) maritime industry. Knowledge from the stakeholder analysis can be used to create an inventory of stakeholder’s interests, values, needs and capabilities. It can be used to make technological solutions more competitive and adhere more to the expectations of the employees. Taking into account the needs and wants of the employees, the development of innovation will be better and adhere more to the three principles of knowledge management. Employees that find more purpose (so aligned to their values) in their work will perform better and find more motivation to work faster. Q-methodology is used in combination with political sciences and discourse analysis to form a new method for stakeholder analysis. The method is developed using existing literature and creation of a new and purpose build statements list, in combination of insights gained from the book ‘The politics of the earth’ (2022) from John S. Dryzek. Information on the stakeholders is collected through interviews and questionnaires where statements are judged on a Likert scale and then analysed to find information about how environmental ‘wicked problems’ can be better tried to solve.

Acknowledgements

Thanks goes out to the members of my graduation committee: Lotte, Sander and Susan for their patience, guidance and expertise these couple months. Special thanks towards Susan for helping me with wading through an entire six revisions of the statement list which resulted in what I believe to be a great set of statements. I would also like to thank Andrea Gammon for her help in creating the graduation committee.

Also thanks goes out to the participants of the research, their insights and suggestions have truly enriched this experience and without them this research would not have been possible.

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Contents

Executive summary

Maritime sectors have been notorious for their slow paced innovation efforts and although it is an efficient sector, it has big impact on the environment just because of the size of the industry (M. Rahim, et al. 2016). There is a lot of activity on the seas, changes in this sector could make a big difference when making our world become more sustainable. However, the sustainable field is a field that is faced with wicked problems. There are always many stakeholders involved and their interests and expectations on these matters can vary wildly. Conversations are important to bring alignment and understanding across stakeholders (Whitemore, 2013). These conversations involve the political and social sciences to investigate. A list of stakeholders was drafted and they were assessed on the grounds of their discourses. A discourse is “a way of shared, structured ways of speaking, thinking, interpreting and representing things in the world.” (Guardado, 2018, p 72) The following RQ was formulated: H*ow can different stakeholders regarding the sustainable transition of the maritime industry be assessed using the discourses of Dryzek?*

With a basis of Q-methodology, a list of statements was created that, based on Dryzek’s discourse theory, is then used to judge the respondents on their environmental beliefs. Also the sustainability reports of selected companies where investigated. It was possible to identify the main themes that could count on agreement/disagreement and controversy. Nature and the existence of limits to our activities where rated highly, while the way to solve it remained controversial. People are more imaginative than their company’s current policies indicate. People see the limitations to the systems that surround them. The willingness of the employees is there, or there is a lack between the strategy of the board and the values of the employees. Further action is required to bridge the gap.

It is indeed possible to asses different stakeholders and firms on their discourses and the research shows two methods to do it. The set up of the interview and the statements proved to be able to provide information about the environmentalism of the stakeholder. This information gives an insight into the social context of environmentalism and brought forward interesting observations about the willingness of the employees and the stance of the companies. The reports indicate a gap between what is needed (and wanted) and what is currently being done. The companies should be more radical and imaginative in both their vision and their solutions, instead of focussing on the solutions alone. Vision is often omitted from the reports, an important oversight.

Overarching vision and motivation can be uncovered but the specific points of departure for technological advancement remain hidden. The thesis brings a contribution to investigations on stakeholder alignment in the clean shipping sector and uncovers some important issues. The firms specific operating context remains to be investigated with more detail, as to properly find the barriers that hold back solving wicked problems. However a good effort is made to indicate the grounds for disputes from the actors.

1 Introduction

Context

With the ever more increasing demand for sustainable solutions in the maritime sector comes a great amount of initiatives. Maritime sectors have been notorious for their slow paced innovation efforts and although it is an efficient sector, it has with big impact on the environment just because of the size of the industry (M. Rahim, et al. 2016). Shipping is a vital part of the global economy, with dozens of big shipping companies operating cargo ships that keep up with the present day global consumption. One ship can burn 250 tonnes of heavy fuel a day, all non-sustainable fuel. Environmental improvements to the shipping process will have big beneficial consequences due to the scale of operation many of the shipping companies operate at. Universities are working on research initiatives to find innovative value chains and new technologies to support the maritime sector. One of such initiatives is the Clean Shipping project at the TUDelft. It aims to replace heavy fuel oil (HFO) with biofuel using the same ship infrastructure and harbour infrastructure, using surplus biomass that would otherwise have been wasted.

Problem definition

The field of sustainability is a field that is faced with so called ‘wicked problems’. These problems are wicked as there is no definitive answer to the problem (Radeljak, n.d.). The problems are often large and important in scale, there are always many stakeholders involved and their interests and expectations on these matters can vary wildly. Finding technological solutions in the field often involves aligning these stakeholders in order to adequately allocate resources towards the solution. What complicates matters further is that often new technologies are involved in making our world more sustainable. These technologies will move in complex ways and adaptation is unpredictable. It is difficult to anticipate how the technology will work and what potential benefits and drawbacks it can give to the company.

Besides the expectations and interests people have, it is also important to look at their values and assumptions. They shape the way we make choices and understand the world around us. We need to explore and work with these ideas. Stakeholder analysis (SA) is what is of importance in uncovering such ideas, it helps in understanding the people involved in the adaptation of the new technology. “Stakeholder analysis is a useful tool for managing stakeholders and identifying opportunities to mobilize their support for a particular goal” (Brugha and Varvasovszky, 2000, p1). It uncovers and removes barriers in a project.

How to do this stakeholder analysis differs from case to case. “Stakeholder analysis is case specific for each project and requires highly flexible project management that adjusts methods and instruments according to given conditions.”(Wang and Aenis, 2019, p1). Its usefulness in dealing with sustainability issues has become apparent to many research areas. “Stakeholder analysis is now widely applied in political as well as development and environmental studies.” (Billgren and Holmén, 2008, p6). However, this doesn’t mean that there is one specific way of doing SA. “SA has been widely debated in academia. Depending on the scholar's academic interests, SA can take off in various directions. Hence, it has been questioned whether there is such a thing as a theory of stakeholder. Others (e.g. Freeman, 1999; Brugha and Varvasovszky, 2000, p5) have opined that SA (or stakeholder theory) does not consist of merely one theory or method but of many.”

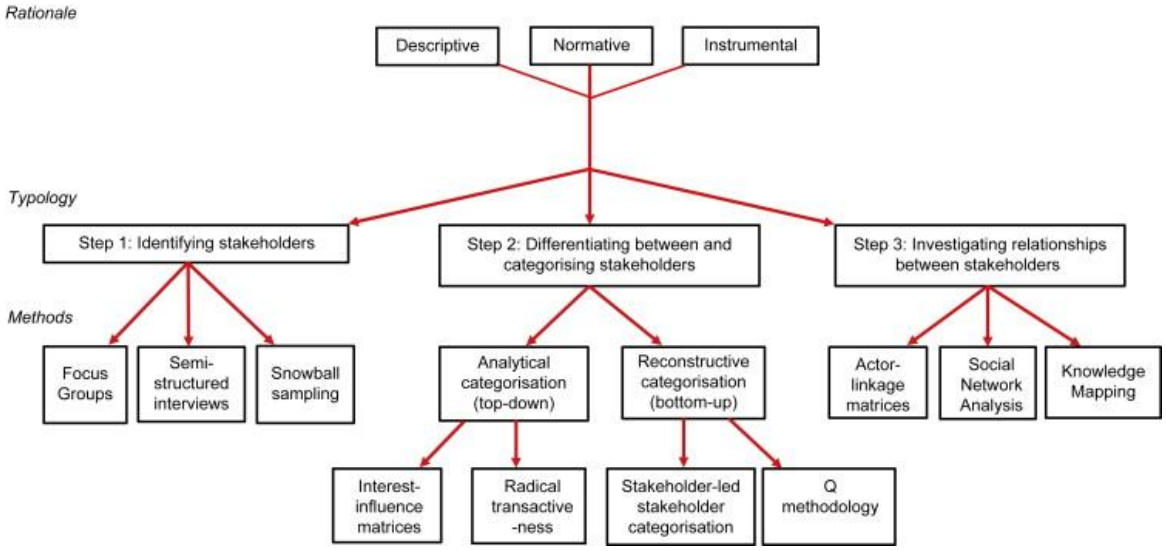

Figure 1: A typology of stakeholder analysis methods (Reed et al. 2009)

In figure 1 the availability of different stakeholder analysis approaches can be seen.

Conversations on the sustainability topic are important to bring alignment and understanding across stakeholders (Whitemore, 2013). The choice is made (see theoretical framework) to make use of Q methodology, which often comes alongside a discourse analysis. A discourse is “a way of shared, structured ways of speaking, thinking, interpreting and representing things in the world.” (Guardado, 2018, p 72). The choice is based on the stakeholders available to the research and the vision of the Clean Shipping project. The key stakeholders will be assessed on the grounds of their discourses.

This thesis tries to assess the different discourses in the different stakeholders that are involved in the transition of the shipping industry towards sustainable operation. This can bring more evidence for the feasibility of the method yet to be made in this thesis in the maritime setting and at the same time also prove useful for a project like Clean Shipping. The discourse analysis gives a solid foundation from the political sciences. As explained by (Miles, 2010, p1): “The history of discourse analysis is one that is longstanding and embedded in the origins of a philosophical tradition of hermeneutics and phenomenology”.

The discourse analysis used is proposed by John S. Dryzek. He describes eight detailed environmental discourses in the political world. The environmental predisposition the stakeholder has is interesting for a project like Clean Shipping. The discourses will be used to describe and map the different languages people use when they are talking about sustainability.

Research Objective

The objective of the research is to map discourses with respect to the energy transition with stakeholders in the clean maritime section. Stakeholder analysis is done using Dryzek’s discourses as a supporting theoretical framework. The people involved in the sustainable transition are thought to be able to be categorized using the discourses and with that comes information on the stakeholders which can further technological pathways. This research is about finding a methodology for the clean maritime sector, subjecting stakeholders to that methodology and provide information about the dominant discourses in the clean maritime sector. Ultimately leading to advice on how to further shape technology in the clean maritime sector.

Research question

- *RQ: How can different stakeholders regarding the sustainable transition of the maritime industry be assessed using the discourses of Dryzek?*

Sub questions:

- *SQ: What different discourses of the partners and potential end users in the maritime sector can be identified?*

Can the discourses be identified, what discourses are found more often than others?

- *SQ: What are pivotal elements in the considerations of these actors in adopting the sustainable transition?*

What are the key points of differences between the stakeholders, what are their main concerns and their most important problems in making thje world more sustainable?

- *SQ: What are some remarks about the vision that shapes the technological pathways, given discourses of the stakeholders?*

With these key pivotal elements, what different tactics can be made to shape technology?

Research approach

Mapping the social context of a project like clean shipping could uncover important gaps between stakeholders, that otherwise would have remained hidden. These gaps can then be bridged or negotiated when trying to further technological development. Ultimately this would result in more intellectual and material resources being deployed and certain (previously unknown) back pressures be uncovered and efforts can be made to alleviate them. This would result in better innovation.

Stakeholders with different occupations in the renewable energy sector of the maritime industry have been investigated. These include people that work at the biofuels industry, solar power industry, shipping industry, boat building industry and harbour industry. These companies are also assessed on the basis of their discourses through reading and coding their sustainability reports.

The thesis starts out with a presentation of the different discourses, followed by the theory behind the methodology and then the drafting of the test’s statements, followed with the results and the conclusion.

