

**Mental models of the drivers of fossil fuel investors' voting  
behaviour on climate resolutions**

Roos Wijker (Student number: 6687512)

Faculty of Geosciences, University of Utrecht

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Supervisor: Dr. Karlijn van den Broek

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### **Abstract**

Mitigating climate change and keeping the increase of global temperatures well below the two degrees underlined by the Paris Agreement is crucial to preventing risks to society. This requirement can only be fulfilled if fossil fuel companies change, as they indirectly produce the majority of greenhouse gasses. Institutional investors can play a crucial role by supporting climate resolutions that request fossil fuel companies to adopt measures aligned with the Paris Agreement. This study investigated to what extent and in what respect different reasonings behind institutional investors' decision-making led to varying voting decisions at the climate resolution filed at Royal Dutch Shell in 2020. This research analysed the mental models of 23 institutional investors with different voting decisions by applying a causal cognitive mapping technique. The produced mental models containing the same voting decisions were compared to the mental models of investors having a different voting decision based on Distance Ratios, Complexity tests and by comparing the perceived influence of drivers and their relationships with the resultant voting decision. Results show that the mental models of investors with different voting decisions differ between the investors who voted "in favour" and "against" and also between investors who voted "against" and "abstain" on the climate resolution. No significant difference between the mental models of investors who voted "abstain" and "in favour" was found. The mental models underlying the different decision-making processes on their voting behaviour did not indicate a significant complexity difference. However, the significance tests were strongly underpowered. A review of the frequencies of perceived drivers and their relationships indicated that these, to a certain extent, differed between investor groups with different voting decisions. An important limitation related to the results is the small sample size of the study. Nonetheless, this study provides scientific implications as it highlights the potential of mental model theories in the shareholder activism research field. Moreover, this study can be reviewed by institutional investors that file climate resolutions at fossil fuel companies to apply these insights for forming climate resolutions and facilitating related conversations between shareholders.

*Keywords:* mental models, mental model comparison, decision-making, institutional investors, shareholder activism, climate resolutions

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### **Mental models of the drivers of fossil fuel investors' voting behaviour on climate resolutions**

The historical Paris Agreement between nations to reduce their carbon emissions to keep the global temperature rise well below 2 degrees Celsius above pre-industrial levels highlights the global sense of urgency to mitigate anthropogenic climate change (Kinley, 2016). However, five years after this agreement has been signed, the actions taken by the signatory countries to reach their pledged reductions are far from satisfactory (Roelfsema et al., 2020).

A United Nations report highlighted that countries' current promises to reduce emissions might still result in a temperature rise of 3.2 degrees Celsius at the end of the century (UNEP, 2020). Such a temperature increase would negatively impact society by leading to increased physical, economic and societal risks, which are interrelated (Handmer et al., 1999; Molnar, 2010; Scheffran et al., 2012). For instance, physical risks, such as flooding could damage people's livelihoods (Hossain et al., 2012). Additionally, social, demographic and economic disruptions could increase health risks (McMichael et al., 2006); and lower cereal grain yields could lead to food scarcity (Parry et al., 2004). Therefore, mitigating climate change and gaining a broader understanding of how sustainable measures can be supported are of societal importance.

Mitigating climate change will require companies to change their business as usual mentality. This is particularly important for the fossil fuel industry, as it indirectly produces the majority of greenhouse gas (GHG) emissions (Griffin, 2017). However, none of the 53 largest globally publicly listed oil and gas companies are on track to reach the 2-degrees target by 2050 (TPI, 2020), thus pressure is needed to change their trajectories. One group that can particularly influence the direction and speed of the energy transition are the institutional investors, or shareholders, of fossil fuel companies (Batruch, 2017; Christophers, 2019; Fink, 2020; Pfeifer & Sullivan, 2008).

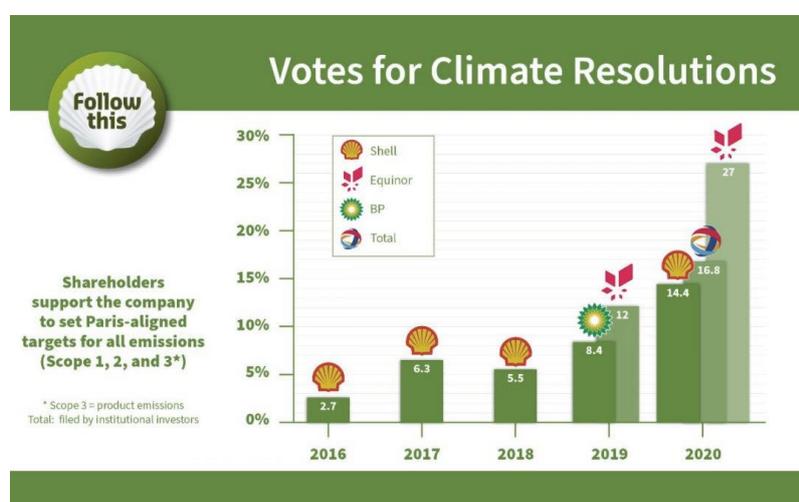
The potential power of investors, and the history of socially responsible investors, to pressure fossil fuel companies to take climate-related measures is especially highlighted in the field of shareholder activism (Bauer et al., 2018; Byrd & Cooperman, 2017; Feit, 2016; George, 2018; Sjöström, 2008; Xie, 2020)). Within this field, filing shareholder resolutions and executing voting