2 Theoretical framework

In figure 1 the availability of different stakeholder analysis approaches can be seen. Reed et al. (2009) has identified the strong and weak points of each typology as well as its common applications. The analysists have an intimate knowledge of the individuals and groups that are at question already (more on this in the methodology), the analysis should go one step further. The analysis won't look into the relationships between the stakeholders either, indeed, the stakeholders need to be investigated on their alignment towards each other. However this also means that they need to be categorised first, something that hasn't been done yet in the clean shipping project. The commonalities and differences between them need to be found as to provide more information about solving the wicked problems, only then can actual relationships be established and can technological pathways be given shape.

Following Reed et al.'s typology, there needs to be a choice between top-down and bottom-up categorisation. According to Calton and Kurland (1996), Grimble and Chan (1995), and Mac and Arthur (1997) (as cited in Reed et al., 2009): "For environmental management and development work, one of the main drawbacks of top-down type's is that it tends to identify the 'usual suspects' and there is a danger that this may lead to the under-representation of marginalised or powerless groups." To be complete we therefore should be looking at bottom-up types. According to Reed et al. (2009), in response to the limitations, "there has been a development of more bottom-up, 'reconstructive methods' (Dryzek and Berejikian, 1993), allowing stakeholders to define categorizations and parameters themselves. This approach ensures that the analysis closely reflects the concerns of the stakeholders (Hare and Pahl-Wostl, 2002)".

Letting stakeholders identify themselves on a categorised list wouldn't work as the environmental conversation is too complex. These conversations often involve the political and social sciences to investigate. The less direct version of SA therefore would be preferred, which brings us on Q methodology. Widely used in the political science alongside Q methodology is discourse analysis.

Stakeholder analysis is done using Dryzek's discourses as a supporting theoretical framework. The discourses are explained by Dryzek (2022) in his book 'The politics of the earth'. There are four main categories of discourses, those main categories of discourses are: Environmental problem solving, Sustainability, Survivalism and Green radicalism.

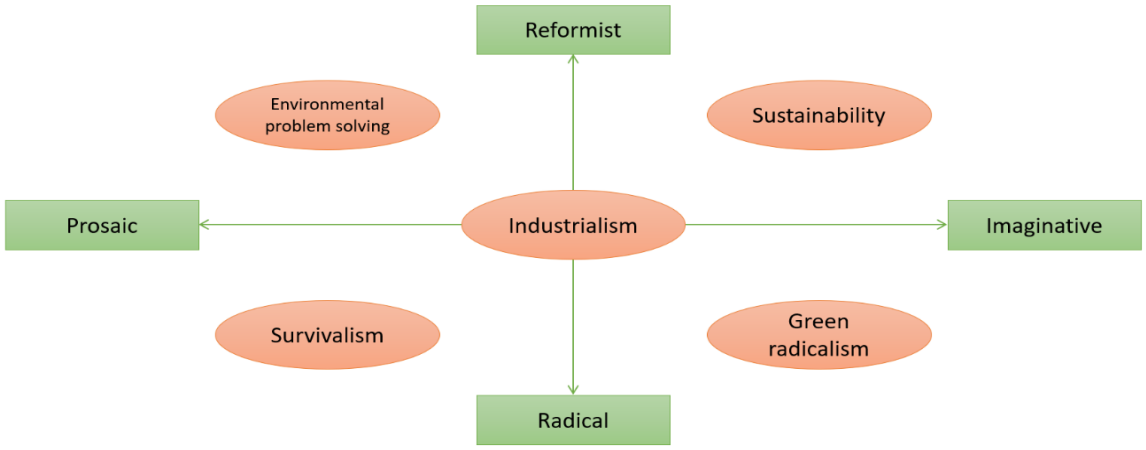

Figure 2: Discourse axis. Reformist/Radical, Prosaic/Imaginative

The four main categories discourses can be defined along two different dimensions, as seen in figure 2. Those dimensions classify the discourses in their differences towards the last discourse: industrialism. Industrialism is the discourse that has long been the main way we run our society. It describes the way of being industrious and being committed to infinite growth. This growth of goods and services is what we have known as the way to achieve the best life we are able to get.

The first dimension is reformist vs radical discourses. There are reformist discourses, which aim to provide reformist departures from the industrialist discourse, accepting the way industrialism works but providing alternatives that can make it work better. Opposed to that are the radical discourses, which are providing radical ways to change the way we run our society.

The other dimension is prosaic vs imaginative discourses. Prosaic discourses are about accepting the political-economic structure industrialism has set while the imaginative discourses are about finding new ways to run political-economic relations.

The radical reformist axis indicates the degree of action that is to be made towards a greener society. The degree of change can be small and reformist or large and radical. The imaginative prosaic axis indicates how far away the suggested steps towards a green society are from the industrialist society. For prosaic: environmental problems are simply seen as problems that we encounter, we just need to try solve them. Imaginative discourses treat environmental problems as problems that lay at the heart of society and its cultural and economic systems.

The next paragraphs will describe all the different discourses by Dryzek (2022), of which the following paragraphs are a summarisation.

Industrialism

Industrialism, a dominant discourse of industrial society, is marked by its unwavering commitment to unlimited growth in material goods and services as integral to the "good life."

Industrialism is characterised by its overarching commitment to growth and material goods and services. It remains a strong movement which opposes action on environmental issues if it hurts prosperity in the capitalist economy. Liberalism, conservatism, socialism, Marxism and fascism are ideologies found to be competing with each other, all committed to industrialism. The ideologies might seem to be overarching the environmental discourses but from an environmental perspective they have long ignored or suppressed environmental concern. Environmental concerns were mainly considered when the resources which they might provide are inputs to the system. Preservation of the environment is not considered on aesthetic or human health reasons, merely on the availability of the resources and whether they are being wasted or not. The availability of the resources to the future growing economy was the main concern.

Survivalism

The main difference between survivalism and industrialism is the focus on limits and whether they are there or not. It consists of two discourses: limits, boundaries, and survival; and the promethean discourse. The limits discourse argues finite resources and related constraints on activities and prosperity. The promethean discourse show similarities to industrialism. It counters these limits, with the humans finding substitutes for resources running out.

The limits, boundaries and survival discourse is about the carrying capacity of the earth, and the limits that apply. In 1968, Garrett Hardin published “The tragedy of the commons” in which self-interest drives resource depletion. Limits are different then boundaries to our activities. Limits concern natural resources running out, overshooting the limit would cause collapse and looks at the human system. Boundaries look at a more broader ecological context and respect our place in it, looking at more natural systems. There are nine planetary boundaries as formulated by Rockström et al. (2009). Elites manage the boundaries and the resources, while cooperative arrangements and social movements are largely overlooked. Conflict and hierarchy govern resource control, ideally led by elites for ecological integrity. These elites cooperate globally.

In Greek mythology, it was Prometheus that stole fire from Zeus and gave it to the humans. The capacity of humans to manipulate their world could then be vastly increased. Prometheans have unlimited confidence in the ability of humans and their technologies to deal with their problems. Prometheans deny the existence of natural resources, ecosystems and nature in general. Nature is seen as nothing more than a store of matter and energy. Nature is not part of the recognised entities of the Prometheans, only markets, prices, energy, technology and people are. Believing in human dominance, they seek solutions through competition. Denying climate change, they stress progress metrics and may cherry-pick data.

Environmental problem solving

Environmental problem-solving approaches differ within survivalism discourses. Survivalism tackles sizable issues but offer limited guidance on system changes or specific remedies. This group of discourses assume a less apocalyptic world view and see ecological problems that are manageable and solvable. There is no talk of the epic heroic struggle of human kind, just that of problems needing solutions. They see ecological challenges as manageable. Three sub-discourses within environmental problem-solving are administrative rationalism, democratic pragmatism, and economic rationalism.

Administrative rationalism solves ecological problems through hierarchical systems in which scientific realism is the most important. The most important institutions are: resource management bureaucracies, pollution control agencies, and advisory commissions. Regulatory policies, environmental impact assessment, and rationalistic policy analysis are central. Bureaucratic hierarchies of experts serve the state, focusing on public-spirited motives. Complex problems can be broken up and be dealt with by each individual subset of experts, specialised in solving problems in their particular field. While effective, administrative hierarchy faces complexity and potential knowledge fragmentation. People often dislike bureaucracies however and administrative realism seems similar to that. All of this aside, the discourse still yielded valuable solutions and a safer, cleaner and more pleasing environment in the developed world during the last fifty years of administrative realism.

Democratic pragmatism solve problems through decentralized democratic structures. Cooperation and participation is key to this discourse. It employs public consultation, policy dialogue and citizen deliberation. Problem solving is done interactively within government and outside government. Communication in governance is done in complex pathways. There doesn't need to be an apex to or approval of any government in the decision/solution that follows. Democratic pragmatism celebrates equality between citizens. Interactions between them being a mix of cooperation, conflict and competition. Democratic pragmatism in some respects follow a similarity with administrative rationalism: plenty of achievements to look back on but limits to the effectiveness are increasingly apparent. As a discourse it has one striking advantage: it is more aware of the limits of its institutional aspects and efforts can be channelled more to overcome those limits.

Economic rationalism centres on privatization and markets to induce environmentally responsible behaviour. The solution to this behaviour is making pollution rights and offsets, like emissions trading marketable. Taxes can be implied on the goods whose production cause pollution or directly on the pollution itself. With the latter being more prevalent. The polluter can then make choices on what technology to use and how much pollution to reduce. Nature only exists to provide inputs to the socio-economic machine. Economic rationalism doesn't include the citizens within us, like that is the case in democratic pragmatism. It prioritizes economic incentives over central control and emphasizes the value of natural resources. However, in reality, no guarantee is given that the offset trees are actually planted, or the trees might displace land uses, driving away local people. The gap between practice and theory can be a problem.

Sustainability

The sustainability discourses claim that we can have it all. Although practical feasibility may vary, they aim to blend ecological protection, economic growth, social justice, and intergenerational equity globally and perpetually. It combines ecological protection, economic growth, social justice and intergenerational equity, not just locally and immediately but globally and in perpetuity. It consists of two discourses. Sustainable development and ecological modernisation. The first is one of local and global ecological concern, what it means in practice however can count on a bit of dispute. The second one gives sustainable development more precision and addresses the restructuring of the capitalist economic system along more environmentally defensible lines.

The most quoted definition of sustainability development is “Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987). Sustainable development seeks balance, defined as meeting present needs without compromising future generations. Unlike promethean approaches, it requires coordinated collective efforts rather than relying on human spontaneity and ingenuity. Recognised is that the developmental aspirations of the world cannot be met by all countries following the same path as industrialised countries have. Alleviating the poor solves one of the basic causes of ecological degradation. Sustainability development assumes nested systems, operating at global, local, and regional levels. It accepts capitalist economy, focusing on power shifts and cooperation. There are many agents and actors at different levels, global and local, they are motivated by the citizen perspective: the public good. Nature gets its respect, but up to a point. Nature is mainly seen as something that provides useful services to humans. Growth is organic and self-conscious. Progress is of great value, history moves in a direction of social improvement. With sustainable development, that progress is in an environmental era. In a world dominated by liberal markets, sustainable developments are poor. Unless it can show that environmental conservation is good for economic growth and business profitability.

Ecological modernisation refers to a restructuring of the capitalist political economy along more environmentally sound lines (Jänicke, 2020:13-14), but not in a way that requires an altogether different kind of political-economic system. It involves industry cooperation and political commitment. It prioritizes pollution prevention and resource efficiency. It addresses relationships between consumption, production, resource depletion, and pollution. Governments, businesses, environmentalists, and scientists partner to reconstruct the political economy for environmental defence. It envisions a tidy household metaphor—maximizing well-being while minimizing waste. It has a much sharper focus on what needs to be done to the capitalist economy, compared to sustainable development (Weidner et al., 2020:7). Unlike sustainable development, it doesn't directly extend to social justice. There are two types of ecological modernisation, the “weak” variant, and the “stronger variant, both proposed by Christoff (1996). The weak variant emphasizes technological solutions with limited international focus. The strong variant envisions broad societal changes, democratic decision-making, and global environmental development considerations.

Sustainability discourses combine aspirations of growth, protection, justice, and sustainability. They address global challenges through versatile perspectives, contributing to ongoing environmental enlightenment.

Green radicalism

Green radicalism, a dynamic and imaginative discourse, encompasses two key tendencies: a focus on altering consciousness and a concentration on green politics. These tendencies yield either sequential change starting with consciousness or direct change to existing systems. Within green radicalism, there exists a contrasting aspect known as "grey radicalism," marked by backlash and an antagonistic stance toward green principles.

Green consciousness is focussed on changing the world through changing the way people think. The precise definition of the discourse is contested. Sometimes it is radically new way of thinking and radically old way of thinking. One being innovative and giving notions to ecological sensibility and cultural change, and the other going back to the ways humans have lived before agriculture even became dominant. There can be seven different versions of green consciousness, deep ecology, ecological justice, ecofeminism, bioregionalism, ecological citizenship, lifestyle greens and ecotheology. Deep ecology advocates a world free from industrial civilization and emphasizes self-realization and biocentric equality. Ecological justice focuses on granting non-human entities legal rights to flourish. Ecofeminism links women's liberation with nature's liberation, seeking a return to matriarchal societies, cultural change still matters (Plumwood, 2002). Bioregionalism emphasizes identification with ecosystems. Ecological citizenship highlights responsible citizenship. Lifestyle greens involve green consumer choices. Ecotheology addresses environmental problems through spiritual lenses, god speaks to us via nature (Edwards, 2016). Should enlightenment principles be abolished in favor of romantic values? Green consciousness practitioners challenge enlightenment's focus on science and reason, highlighting environmental destruction caused by modern technology. However, some greens argue for cautious engagement with technology to solve environmental issues.

Green politics is about changing social structures and institutions, as well as consciousness change. Varieties include green parties, social ecology, social movements, transition initiatives, new materialism, eco-Marxism, environmental justice, global environmental justice, doughnut economics, environmentalism for the global poor, and radical summits. The stage for green politics is a global one, with complex social relations at issue. It recognises crisis and with that global limits to our activities. Green politics transcends party lines, demanding radical change and pushing beyond conventional political boxes. It includes both grassroots movements and institutionalized political parties advocating for nature, equality, democracy, and more. Green politics can help constitute a political alternative to grey mainstream politics (Torgerson, 1999). Green radicalism has provided us with a comprehensive critique on the shortcomings of our industrial society. What however remains is great uncertainty about what to do about the relatively secure liberal capitalist economy, entrenched beyond the control of most national governments. Demanding such a blueprint to an alternative society might be too much, and potentially dangerous, just looking at fascist Reich’s or free-market utopias of the 80’s. Not having a plan is in the green’s favour, allowing for experimentation and better fleshing out important details to meet the needs of the future.

Grey radicalism can be seen as a backlash against environmentalism, it is the antagonist to anything green, ash and smoke rule. It draws into populism, conservatism, nationalism and in the US even Christianism. It doesn’t recognise environmental concern. Grey radicalism creates an in-group/out-group dynamic and conflict and polarisation is normalised. Grey radicalism poses challenges by resisting environmental concerns and contributing to a divisive culture war. However, its influence may wane over time, as certain countries shift away from its power in upcoming political cycles.

Green radicalism critically assesses industrial society's flaws, but uncertainties persist in tackling the entrenched capitalist economy. In bridging the divide between al of the discourses, recognizing the underlying identities and using the appropriate language is crucial. While some extreme forms of grey radicalism might resist any gap bridging, there's potential to reach segments of its more cooperative members through strategic rhetoric and messengers.

Concluding

These discourses all have distinct differences in dealing with environmentalism, these are summarised by Dryzek in tables with aspects. Each discourse has different aspects accredited to them, they signify the core ideas behind the discourse and are based on the overarching idea Dryzek had while making the discourses. Dryzek gives detailed but yet understandable aspects to different environmental directions which makes it easy to use when drafting a questionnaire or an interview.

These aspects are used in the next chapter to try to match the stakeholders to the discourses. Ultimately the discourses are used to categorise different stakeholders and investigate their stance towards environmentalism. The discourse axis figure 2 can be used to judge stakeholders and see how radical/imaginative they are and with that we can gather information about how new technological pathways can be given shape. The method is explained in the next chapter.

3 Methodology

Each discourse had a set of aspects or characteristics that made it distinct from the other discourses. This made it possible to use the discourses as guidelines along which the line of questioning would be based. The ultimate stakeholder analysis that was developed seeks a solid foundation in literature. Each stakeholder analysis is different and so it is necessary to search for an appropriate basis to build and expand upon. Q-methodology was used to try to make it easier. This is what the next chapter aims to explain.

Empirical setting/research design

The starting point was Q-methodology. It is a form of research methodology used in different disciplines, like social sciences, psychology, marketing and political sciences. It also frequently addresses research that concern discourses. The Q method aims to analyse subjectivity, in a structured and statistically form (J. Barry and J. Proops, 1998). The methodology allows researchers to systematically identify groups of individuals with a common attitude structure by looking at patterns of response across individuals in order to reveal diversity amongst perspectives and consensus within a group regarding a contentious topic (McKeown and Thomas, 1988).

Unlike traditional survey techniques, Q-method reveals taxonomies of shared subjective constructions and provides an in-depth portrait of the typologies of perceptions that emerge, in contrast to a statistical model with predictive or explanatory powers over a population (Cotton, 2015). The basic distinctiveness of Q methodology is that, unlike standard survey analysis, it is interested in establishing patterns within and across individuals rather than patterns across individual traits, such as gender, age, class, etc. (Barry and Proops, 1999)

Using Likert scale type questions, the statements were used to determine someone's particular discourse during an interview. These statements were based on the discourses of Dryzek. The ranking is done on a scale from 1-5. 1:Totally disagree. 2: Partially disagree. 3:No opinion/indifference. 4:Partially agree. 5:Totally agree. It was chosen to make the statements from scratch, the collection of statements from magazines/internet/TV has been done before in similar studies, however this might have imposed certain selection biases from the researcher. The full list of statements that was used can be found in appendix A. An overview of which statement comes from which discourse in given in appendix B.

To make the statements the 'concourse matrix' was followed (Dryzek and Berejikian, 1993). This matrix's purpose was to provide a broad spectrum of different statements which finds frequent use in political discourse analysis. The match between the type of claim and the discourse element is what makes up the final statement. These types provide information about how the statement is formed. The statement could be addressing facts about environmentalism, normative questions, or expressions of the worth of some of the discourse elements. This way an even set of opinions could be produced for each discourse. This was thought to provide each discourse with a set of statements that are somewhat homogenous to each other and create more variety in the end statements, and although the content of claim will be different for each discourse, the way of opinionizing the statement is not.

Similarities between the 'discourse elements' in the concourse matrix and the four main characterizations per discourse can be seen as most points describe the same social and political parameters. Therefore the choice was made to combine the 'concourse matrix' with the discourse characteristics described by Dryzek. Resulting in the following matrix:

Discourse element				
Type of claim	**Basic entities**	**Metaphors**	**Agents and Motivations**	**Natural relationships**
Definitive				
Designative	1	2	3	4
Evaluative	5	6	7	8
Advocative	9	10	11	12

Table 1: Concoursive Matrix with statement number indicating the combination between claim type and discourse element of that statement. The definitive row is left out as explained in the text.

The type of claim (Barry, John & Proops, John., 1999):

1. *Definitive:* concerns the meaning of terms
2. *Designative:* issues of fact
3. *Evaluative:* expressions of the worth of something
4. *Advocative:* something that should or should not exist

The types of discourse elements:

1. *Basic entities to be recognized:* The fundamental aspects of the world that a discourse focuses on. Different discourses emphasize different entities, such as individuals, communities, ecosystems, or even non-human entities like animals or landscapes.
2. *Natural relationships:* This refers to how the entities recognized in a discourse interact and relate to one another in the natural world. These relationships include notions of hierarchy, cooperation, competition, or symbiosis.
3. *Agents and their motives*: Discourses give agency to different entities within the recognized entities. This involves identifying who or what has the power to act and influence events, as well as understanding their motivations for doing so. Agents could be humans, nature, technology, etc.
4. *Key metaphors:* This refers to the use of metaphors to convey the core ideas and assumptions of a discourse. Metaphors can help shape how people think about and understand complex concepts by drawing parallels with more familiar or tangible concepts

What needs to be noted is the fact that the agency category in the original matrix was replaced with ‘Metaphors’. Agency is still represented in both the basic entities and agents and motivations categories. Place needed to be made to add in the key metaphors which can provide the interviewees with a different way to identify themselves with the discourse. This made the method more reliable. Another agency tab would also have made the question list 100 questions long which was thought to be excessive.

Each characteristic was then linked to one of the type of claims; definitive, designative, evaluative and advocative. The characteristic was chosen in such a way that it matched up the best for the type of claim that needed to be made. The statement number in the table signifies what type of claim that statement is and which discourse characterization it is highlighting. The results can be seen in Appendix A and B. The definitive row was not used as statements became too complex to be asked in an interview. The subject matter already was very heavy and the added complexity of making someone consider the meaning of the terms at question made a lot of these statements not suited for the interview due to the time constrictions the interviewees had.

First contact to the interviewee’s was already established through the Clean Shipping project and most have ties to a cleaner shipping sector. These stakeholders occupy important positions in their companies. There is a total of eight interviewee’s. Selection is done on the basis of convenience to the researcher and availability through the Clean Shipping project. Interviewees work in different businesses in the maritime industry, most being of a renewable nature, more on this under ‘data collection’.

The order of the statements is fixed and always starts with the survivalism discourse. This improves the testing of different discourses (for instance differences between democratic vs administrative vs economic environmental problem solving) within each main discourse. There is however also a limitation to the first main discourse: survivalism. For someone that doesn't know about the other statements in the statements list, it could appear that the promethean discourse is hinting to the old ways of solving sustainability issues (it is indeed at first glance more industrialist than the limits discourse), while the limits discourse takes sustainability questions more seriously. This could affect scores to be more binary between these two discourses than they might be in real life.

Data collection

Data collection was done through interviews. The interviews were of the structured type, the question list was fixed. Most interviews were online as to per interviewee's convenience, the questionnaire was sent through using an online form filling tool and the statements were shown and red to the interviewee. Using Likert scale type questions on the form, the interviewee could then rank their agreement to the statement on a scale of 1-5, from Totally disagree to Totally agree. Three people were in the call, two researchers and the interviewee. The second researcher is there to note down the conversation. An overview of the interviewees is given in table 2. The companies are anonymised. It wasn't possible to schedule interviews for all subjects so for a portion of the people a questionnaire version was made, with the same setup as the interview version. The introductory text can be seen in appendix E.

Function	**Company description**
Project Manager	Student team
Project Engineer	Clean maritime contractor
HSSE Manager	Clean maritime contractor
Engineering Intern	Maritime contractor
Lead Design	Clean maritime contractor
Project Engineer	Maritime contractor
Senior Project Manager	Company representing renewable interests
Senior Advisor, Public and Regulatory Affairs	Shipping company

Table 2: Interviewee overview, each interviewee represents a different company

The difference between regular maritime contractor and clean maritime contractor in the table above is the novelty in the way the company handles it's operations and activities. Maritime contractors are more incumbent firms, the clean contractors provide solutions that are more outside-the-box.

These companies can be investigated as well using their sustainability reports, they give ample information about the sustainable movements of the company but they also give an insight in how sustainability is handled. These reports are made by sustainability experts inside the companies and their discourse usage is worth looking into. The usage of different discourses indicate how technology is developed from a point of vision. What where the reasons technology was employed to solve environmental issues was investigated.