power, on environmental, social or governance (ESG) issues are some of the most direct actions shareholders can take to influence corporate decisions (Duan et al., 2020; de Groot et al., 2021). For instance, all shareholders can vote on resolutions at the annual general meetings (AGMs) of fossil fuel companies by voting in favour, against or voting abstain (VBDO, 2020).

Investors were recently given the power to decide to support or oppose a climate resolution filed at Shell, Equinor and Total, which requested that these fossil fuel companies implement greenhouse gas (GHG) emission reduction targets aligned with the Paris Agreement (Follow This, 2020a; VBDO, 2020;). Although there has been an increasing trend in investors deciding to support such climate resolutions over the past few years, a majority still choose to vote against (Figure 1) (Follow This, 2020b). However a larger amount of in favour votes would increase pressure on the management of fossil fuel companies to act accordingly (Logsdon & van Buren, 2009).

**Figure 1**

*Overview of in favour votes on climate resolutions filed at fossil fuel companies*



*Note.* An increasing trend of support for climate resolutions is noticeable. (Source: Follow This, 2020b.)

Although investors' decisions to vote in a particular way have a tremendous influence on the effectiveness of resolutions in supporting fossil fuel companies to become more sustainable. However, there is a lack of research identifying why investors make certain voting decisions. Therefore, increasing knowledge and understanding of this matter within the field of shareholder activism is important, as highlighted by Sjöström (2008).

A large number of studies have attempted to understand people's reasoning on a variety of topics and tried to describe factors that influence their decision making (Capelo & Dias, 2009; Elsayah et al., 2015; Karakaya & Yannopoulos, 2010; Maitland & Sammartino, 2015; Senge, 1990). Scientific research that primarily focuses on this matter aims to elicit and understand the mental models of people. Mental models, exist based on people's perceived drivers and relationships and represent how people understand a certain system, as influenced by their values and beliefs (Biggs et al., 2011; Kolkman et al., 2005; Moon et al., 2019). Differences in mental models can affect how an individual defines a problem and hence can influence the perceived need for and type of action (Rook, 2013; Senge, 1990), such as an investor's perceived need to support or not support a climate resolution. Therefore, gaining an understanding of the different perceptions that stakeholders hold allows for their reasons for disagreement to be understood and for the facilitation of more effective communication that uses language fitting their respective various mental models (Vecchiato, 2019; Jones et al., 2011; Kolkman et al., 2005).

Eliciting and comparing mental models has proven effective in understanding decision-making processes (Gary & Wood, 2011; Kolkman et al., 2005; Rydén et al., 2015; Schaffernicht & Groesser, 2011). For instance, Muñoz (2018) examined the decision-making of 37 sustainable entrepreneurs by applying a mental model approach, leading to the identification of a variety of factors that influenced their decision-making processes. However, there is a limited amount of mental model research focusing on decision making by institutional investors. For instance, the study of Petersen & Vredenburg (2009a, 2009b) elicited investors' mental models and provided insights into the perceived drivers that influence investors' views on social responsibility and decisions to sell or keep fossil fuel shares. Nonetheless, mental model research has never been applied to increase knowledge on the relationship between institutional investors, climate resolutions and voting behaviour.

This study contributes to the scientific gap in understanding why investors vote on climate resolutions in certain ways by applying mental model research to the field of shareholder activism.

Knowledge of whether investors' mental models lead to different voting decisions and what aspects they apply to will provide a broader understanding of why investors oppose or support climate-related resolutions. The insights gained could then be used to review climate resolutions so that they appeal to a broader group of investors by considering the opponents' concerns. This will also allow better communication of climate-related resolutions to institutional investors based on their different views. Furthermore, although mental models are generally used to understand different decision-making processes, research and methodologies that compare them quantitatively to identify whether different mental models are related to different decision-making outcomes are limited (Lozano, 2013; Schaffernicht & Groesser, 2011). Therefore, this study provides new insights that can be used by mental model researchers who wish to quantitatively compare mental models held by stakeholders who reached different decisions.