Three sustainability reports have been collected via the companies official web pages, using the most latest editions. These companies have been selected on availability of the reports and their impact on the maritime industry. The companies have a considerable effect on the maritime setting and their operations can be found on a global scale. Their impact on the environment therefore deserves some more in depth investigation. The companies are of different sizes, Maersk has 90.000 employees, Boskalis 10.000 and Heerema 1.000.

Data analysis

Each statement has a link to a different discourse. The average scoring per discourse is what is analysed. Scores above three will mean a preference towards a particular discourse and scores below this an adverse preference. Scores of exactly three will mean indifference.

The workability of the methodology proposed in this paper is also at question. Whether the discourse the stakeholder prefers most is actually the one that the method is pointing out is hard to test, as there is no verified, tested and proven way to test their discourse. This thesis is investigating stakeholders that are involved in sustainably maritime towards at their discourses on sustainability and learn from that for future projects/solutions.

The main reason for the test is making a list of discourses that the subjects agrees with. The standard baseline (no opinion) is three. It is also possible to set a baseline based on the subject itself. Someone more positive towards all green arguments, no matter the consequences, might achieve a more agreeable score. In that case it might be better to judge the tendency towards discourses based on the subjects own definition of the baseline. However, the test is about making a list of discourses that the subjects agrees with the most. The absolute score doesn't matter, only the relative score.

Analysing the coding of the sustainability reports is done by analysing the proportions of the discourse codes present in their texts. The code book can be found in appendix D. The patterns of discourses and structure of the sustainability reports is considered and any observations are written down during the coding process. Individual sentences are analysed on their discourse usage and highlighted using different colours to indicate the particular discourse. Mentions of SDG's and global scale cooperation fall into the sustainability discourse, limits to our survival on earth fall into survivalism and company efforts towards greener solutions usually fall inside environmental problem solving (cooperative efforts are usually coded as sustainability). The pattern that emerges is investigated for commonalities inside the same report. Green radicalism codes are given to excerpts indicating the contents of the green radicalism discourse, usually of imaginative/radical reasoning. Is the company using a particular style of reporting? And then, what are the differences between the reports?

4 Results

In this chapter there is a focus to find commonalities and differences between interviewees, analyse their discourses and look at other observations that can be made. This chapter also probes the sustainability reports of the companies and analyses the coding.

Average discourse scoring.

Each discourse is roughly equally presented in the question list, it is therefore thought to be fair to look at all the questions belonging to one discourse and look at their average score. An average score above three is more agreeable towards that particular discourse and one below three more dismissive of the same discourse. Three indicates indifference. The baseline is in this case the score of three. The result can be seen in figure 3. Most statements brought up meaningful deliberations and dialogue, the statements had personal effect on most stakeholders.

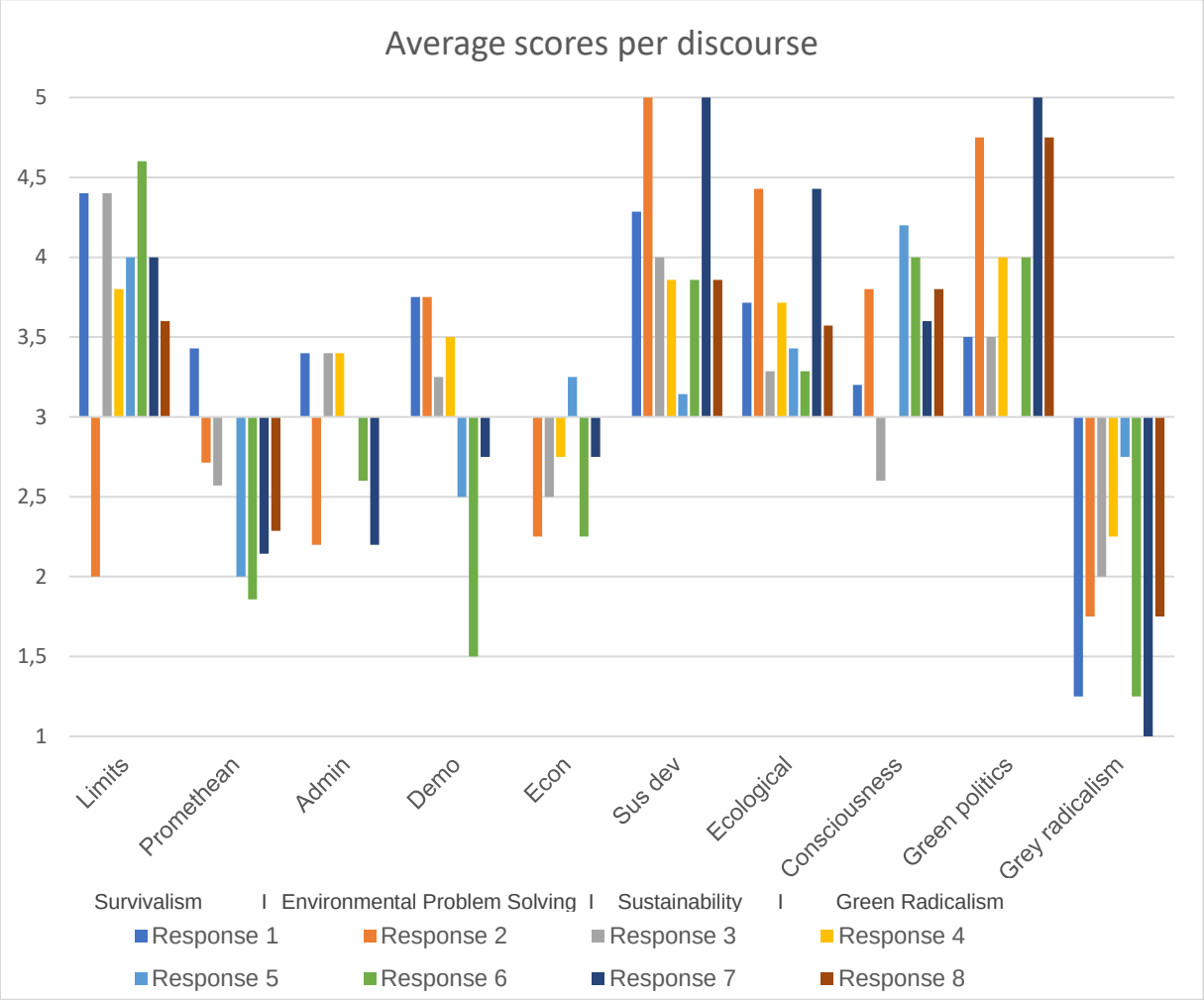

Figure 3: Average scores per discourse, per response

The given scores are explained in the interviews, a summarisation of the most interesting points is given in the next Alinea's.

Survivalism

Most respondents accept the earthly limitations as a given, the promethean response is viewed as a negative way of dealing with the problems, however the limitation mentioned in the method section might also be affecting the score. Universal disagreement can be found when talking about cherry picking inside the promethean discourse; *"Yes, some areas are doing well, but that doesn't mean the world is doing well'.* Also there was agreement about including global cooperation alongside competition: *"competition + economic incentives can be impulses, but we should not forget non-competitive input from NGOs and governments. It is part of the solution."* Promethean did not do well, it's limitation might not be affecting its score as much, stakeholders don't really see the narrative promethean tries to tell.

Environmental problem solving

People disagreed with each other inside environmental problem solving. One respondent pledges for more governmental regulations: *"There isn't a lot of governmental regulation right now, but there should be more".* At the same time someone else said the opposite: *"Government should not interfere with companies too much".* Inside economic rationalism there was also disagreement: *"We should acknowledge people sometimes act from self-interest, but it shouldn't be the only strategy",* in slight contrast to: *"The government hopes that this will happen, that through regulations homo economicus is being awakened, but it doesn't let itself be awakened. It's not just about homo economicus, changes also cause 'hassle'* (referring to ingrained (fossil) tendencies that don't let itself be changed easily)".

Whether the company someone works at is more democratic or hierarchical is roughly represented in the response to environmental problem solving. The match people make between their preferred way of working together in a company seems to also be the way they see solutions towards environmental problems best be given shape. Student teams and start-ups score highly in the democratic area while more established incumbents rank highly in administrative. However these results need to be viewed lightly due to the sample size.

Sustainability

Positivity can be found inside the sustainability discourses, more often than not the statement received a clear 'totally agree', without even a second thought, at least from some respondents. Some others remained a bit more reserved: *"We still need some market competition, that can also drive solutions"*. *"There are also limits to what we can recycle".* However the premise of sustainability and particularly sustainable development was accepted.

Sustainable development receives more points than ecological modernization. Ecological modernisation mainly scores lower on its optimism towards keeping economic growth and progress inside the mix: *"We should determine how much economic grow is acceptable".* Another respondent said this: *"We should be mindful about how we do it, we shouldn't just scream economic growth, without thinking of the consequences."* Also the calculative approach towards nature is not a favourite among the interviewees. Nature deserved more, as can be red in the next Alinea.

Green radicalism

The stance towards nature is reflected in the next main discourse. Nature gets a higher status, represented mainly in the high score of green politics. Consciousness scores lower, which might have to do with the fact that the discourse might be able to be perceived as vague. On the question whether human and natural relationships have been violated was consensus that the severance of such tie isn't that bad: *"There are examples where humans and nature can and indeed do coexist".* Also, the question whether we as humans are just a subject to climate change could count on some controversy, as well as the question whether we should be led by peoples intuitions and emotions *("we should be fact-based", "not be led by, but not ignore emotions and intuitions either"*). Both statements brought down the score for consciousness. It seems that the way to handle environmental problems should remain fact based and pragmatic but the overarching vision of consciousness was still viewed positively. *"Ideas can indeed move history, however I side with this historical debate on the side that favours the material forces. Big changes are always in the bottom streams (material forces)".*

A contrast between green politics and consciousness towards grey radicalism. Grey radicalism had the lowest scores of any of the discourses tested. Negativity is earned in the creation of an us vs them society and the complete disregard towards nature. The hard working citizen can count on sympathy however the hard 'against the grain', us vs them cannot. The hard working citizen is viewed to be just as important to the balance of the world as the rest. Their values and needs are just as important. There are not much quotes in this section, most respondents made their stance clear without too much deliberation: 'totally disagree!'. No one is in favour of the polarised views of grey radicalism, only respondent 5 almost had a neutral stance towards it, almost.

Sorting discourses

This is the list generalisable to the entire sample, there is a table available in the appendix (appendix C) to see each individual respondents preferred discourse list:

Average total score	
Sus dev	4,13
Green politics	4,06
Limits	3,85
Ecological	3,73
Consciousness	3,53
Demo	3,00
Admin	2,90
Econ	2,72
Promethean	2,50
Grey radicalism	1,75

Table 3: Averaged total scores for every discourse

High scoring discourses are the sustainable development discourse and the green politics discourse, as seen in table 3. What is interesting is that the environmental problem solving discourses score quite low, while most of the respondents are working at companies that are doing precisely that, making environmental solutions. People are more imaginative and see limitations to the systems that surround us, that surround them, and their companies, but they aren't always entirely dismissive of the systems.

This follows from the interviews, in reaction to the statement: *"To solve our climate problems, it's crucial that people motivate themselves through material self-interest and, as a result, improve the common good (buying electric cars, reducing heating, building luxury homes with A+++ energy efficiency)"*. One respondent said: *"It's a strategy within the current system we're in, but not the solution, preferably: regulate."* Or the same respondent's response to 2.11: "People should be "Homo Economicus" (rational and efficient, focused on money) and should pursue self-interest for the climate (think insulation, introducing bottle deposits). The response was: *"The government hopes that this will happen, that through regulations homo economicus is being awakened, but it doesn't let itself be awakened. It's not just about homo economicus, changes also cause 'hassle'."*

The lesser imaginative (but still radical) discourse survivalism does quite well in its limits part however it doesn't score quite so high due to the promethean discourse. This might have to do with the order in which the statements have been presented, more information on this limitation is mentioned in the methods section.