Considering the scientific and social relevance of mental model research, this study aims to answer the following two research questions. Firstly, this research will aim to identify to what extent mental models differ across institutional investors who vote in favour, vote against or vote abstain on climate resolutions for fossil fuel companies (RQ1). Additionally, a follow-up research question is examined, focusing on identifying in what respect the mental models of investors differ across these three types of voting behaviours to identify the different drivers and relationships that lead to different voting decisions (RQ2).

To answer these questions, the resolution filed by the shareholder activist group Follow This at Royal Dutch Shell in 2020 represent the focus of this research, as this represented the most recently filed climate resolution at the largest targeted fossil fuel company at the start of this research. The mental models of the investors were elicited by applying a causal cognitive mapping technique using the digital Mental Model Mapping Tool (M-tool) software.

This thesis is organised as follows. Firstly, the Theoretical framework is introduced, explaining the concept of mental models and their connection with decision making, leading to two hypotheses. A literature review on the potential drivers behind investors' voting decisions is also included in this

section. This is followed by the Methodology section, which explains the use of causal cognitive mapping by applying the digital M-tool and the quantitative analysis and descriptive approach that were applied. The Results section includes the findings on the perceived drivers, relationships and differences between the mental models of investors. A selection of these results are then further explored in the Discussion, which also highlights the limitations of this study. Finally, answers to the research questions are provided in the Conclusion.

### **Theoretical framework**

The definition of mental models, their relationship with decision making and previous mental model research are explored in the following subsections. Furthermore, two hypotheses are presented based on these insights and a review of mental model research. A literature review is then provided to identify potential drivers of the voting decisions of institutional investors, which laid the foundation for applying the M-tool, as explained in the Methodology section.

#### **Relationship between decision making and mental models**

Scientific research into people's decision-making processes (e.g. on sustainability-related topics) can be broadly divided into two approaches (Maitland & Sammartino, 2015). The first approach focuses on normative decision-making models that explain how decisions should be made, which is aligned with the view that managers act in a rational way (Elsawah et al., 2015; Maitland & Sammartino, 2015). The second approach, which is followed in this research, is that decision making is based on bounded rationality and also includes cognitive learning processes. This latter decision-making perspective follows the notion that it is important to understand how the established views of individuals i.e. the mental models, influence people's decision making (Capelo & Dias, 2009; Elsawah et al., 2015; Karakaya & Yannopoulos, 2010; Maitland & Sammartino, 2015).

The concept of mental models was introduced by the psychologist Craik as referred to in Ritchie (1943), whose research highlighted that people's reasoning is influenced by their mental models. There are a variety of mental model definitions, but this paper uses the following definition because it incorporates concepts that are more frequently mentioned in the literature (Doyle & Ford,

1998; Rook, 2013): *'Mental models are a representation of stakeholders' perception of the constituent variables [i.e. drivers] of complex and dynamic systems, together with the causal relationships between those variables.'* (Van den Broek, 2020a, p. 1)

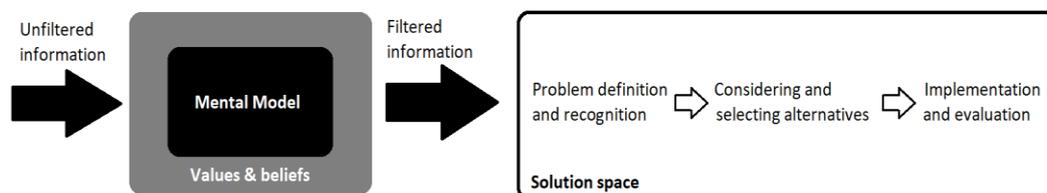
Within the scope of this research, the stakeholders are the institutional investors and the complex system is the broad number of drivers (i.e. variables) perceived by the investors as influencing their voting decisions, leading them to vote in favour, vote against or vote abstain on the climate resolution.

Based on the above definition, a mental model can be explained as an internally held view resulting from an external perceived reality (Elsawah et al., 2015). However, mental models do not necessarily represent a correct understanding, as people are limited to their bounded rationality, which is even more apparent for complex systems (Doyle & Ford, 1998; van den Broek, 2020a). Hence, mental models are subjective, as they are influenced by a number of factors, such as the investors' knowledge, experiences, values and beliefs around the topic of climate-related resolutions (Biggs et al., 2011; Kolkman et al., 2005; Moon et al., 2019). Moreover, mental models are context-specific and dynamic, as these factors can change over time, causing the mental models of the investors to change as well (Biggs et al., 2011; Gray and Zanre, 2013; Jones et al., 2011; Rook, 2013).

Importantly, mental models determine not only how to make sense of complex situations but also how to act in the perceived situation (Senge, 1990). Therefore, mental models influence decision making by filtering derived information to gain a particular perspective of the situation or problem, leading to specific considerations and related decisions (Biggs et al., 2011; Capelo & Dias, 2009; Chermack, 2003; Kolkman et al., 2005; Rook, 2013) (see Figure 2). Consequently, it can be expected that the mental models of investors also influence their decision to support or not support climate resolutions. Therefore, this thesis aims to elicit the mental models of investors to understand their different voting behaviours.