Statement analysis

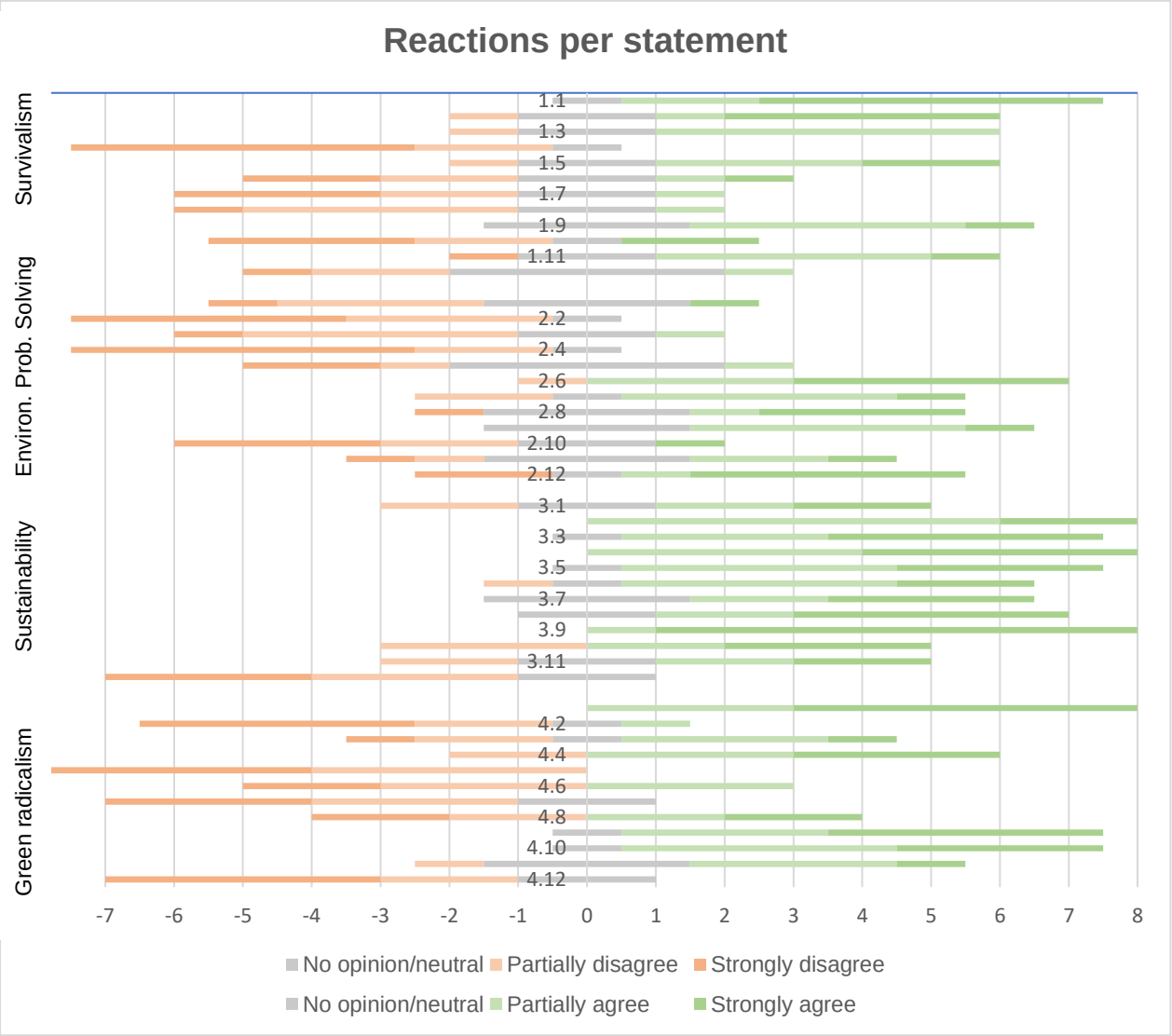

Figure 4: Statement analysis

Figure 4 gives an overview of the responses per statement. The length of the bar indicates how much of the responses are of that answer type (e.g. for 1.1 there was one no opinion, two partially agrees and five totally agrees). There are 20 statements that have one sided responses: The statement had either exclusively positive responses (totally agree, partially agree, no opinion) or exclusively negative (totally disagree, partially disagree, no opinion) responses. This might mean that the statements have only up or downsides mentioned in them or that this particular pool of respondents all agree on judgment of the statements. Upon close inspection, statements 1.4, 2.4, 3.1 and 3.4 give non nuanced facts about the discourse they reflect, without mentioning the potential upsides (or downsides) about having that certain attitude. These statements might require some further tweaking:

- 1.4 “Nature only has value as something we can use.”
- 2.4 “Nature is subordinate and can be subjected to human problem-solving.”
- 3.1 “Nature is like a waste processing facility. It is a source of raw materials and a recycler of pollution. With proper care, it could function this way.”
- 3.4 “Economic growth, social justice, and environmental protection can go hand in hand.”

The most agreed upon statements of the entire list were 1.1, 3.4, 3.9 and 4.1:

- 1.1 “There are global limits that must be respected (think of CO2 emissions, consumption of finite resources like oil).”
- 3.4 “Economic growth, social justice, and environmental protection can go hand in hand.”
- 3.9 “We should keep in mind that there are limits to what we as humans can do to the Earth.”
- 4.1 “There are global limits to our activities.”

Most of these have to do with the limits to our activities, which can be found in several discourses. The different way of phrasing this mention of limits is what sets these apart. The sustainability version (3.9) gets the most points, followed with the even more open minded version of green radicalism (4.1). The overall positive note of 3.4 (“Economic growth, social justice, and environmental protection can go hand in hand.”) is also reflected in its score. The survivalism version (1.1) of the limits statement has less agreeableness, however it still yielded an overwhelming positive response. The detailing towards CO2 emissions and oil consumption might have influenced some people to be less positive towards the statement. The respondents like the more generalised versions of the limits question, disagreement can be found when the limits become more defined. There are indeed limits, but what are they?

Most negative responses were found on statements 1.4, 2.2, 2.4 and 4.5, of which most had to do with the subordination of nature.

- 1.4 “Nature only has value as something we can use.”
- 2.2 “Markets and companies are free from government interference. They should not be forced to do anything. Governments exist only to provide a supporting legal framework.”
- 2.4 “Nature is subordinate and can be subjected to human problem-solving.”
- 4.5 “The value of nature is irrelevant when making decisions.”

The nature statements from survivalism (1.4), environmental problem solving (2.4) and green radicalism (4.5) scored the worst. Nature is indeed something to be taken seriously, whatever the statement, nature always deserves its vote and consideration. One respondents response to 4.5 was: “It is what is happening now, but it isn’t how it is supposed to be”. An evaluative comment about how it is and normative about how it should be. Maybe the stakeholders are very much in disagreement how things are going right now.

A bit less disagreement was obtained by 2.2, however still predominantly negative. The open minded approach towards companies and their ability to be responsible about their business practices is not scoring highly, not much trust is granted towards the company’s ability to tackle environmental problems on their own.

The three most opinionizing questions (all answer types are given; people totally agree/disagree and everything in between) where 1.6, 2.11 and 4.3:

- 1.6 “Actually, the world is doing quite well. Just look at things like life expectancy; it is still rising.”
- 2.11 “People should be "Homo Economicus" (rational and efficient, focused on money) and should pursue self-interest for the climate (think insulation, introducing bottle deposits).”
- 4.3 “As humans, we are only subject to climate change. Some of us understand what's happening to us, while others do not.”

1.6 is indeed designed to be reflective of the cherry picking of the promethean discourse, however it might have been too subtle for a questionnaire. The score reflects the difference in the medium in which it was questioned, questionnaire (higher scores) or interview (all low scores). Whether the economisation of environmental problems is a good idea is heavily opinionized, most respondents remained on the fence about it (most had 3) but there were also respondents with clear opinions on the matter. The respondents where more able to pick a side with 4.3, but most remained hesitant in their opinion (partially (dis)agree had the most responses). How accepting should we be in accepting our fate? The statement deserved more consideration. One respondent stated: “we are not all on the same page, but we are subjected to the same”. Another said that it was two statements in one: one about whether we are a subject to climate change and whether some people know what happens and some don’t. The essence of the whole statement was the defeatist attitude: We are just a subject, it’s just that some of us know what is happening to us and are trying to do something about it (maybe even in vain). The way of translating Dryzek’s meaning when addressing green consciousness might not have been picked up by everyone. Some fine tuning might be in order.

It is important to note that there were no statements that had the same response of every participant. It is difficult to make the distinction for each question between the possibilities that; the statements are leading or one sided, or that the subject group doesn’t represents all discourses. However the statements all have different responses, and most statements had profound deliberations to them in the interview rounds. It remains to be seen whether the considerations of the participants are comparable to the considerations Dryzek made while making his aspects to the discourses.

Discourse dimensional axis analysis

The discourse dimensional axis with respect to industrialism is presented in figure 5 without grey radicalism. Grey radicalism is indeed very imaginative and radical, however it is also deeply polarised towards many sustainable opinions. “This discourse involves a comprehensive rejection of what environmentalism stands for, and does not recognise the validity of environmental concern” (Dryzek, 2022, p233). All respondents where negative towards grey radicalism but often quite positive towards other green radicalism discourses. To not disadvantage the imaginative green movement too much, it was chosen to factor out grey radicalism in this graph.

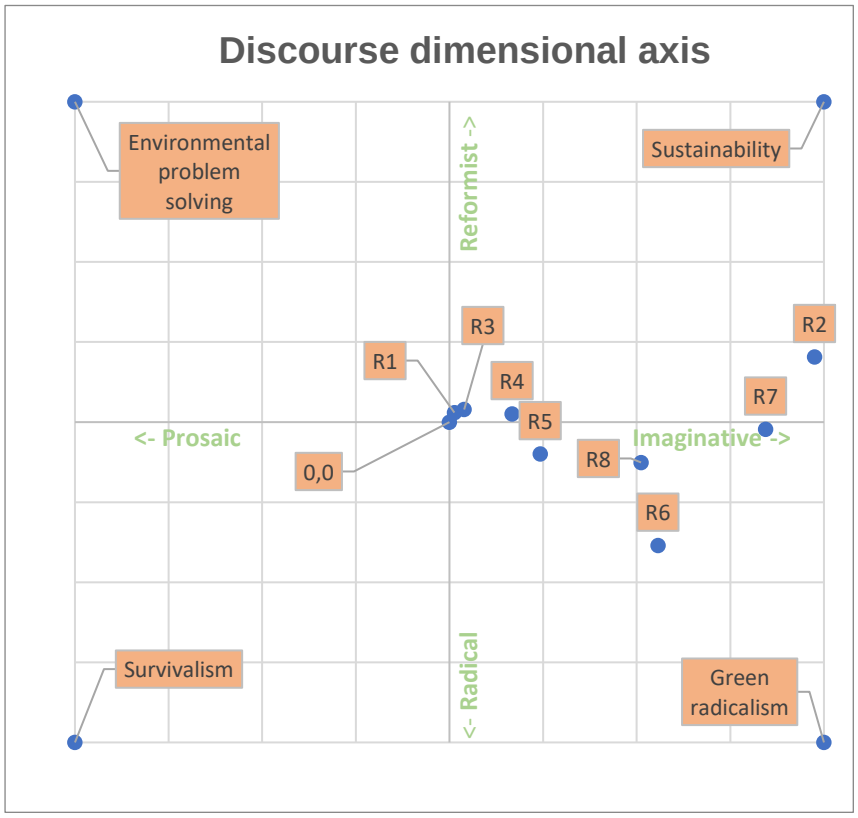

Figure 5: Discourse dimensional axis analysis

Table	Age group	Distance from 0,0
R1	20-30	0,13
R3	20-30	0,22
R4	20-30	0,68
R5	30-40	1,05
R8	30-40	2,11
R6	30-40	2,71
R7	40-50	3,38
R2	40-50	3,98

Table 4: Different age groups of respondents and the distance from the 0,0 point in figure 5

In table 4 the age group is shown and the distance the respondent has to the 0,0 point of figure 5. Age wasn’t asked in this research, however it is possible to see a relation between the respondent’s age group and the distance from the 0,0 point. Older respondents might have more life experience and with it more certainty about which direction environmentalism needs to move in.

Some respondents seem to have difficulty departing from the 0,0 point on the graph. Although often quite positive towards sustainable opinions, it is difficult for the respondents to pick a direction. Without direction, the score falls back to the 0,0 point on the graph. This doesn’t mean that they have a preference towards industrialism. Industrialism can indeed also be found in the middle of the four main categories of discourses, however the stance of industrialists towards sustainable opinions is quite neutral. They want to keep thing the way they are, which is not to be confused with R1 and R3, who score low in directionality towards any particular discourse but have high agreeableness with the statements. They just don’t know where to go yet.

Most people are situated on the right side of the graph, high scores towards more imaginative discourses. Some are more radical in their ways than others. No one can be found on the prosaic part of the graph. A conclusion is that all participants agree that the path towards the sustainable requires more outside of the box thinking.

An observation needs to be made about multiple participants: High scorers on de discourse of limits, but low scorers on promethean discourse. The overall tendency towards falling into the survivalism corner of the chart is therefore diminished, while promethean is arguably more inclined towards industrialism than limits is. This might point out a problem with the literature as the individual discourses aren't defined on the chart, only the four main categories are. It is possible to allocate weights towards the individual discourses and their scores towards prosaic, reformist etc., however these are difficult to substantiate from the literature.

Sustainability reports

Company	CEO letters	Starting of chapters	Chapter contents
Maersk	1. Sustainability 2. Env. problem solving 3. Survivalism	1. Survivalism 2. Env. problem solving 3. Sustainability	1. Env. problem solving 2. Sustainability 3. Survivalism
Heerema	1. Sustainability 2. Env. problem solving 3. Survivalism	1. Sustainability 2. Env. problem solving 3. Survivalism	1. Env. problem solving 2. Survivalism 3. Sustainability
Boskalis	1. Env. problem solving 2. Sustainability 3. Survivalism	1. Env. problem solving 2. Sustainability 3. Survivalism	1. Env. problem solving 2. Sustainability 3. Survivalism

Table 5: Ranking of top three discourse usage in different chapters of the sustainability reports

Sustainability reports give interesting insight into how environmentalism is handled inside the firm, as previously mentioned there where three firms that receive investigation: Maersk, Heerema and Boskalis. A brief summarisation of this part can be seen in chapter 5 where the results of the coding process are shown. The ranking is done on rate of appearance of the discourse. The top three is shown as the fourth place is homogeneous for every chapter and every company: Green radicalism.

The report usually starts off with a letter from the CEO or chair. The language that can be found can be categorised as containing three of the four discourse: Survivalism, Environmental problem solving an Sustainability. Green radicalism is not found in the letters, and often not even anywhere in the report. The letters contain lots of mentions about the limited nature of our planet: “In our global operations, we emit millions of tonnes of greenhouse gases every year. We recognise that we are part of the problem.” (Maersk, 2022, p5). “We remain committed to our target of becoming climate neutral across our global operations by 2050” (Boskalis, 2022, p4). “We need to take action now to act sustainably” (Heerema, 2021, p4). The letters state the companies often sustainable considerations: circularity, responsibility and the adherence to the SDG’s. Another commonality is the mention of their companies’ efforts towards environmental problem solving: building hydrogen ships, protecting communities, installing commissions to watch for carbon expulsion. The language encompass the three discourses extensively, and cover a whole variety of global issues, not just limited to environmental ones. There are also differences. The leaders of Heerema and Maersk dedicate the whole of their letters to environmental problems, the chair of Boskalis also talks about shareholders positions, strategy and business plans. Boskalis however also mentions the most tangible solutions to environmental problems.

The reports state activities and actions about their environmental practices. An interesting observation is the often repeated order in which the discourse language occurs in the reports. At Maersk, a chapter usually starts with a mention of limits. What global effects are happening right now, what problems are there, and then the text usually immediately follows up with a possible answer; an action that Maersk is doing to help prevent/solve it. Survivalism is usually followed up by environmental problem solving. Maersk sees itself as a catalyst for change, mention of partnerships and cooperations with government, clients and customers is widespread. As can be seen in this passage: “At the highest level of collaboration, Maersk is working with its customers to co-innovate green solutions and create transformational partnerships with customers who are sustainability leaders within their own industries” (p10). The discourse of sustainability is represented often but gets more of a supportive role. The cooperation between different industries and governments gets a pragmatic connotation as it is seen as a way to achieve innovations faster and better.

Heerema also acts upon environmental problems but has a different order of discourse language. It’s chapters usually start off with the sustainability discourse and follows up with the environmental problem solving discourse. There is frequent mention of SDG’s, values on

sustainability, social and also economic values. Thoughts about lifespan, social values and circularity are not omitted from the report. The survivalism discourse is mentioned too though but has more of a supporting role. The discourse is usually used to make further argument about the urgency of implementing the proposed solutions however it isn't the starting point of which environmental problem solving is utilised. Their efforts and abilities as a contracting business is mentioned as well and a good impression is made that Heerema is a capable partner in the energy transition

Boskalis's discourse usage is consistent throughout the report. The company states lots of information about their ability to solve environmental problems but doesn't necessarily always have a consistent overarching vision on where the solution needs to go and what it solves. At least, not as much as Maersk or Heerema have. Solutions sometimes are presented outright. What is certain is that there is ample information about their ability to solve the problems on the ground. Vessels get scrubbers, alternative fuels are investigated and even their operation on the main land (office spaces, lease fleet etc.) gets attention. They might be more hesitant and don't take the leadership role synchronous to what Maersk is doing: "The rate at which we move towards our emission-reduction targets is a function of the opportunities and technology available to different parts of the company. Some aspects of our business are already achieving substantial reductions in their emissions, while other parts will take longer to do so since they are dependent on technology and infrastructure that is currently still being developed"(p44). And: "When assessing carbon reductions across the company, it is important to distinguish between those parts where we have direct control and our sphere of influence to prevent or limit emissions is significant, versus parts of our operation where our influence is indirect or where we are dependent upon the progress achieved by third parties" (p44). Their report also mentions the rare fourth discourse: green radicalism. There is this passage concerning innovation which is reminiscing of the Consciousness discourse: "We recognize that innovation is just as much about the way we do things, as it is about new technology; new ways of thinking and changes to behavior are vital to achieving our sustainability objectives." (p50). Maybe they are still searching for their way of doing that, to find that overarching idea that could steer innovation.

It is interesting to see how these companies report on their environmental efforts. Maersk might be so big that they themselves need to have a good view of the limits of our world. Indeed their stance comes across as being very proactive and independent. Heerema is a lot smaller and mainly makes mention of SDG's and cooperations with groups as the starting point, they are more a contractor (even more so than Boskalis), with a good environmental portfolio. Boskalis is in between in terms of size and is also this way in their reports. They use both sustainability and survivalism as overarching visons for their activities but they are mainly a contractor (with a healthy amount of cooperative initiatives (p49)).

New technological solutions could be more imaginative and radical. The reports show the imaginative and radical side of the debate, Maersk picks the radical side, Heerema the more imaginative. The solutions however still fall primarily inside of environmental problem solving, not matching with the ambitions the companies have, staying very much inside of what is known. These solutions involve placing scrubbers or using biofuel as add-on to existing heavy fuel ships. The solutions could be more ground breaking, even if they appear too radical, or too outside of the box. The employees investigated in this thesis would be willing, if we are to judge them solely on their discourse analysis, and keeping in mind that most work in sustainable positions. Maybe change isn't happening fast enough as not enough resources are allocated to them due to a fear of losing a competitive edge, but eventually, the firm that doesn't embrace innovation always falls behind anyway. There certainly seems to be potential to achieve something great among the workforce.

5 Conclusion

This thesis has searched for an answer the main research question: *how can different stakeholders regarding the sustainable transition of the maritime industry be assessed using the discourses of Dryzek?* A qualitative research has been conducted on stakeholders in the clean energy industry. At the beginning there were three sub questions to be answered:

1. *What different discourses of the partners and potential end users in the maritime sector can be identified?* The research made apparent that it was possible to condense the discourses into statements that then could be judged by the partners. The style of the interview made the partner's stance on the topics apparent. With this a list could be made that showed the stakeholder's order of discourses and position on the discourse axis figure. Differences between stakeholders could then be observed and investigated further. The order of the list was as follows: Sustainable development, Green politics, Limits, Ecological modernisation, Consciousness, Democratic, Administrative and Economic problem solving, Promethean and finally Grey radicalism. All narratives where tested and the discourses where identified.

2. *What are pivotal elements in the considerations of these actors in adopting the sustainable transition?* Most respondents accept the earthly limitations as a given and most saw the negative consequences of our activities on earth. Most felt the need to limit these activities in some ways, global cooperation seems the most favourite step. The way to solve environmental problems was less clear, as the respondents where in disagreement on the style of problem solving that is needed: democratic, administratively or with economics. Also interference of the government with companies and whether we should keep solutions market driven is controversial. International cooperative bodies are trusted in making the world more environmental, however more controversial is the need to keep economic growth in the mix when it comes to the energy transition. Nature certainly has a high status and deserves its own vote.

3. What are some remarks about the vision that shapes the technological pathways, given discourses of the stakeholders? The stakeholders demands are action and outside the box thinking. They don't believe the system can be repaired fully. This calls for new disruptive technologies to match the assumptions that the stakeholders have. What might be necessary to do is to look more closely at the needs of the employees and open a dialogue about how we could solve today's problems. Often the companies investigated were finding their technological solutions in areas they are already familiar with. The known to be working solutions of today might not be radical enough to solve the energy transition and the stakeholders interviewed hope for something more outside-the-box. Instead of placing a scrubber on a fossil fuelled ship there could be other ways of propelling it, think solar or wind power, or something completely different altogether. Something that would work with nature instead of against it and address the wants and needs of the actors more.

The main *RQ: how can different stakeholders regarding the sustainable transition of the maritime industry be assessed using the discourses of Dryzek?* What was shown in this thesis was the usage of the Q-methodology combined with discourse analysis. This research has shown that with this method it is indeed possible to asses different stakeholders on their discourses. The set up of the interview and the statements proved to be able to provide lists of respondent's discourses and showed the differences between different respondents. It was also possible to draw conclusions based on these results regarding themes. The sustainability reports might be another promising method. There certainly are parallels in discourse usage between the sustainability reports and the employees in the interviews. The reports give ample information about the situation we are in but the solutions aren't always as radical and imaginative in their nature. It is what we know, keeping in bounds of the industrialist complex. The reports seem to indicate a gap between what is needed and what is currently being done. Also, a frequently liked discourse among the respondents, green radicalism, is seldom found in the reports. Maybe the companies should be more radical and imaginative in both their vision AND their solutions. Acceptance of our need to change is certainly there, SDG's get sprinkled throughout the reports and visions about our world on the brink of collapse are there, we just need to take more drastic action and solve the barriers that are in place.

6 Discussion

This thesis aimed to help in solving the wicked problems of sustainability. The alignment of stakeholders in a maritime world could mean great changes to the betterment of our planet. Innovation and new technological pathways could be aided by extending knowledge on actors involved in the maritime world. Deeper understanding about the way technology is handled could make development work better, by understanding the social context the technology operates in. New technology requires considerable resource investments so a stakeholder analysis is not to be excluded from the process. The proper way to do the analysis is, as previously explained, a specialised craft, each stakeholder analysis needs to be made specific for the context and the people that are involved in the research. The discourse analysis combined with Q methodology was chosen as to open up conversation on the sustainability topic and create dialogue from which the researchers could understand the complexities surrounding the topic better. This proved successful as to uncover political ideas and thoughts about the sustainability topic and the considerations of aspects of the economic and social systems we have. The method worked on the variety of investigated actors, their considerations in choosing specific agreement towards the statements was insightful and stressed the importance of open dialogue between actors in firms and indeed between companies. A project like Clean Shipping might however need a more concentrated stakeholder method. The discourse analysis remained political and has yet to uncovered technological barriers, although alignment between stakeholders is given some interesting starting points.

That is why real relevance of this thesis is to be found in the potential for stakeholder alignment. Part of the question whether technologies like clean shipping find real enthusiasm and support in firms is whether the people involved have the same expectations, the same attitudes and priorities to achieve innovation. The method chosen provided adequate ways to uncover such similarities, and differences, between actors. The exact focus on specific alignment reasons and problems remained quite ambiguous as there wasn't much known about the stakeholders and their way of handling the sustainability topic. The setup of the statements was therefore done in such a way to provide an accurate method to categorise the actors and provide them with a list of preferred discourse. Dryzek's discourses provide enough political information so that different areas of interest can be accurately investigated. Indeed, the wide setup of the reasons for alignment can be refined quite considerably. This way of investigating stakeholders offers many possibilities and can be tailored to the researcher's interests. This way better alignment can be found about a wide range of topics, or a specific set of issues, knowledge thereof can only benefit innovation. Q methodology as a method to stakeholder analysis is therefore proven to be an effective tool in understanding maritime relations. It provides perspective on a wide range of issues and can provide a promising starting point for more detailed research's.

The thesis has shown the main desire for solutions to be more outside the box and be more adhered to intuitive considerations, as well as the need to being more open to smart cooperation. This is based on the assumption that the political stance of the actor also is reflected in the way he or she sees technology to be ideally developed. There needs to be some consideration about this assumption, as there is the problem that it is rather difficult to know what role someone takes when being interviewed. Is it the employee of a company that needs to give adequate answers and in some way feels responsible? Is it the citizen that needs to speak up for the betterment of the world? Is it the consumer that mainly cares about the costs? Differences can be expected when talking about sustainability, and indeed about the development of technology. It is quite hard to answer these questions.

What does this thesis tell us about underlying theory and principles? The idea of choosing and catering precise stakeholder theories to the needs of the research still stands. The starting problem statement of the thesis remained broad but that also resulted in some broad conclusions about this specific group of stakeholders. It certainly is true that the political approach of discourse analysis also resulted in knowledge about vision and about the ideal world type situation. In providing specific technological recommendations it is better to pick a different type of research. The need for a project like clean shipping is to know how people will respond to the technology they are developing, it might therefore be better to subject stakeholders to a case study. A case study could be started to subject stakeholders to similar conditions that the actual intended technology movements might cause to them personally, and then investigate their response. The decisions that they make can be investigated more detailed than the politics of environmentalism could predict as the context of the firm and the personal context are intimately intertwined and have complex interaction on the actor. The firm context is then something that remains to be investigated.

When does this pattern emerge? The link between the political nature of the findings and the discourse analysis is the source material. Dryzek's understanding of sustainability issues is one on a global scale. The issues overarch large portions of sections and systems, of which the implications are largely complex, also for the participants to understand. Mapping the social context gives it a good start though. How much of the connectedness of the different aspects of a discourse is possible to be understood in a couple sentence statement? The downsides of nature as being just a subject to human problem solving seem apparent but possibly beneficial activities towards environmentalism, like geoengineering, are then not considered. Another bottom-up approach might be in order, one where the actors first try to truly grasp the concepts shown in the discourse categorisation and then try to apply themselves to the appropriate category. The reason to still map these discourses is to find a good representation of the group on the discourse axis graph, which gives valuable insight into the way, at least from a vision standpoint, that technology could be shaped. This bottom up approach might, although very time costly for the participants, give a more insightful discourse axis graph and with that ultimately better conclusions.

The findings of this thesis, and its methods that lead up to the results, could also be explained by some alternative explanations. There is the question of validation, discourses needed to be brought down to a list of 4 to 7 questions per discourse, which meant that some important aspects of discourses have been selected out in order to keep the size of the statement list down. Selection could be tailored to the researchers interest but the assumptions that are made there are important to document. The aim of the selection done in this research was to represent the discourse as explained by Dryzek most accurately. There were no high scorers on grey radicalism, it is possible that this result and other results are influenced by the social setting in which the stakeholder is present. They might give more socially acceptable answers. There is also a question of the convenience sampling. Most of the respondents were employed in clean maritime functions. Their discourse use might not be the case for everyone in the company and indeed the whole industry and with that the link between the respondents and the sustainability reports should be viewed lightly. For a project like Clean Shipping it is therefore vital to start more in depth research before breaking ground and starting up, changes to the technology are of course much easier to make before the project has hit the stakeholders.

7 Recommendations

Further investigation is required to solve more wicked problems, how do we bridge the gap between employees and organisation? What contextual circumstances are limiting alignment and what is required to speed up innovation?

A main problem is the size of the statement list, the questions are thought provoking and require great considerations on the part of the interviewee. Still, every discourse had a maximum of seven questions attributed to them, which did mean that information about the discourse was left out and not tested. It might be better to first question someone on the basis of main discourse usage. Are they radical/reformist, imaginative or prosaic? Then when one quadrant is determined it is possible to pick a set of questions attributed to the discourses within that quadrant. If someone turns out to be mainly radical and prosaic (so the survivalism quadrant) then statements about differences between the limits and promethean discourse can be given. This way the statement list is not designed to test each discourse, which brings down the test time and keeps the interviewee fresh, while also making the statements more representative of their discourse. Still, one also needs to consider that people might be positive towards everything, but directionless (like R1). Then this method might not work as well.

Appendix A

List of statements as they where asked in the interview and questionnaire.

Section 1: Survivalism.

1. There are global limits that must be respected (think of CO2 emissions, consumption of finite resources like oil).
2. The Earth is like a spaceship; it is a delicate, vulnerable, closed system with life support systems that keep us alive. These systems can kill the crew if not maintained.
3. It is possible to motivate the government to ensure that everyone reduces their activities to a safe upper limit, respecting the Earth's carrying capacity.
4. Nature only has value as something we can use.
5. We should give governments and people with relevant expertise a central role in addressing environmental issues.
6. Actually, the world is doing quite well. Just look at things like life expectancy; it is still rising.
7. Larger populations are better because the more people, the more willpower and imagination there is working in their self-interest, ultimately leading to more improvements for everyone.
8. Competition among people is crucial when it comes to solving environmental problems because it brings forth the most creative solutions.
9. Markets should exist to promote human progress (e.g., by promoting competition among people).
10. We can be selective when choosing research data so that we can argue against the scientific consensus on climate change (cherry-picking). For example, only looking at short-term data on average global temperatures, which are less important for climate change than long-term trends.
11. Things like population, resources, pollution should be controlled, preferably in a hierarchical manner. The government is there to keep us within the limits that apply to our planet.
12. People should dominate nature, build cities, practice geoengineering, and engage in intensive agriculture.

Section 2: Environmental problem solving.

1. The status quo of liberal capitalism is a given and should not be changed.
2. Markets and companies are free from government interference. They should not be forced to do anything. Governments exist only to provide a supporting legal framework.
3. There is actually very little government regulation on polluting companies; it's better if it remains an informal relationship, a cooperative bond between businesses and the government.
4. Nature is subordinate and can be subjected to human problem-solving.
5. It's important that expertise is centrally controlled by the government and authoritatively implemented to try to nurture everyone's interests.
6. It's of great importance that society is guided to navigate us through the upcoming environmental problems.
7. To solve our climate problems, it's crucial that people motivate themselves through material self-interest and, as a result, improve the common good (buying electric cars, reducing heating, building luxury homes with A+++ energy efficiency).
8. The knowledge of experts is superior to experiential knowledge or the knowledge of laypeople (the person who observes something in the forest where they often walk their dog versus the Ph.D. who has studied the forest extensively and knows more about it).
9. We can exploit natural resources to some extent, but we should establish rights for natural resources because there are ultimately limits to those resources.
10. Climate policy should be considered a scientific experiment to determine what works and what doesn't.
11. People should be "Homo Economicus" (rational and efficient, focused on money) and should pursue self-interest for the climate (think insulation, introducing bottle deposits).
12. All citizens should be equal to each other. That is to say, everyone has the right to exert political pressure, whether they are scientists, elected officials, activists, regular voters, or non-voters.

Section 3: Sustainability.

1. Nature is like a waste processing facility. It is a source of raw materials and a recycler of pollution. With proper care, it could function this way.
2. Dealing with environmental issues can be seen as keeping a household tidy: you maximize well-being while simultaneously trying to minimize waste by being efficient in what is used and consumed.
3. Sustainable development is achieved through collaboration, not competition.
4. Economic growth, social justice, and environmental protection can go hand in hand.
5. Viewing environmental problems as highly complex systems (intricate and interconnected social and ecological systems) leads to better solutions.
6. Social progress is the most important (basic needs, opportunities, quality of life, and the environment), rather than economic progress.
7. It's important that we restructure our economic and political systems, motivated by the common good; governments, businesses, and climate scientists can be partners in creating the new system.
8. The value of collaboration between government, business, environmental activists, and scientists should not be underestimated.
9. We should keep in mind that there are limits to what we as humans can do to the Earth.
10. We can have it all: economic growth, environmental protection, and social justice, not just in the present but for all time.
11. It's important that we restructure our economic and political systems, motivated by the common good; we should seek new players alongside the governments, businesses, and climate scientists that exist now, both locally and internationally.
12. Nature should be subordinate to human needs and calculations.

Section 4: Green radicalism.

1. There are global limits to our activities.
2. A culture war is underway, one in which we are searching for our identity, and climate activists may be stereotyped.
3. As humans, we are only subject to climate change. Some of us understand what's happening to us, while others do not.
4. Natural relationships between humans and nature have been violated.
5. The value of nature is irrelevant when making decisions.
6. It's important to also be guided by the emotions and intuitions of people when addressing environmental issues.
7. The common good of "us," the hardworking citizens, should weigh the heaviest.
8. It's better that everyone's voice carries equal weight, making it easier to communicate on advancing our collective interest.
9. Nature should be considered as a complex system with various functions and variables.
10. The organic balance of the world should be examined; the entire system cannot be understood by looking at its components alone.
11. Ideas write history, not material forces. The key to changing the world is to change ideas.
12. We should dominate everything that is not human. We need not concern ourselves with the well-being of non-cognitive animals, AI, and robots.

Appendix B

List of statements with their Q-method type, Dryzek type, content and their discourse.

Survivalism	Type	Dryzek type	Contents	Discourse
1.1	Designative	Basic entities	Planetary boundaries	Limits
1.2	Designative	Metaphors	Spaceship earth	Limits
1.3	Designative	Agents and motives	Originally elites; motivations is up for grabs (unknown)	Limits
1.4	Designative	Basic entities	Nature as only brute matter	Promethean
1.5	Evaluative	Basic entities	Elites	Limits
1.6	Evaluative	Metaphors	Trends	Promethean
1.7	Evaluative	Agents and motives	Everyone; motivated by material self-interest	Promethean
1.8	Evaluative	Natural relationships	Competition	Promethean
1.9	Advocative	Basic entities	Markets	Promethean
1.10	Advocative	Metaphors	Cherry picking	Promethean
1.11	Advocative	Natural relationships	Hierarchy and control	Limits
1.12	Advocative	Natural relationships	Hierarchy of humans over everything else	Promethean
Environment. problem solving	Type	Dryzek type	Contents	Discourse
2.1	Designative	Basic entities	Liberal capitalism	Admin./Demo.
2.2	Designative	Metaphors	Connection with freedom	Economic
2.3	Designative	Agents and motives	Some government officials must be motivated by public interest	Economic
2.4	Designative	Natural relationships	Nature subordinate (to human problem solving)	Administrative
2.5	Evaluative	Basic entities	Experts	Administrative
2.6	Evaluative	Metaphors	Navigating and steering	Administrative
2.7	Evaluative	Agents and motives	Material self-interest and multiple conceptions of public interest	Democratic
2.8	Evaluative	Natural relationships	Experts knowledge superior to experiential knowledge	Administrative
2.9	Advocative	Basic entities	Markets	Economic
2.10	Advocative	Metaphors	Policy is like scientific experimentation	Democratic
2.11	Advocative	Agents and motives	Homo economicus: self-interested	Economic
2.12	Advocative	Natural relationships	Equality among citizens	Democratic

Sustainability	Type	Dryzek type	Contents	Discourse
3.1	Designative	Basic entities	Nature as waste treatment plant	Sustainable development
3.2	Designative	Metaphors	Tidy household	Ecological modernisation
3.3	Designative	Natural relationships	Cooperation	Sustainable development
3.4	Designative	Natural relationships	Economic growth, environmental protection, (distributive justice and long-term sustainability) go together	Sustainable development
3.5	Evaluative	Basic entities	Complex systems	Ecol./Sus.
3.6	Evaluative	Metaphors	Connection to progress	Ecol./Sus.
3.7	Evaluative	Agents and motives	Partners; motivated by the public good	Ecological modernisation
3.8	Evaluative	Natural relationships	Partnership encompassing government, business, environmentalists and scientists	Ecological modernisation
3.9	Advocative	Basic entities	Ambiguity concerning existence of limits	Sustainable development
3.10	Advocative	Metaphors	Reassurance	Ecological modernisation
3.11	Advocative	Agents and motives	Many agents at different levels, transnational and local, as well as the state; motivated by the public good	Sustainable development
3.12	Advocative	Natural relationships	Subordination of nature	Ecological modernisation
Green rad.	Type	Dryzek type	Contents	Discourse
4.1	Designative	Basic entities	Global limits	Cons./Green.
4.2	Designative	Metaphors	Stereotyping of the other side	Grey radicalism
4.3	Designative	Agents and motives	Human subjects, some more ecologically aware than others	Consciousness
4.4	Designative	Natural relationships	Natural relations between humans and nature that have been violated	Consciousness
4.5	Evaluative	Basic entities	Irrelevant nature	Grey radicalism
4.6	Advocative	Metaphors	Appeals to emotions, intuitions	Consciousness
4.7	Evaluative	Agents and motives	Own side: common good of people/nation	Grey radicalism
4.8	Evaluative	Natural relationships	Equality among people	Green politics
4.9	Advocative	Basic entities	Nature as complex system	Green politics
4.10	Advocative	Metaphors	Organic metaphors	Green politics
4.11	Definitive/Designative	Basic entities	Ideas	Consciousness
4.12	Advocative	Natural relationships	Domination of the nonhuman world	Grey radicalism

Table B: Statement contents and discourse to be tested.

Appendix C

Respondent's individual ordering of the discourses as explained in the results chapter.

Response 1		Response 2		Response 3		Response 4		Response 5		Response 6		Response 7		Response 8	
Limits	4,4	Sus dev	5,0	Limits	4,4	Green politics	4,0	Consciousness	4,2	Limits	4,6	Sus dev	5,0	Green politics	4,8
Sus dev	4,3	Green politics	4,8	Sus dev	4,0	Sus dev	3,9	Limits	4,0	Consciousness	4,0	Green politics	5,0	Sus dev	3,9
Demo	3,8	Ecological	4,4	Green politics	3,5	Limits	3,8	Ecological	3,4	Green politics	4,0	Ecological	4,4	Consciousness	3,8
Ecological	3,7	Consciousness	3,8	Admin	3,4	Ecological	3,7	Econ	3,3	Sus dev	3,9	Limits	4,0	Limits	3,6
Green politics	3,5	Demo	3,8	Ecological	3,3	Demo	3,5	Sus dev	3,1	Ecological	3,3	Consciousness	3,6	Ecological	3,6
Promethean	3,4	Promethean	2,7	Demo	3,3	Admin	3,4	Admin	3,0	Admin	2,6	Demo	2,8	Admin	3,0
Admin	3,4	Econ	2,3	Consciousness	2,6	Promethean	3,0	Green politics	3,0	Econ	2,3	Econ	2,8	Demo	3,0
Consciousness	3,2	Admin	2,2	Promethean	2,6	Consciousness	3,0	Grey radicalism	2,8	Promethean	1,9	Admin	2,2	Econ	3,0
Econ	3,0	Limits	2,0	Econ	2,5	Econ	2,8	Demo	2,5	Demo	1,5	Promethean	2,1	Promethean	2,3
Grey radicalism	1,3	Grey radicalism	1,8	Grey radicalism	2,0	Grey radicalism	2,3	Promethean	2,0	Grey radicalism	1,3	Grey radicalism	1,0	Grey radicalism	1,8

Table C: Individual ranking of the 10 discourses per respondent

Appendix D

Code book for the sustainability reports. Examples are excerpts from Boskalis (2022), Heerema (2021) and Maersk (2022).

Theme	Aspects	Aspect description	Codes	Examples
Survivalism	Limits	Limits to our survival on earth, crossing these limits will give consequences	Population, emission, bio diversity, rare materials	"Through our activities, we also generate emissions and have committed to becoming climate neutral across our global operations by 2050."
	Climate change	Causes for the threats to (our) survival on earth	Temperature, sea level, extreme weather, conflict	"Over the past two years, supply chains have seen unprecedented disruptions. While the worst of the pandemic-related disruptions are easing, new disruptions are coming into play, including an increase in extreme weather events and ongoing geopolitical conflicts."
	Energy transition	Break between the fossil and clean era	Switching to renewables	"To move towards climate neutrality, new 'clean' fuels are needed for the international maritime industry. To reach this goal, we exert our indirect influence and are, in part, dependent upon factors that lie outside of our control."
Environmental problem solving	Technical innovations	Solving problems on the ground: insulating offices, retrofitting ships, wind mills, etc.	Scrubbers, offices, windfarms, solar farms, hydrogen etc.	"The size and share of offshore wind energy has grown substantially within the group and based on the market outlook, the further prospects are positive. Early 2023, Boskalis acquired its 100th offshore wind project and over the last decade the company has been involved in the realization of almost half of all such projects outside of China."
	Inter-organisational efforts	Internal systems to ensure environmental action	Planning, commissions, regulatory bodies, managing environmental risk	"the prevention and mitigation – through our structured approach to managing environmental risks – of negative impacts on marine life or local habitats, such as those linked to invasive species, turbidity or pollution."
	Intra-organisational efforts	External systems to ensure environmental action	Joint development, joint innovation (not as intended in the spirit of the sustainability discourse)	"No one company can do this alone, and such partnerships and investments are critical to the uptake, scaling and maturing of ground-breaking solutions that are urgently needed for net zero supply chains."
	Economics	Economic systems to ensure environmental action	Carbon-taxes, tree offsets, developmental subsidies	"In addition to the clear technology pathways to decarbonisation in our roadmap, we can also see a credible commercial pathway. This is based on the abatement cost per tonne of CO_2 equivalents (CO_2e), which will likely be a key purchasing criterion for our customers."
	Life cycle	Advanced planning to prevent environmental damage in the future	Decommissioning, new propulsions in new ships, environmental friendly paints, refurbishing vessels	"The advantages of acquiring and modifying existing assets include the ability to extend the lifetime of vessels, a more sustainable approach when compared to a new-build."
	Clean up	Efforts to solve problems that find their causes in the present or the past.	Wreck salvaging, plastics, oil spillages	"On 31 January Boskalis successfully salvaged the disabled and drifting cargo vessel, Julietta D, preventing it from running aground near the resort of Scheveningen."

Sustainability	Social impacts	Impacts of the firm on areas they operate in and the impact on locals and local businesses.	Local communities, prosperity, social progress, social justice	"The majority of our work takes place offshore, however, our operations can impact local communities at the coast or inland. This impact may be either positive — through the creation of jobs and opportunities for trade and economic growth – or, potentially, negative, through disturbance or changes to the local environment."
	Economic impacts	Impact on economical matters in operating area	On other countries, employment, sustainable growth	"Our focus on sustainable growth lies at the heart of our business strategy."
	SDG's	Sustainable developmental goals and contributions to them (often environmental problem solving).	All SDG's, UN cooperation, Paris agreement	"The four areas of our business set out above contribute to the following specific SDGs: Affordable and Clean Energy; Industry, Innovation and Infrastructure; Climate Action; Life Below Water"
	Cooperation	Cross national cooperation, including but not limited to existing government, businesses, non-profits, citizens, activists.	Inter-national, governmental, joint initiatives	"We are really proud to be a part of both the EverLong and LNG-ZERO consortia and are looking forward to further contributing to emission reduction in the maritime industry."
Green radicalism	Vision	Points of departure of policy and reasoning behind climate action	Ambition, motivations, public perception	"Together with industry-leading customers and partners, we're calling for ambitious policy and action to ensure this happens. We're also fully committed to doing our part to make this vision a reality."
	Ideas vs material	What changes the world, ideas or the material work on the ground	Historical debates, call to action, call to change behaviour, ideas, influencing	"We recognize that innovation is just as much about the way we do things, as it is about new technology; new ways of thinking and changes to behaviour are vital to achieving our sustainability objectives."
	Nature central	Position of nature in decision making	Voting power attributed to natures needs and wants	"As a global business operating across ocean, land and air, our activities at A.P. Moller - Maersk (Maersk) can impact the ecosystems that people and nature depend on."

Table D: Code book

Appendix E

Introductory text to the questionnaire which was send to the people that we couldn’t meet in the interview.

Welcome! This research is part of my master's thesis in the Master of Management of Technology program at TU Delft.

Before we begin, let me explain what this research is about. In these times of environmental troubles, there are many different opinions on how best to solve environmental problems. This research aims to bring order to all the different views and discussions surrounding the environment.

The research is part of the Clean Shipping project at TU Delft, but it goes beyond that. Based on methods from the literature, this questionnaire has been created, which may make it possible to categorize environmental beliefs. Afterwards, it may be possible to determine which environmental worldview you belong to, and you can receive the worked out worldview, provided that the method works. Thank you in advance for your contribution!

How does it work? I will present you with a list of statements and ask you to what extent you agree with each statement. All statements relate to the environment.

The list consists of four sections. Each section contains various statements, and you can indicate how much you agree with each statement.

It's mostly about the initial impression you have of a statement. If something is unclear, please leave a comment at the end of the section.

You can stop filling out the questionnaire at any time, and your data will be anonymized when we move on to publication.

1 = Strongly Disagree

2 = Somewhat Disagree

3 = No Opinion/Neutral

4 = Somewhat Agree

5 = Strongly Agree

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