**Figure 2**

*Information processed through a mental model*



*Note.* This figure illustrates how certain information is processed through a mental model, leading to a solution or decision making that is considered appropriate for the perceived situation. (Adapted from Biggs et al., 2011.)

### **Mental model research**

Since mental models only exist in the mind, it is challenging to elicit them for research purposes. Nonetheless, a broad research field has applied mental model research and obtained the models of research participants (Biggs et al., 2011). For example, researchers have elicited mental models for nature conversation purposes (Kolkman et al., 2005; Moon & Adams, 2016; Moon et al., 2019; Özesmi & Özesmi, 2004), organisational learning (Porac & Thomas, 1990), risk communication (Breakwell, 2001), education (Coll et al., 2005; Greca & Moreira, 2000;), system dynamic research (Doyle & Ford, 1998) and climate change (Bostrom et al., 1994; Otto-Banaszak et al., 2011).

Kolkman et al. (2005) highlighted that eliciting mental models can be an effective tool for analysing the decision making of different stakeholders. A comparison of mental models can identify the differences and similarities between the mental models of different stakeholders who made different decisions (Gary & Wood, 2011; Kolkman et al., 2005; Schaffernicht & Groesser, 2011; Özesmi & Özesmi, 2004). Highlighting how stakeholders think differently according to their mental models also allows improved communication between different stakeholders through the use of language that fits their views (Jones et al., 2011; Kolkman et al., 2005). Moreover, eliciting the perceived mental models allows the knowledge limitations and misconceptions behind stakeholders' decision making to be revealed so they can be specifically targeted with the necessary resources, which could change their currently held mental models (Jones et al., 2011; Vecchiato, 2019).

However, mental models only determine the perceived situation rather than whether and in what respect this perception is correct (Moon et al., 2019). Moreover, because mental models contain tacit knowledge, it can be assumed that stakeholders are not aware of their full mental models, leading to incomplete visualisations (Elsawah et al., 2015; Jones et al., 2011).

As stated previously, different mental models can lead to different perceptions of the need for sustainability-related actions. For example, different sets of beliefs and concepts related to climate change and extreme weather events lead to different attitudes and perceived needs for actions by various stakeholders, such as researchers, business actors and policymakers (Bostrom et al., 1994; Otto-Banaszak et al., 2011). Moreover, mental model research focusing on understanding managers' perceptions of sustainability-related matters has also indicated that managers' mental models differ depending on their companies' social and environmental performances (Hockerts, 2015). It also appears that business managers and entrepreneurs perceive different drivers as important factors leading to sustainable decision-making, such as reputational risk, financial costs and purpose-driven motivations (Hockerts, 2015; Muñoz, 2018; Roehrich et al., 2014).

Mental model research focusing on institutional investment managers and sustainability-related topics has also highlighted the existence of various drivers behind sustainability-related activities, such as drivers related to risk management (Guyatt, 2019; Petersen & Vredenburg, 2009a, 2009b). For instance, the research of Petersen and Vredenburg (2009a) suggested that different drivers influence investors' perceived value of corporate social responsibility (CSR), which influences their decision to invest or not invest in fossil fuel companies. A comprehensive overview of the different drivers behind the decisions of institutional investors on sustainability-related topics is presented in the next subsection.

In summary, the literature suggests that different mental models lead to different types of decision making, and various drivers appear to influence sustainability-related decision making by managers and investors. Consequently, it is expected that the group of investors who vote differently on climate resolutions will have different mental models, with different perceived drivers and

relationships behind their voting decisions. Thus, related to RQ1 'To what extent do mental models differ across institutional investors who vote in favour, vote against or vote abstain on climate resolutions for fossil fuel companies?', the following hypothesis was tested:

*H<sub>1</sub>: There is a difference in the contents of the group mental models of investors who vote in favour, vote against or vote abstain on a climate resolution.*

In addition to drivers and relationships, research suggests that the level of complexity within a mental model influences the decision-making process (Gray et al., 2015; Gröschl et al., 2017; Hockerts, 2015; Nadkarni & Narayanan, 2005). In simple terms, the complexity of a mental model can be understood as the number of drivers and perceived links (Tegarden & Sheetz, 2003), as further elaborated on in the Methodology section. Thus, the higher the number of drivers and connections within a mental model, the higher the mental model complexity and the broader the understanding of a certain situation (Gray et al., 2015; Nadkarni & Narayanan, 2005).

Hockerts (2015) applied a mental model approach to analyse the different perceptions of company managers towards their firms' investments in corporate sustainability activities. In this qualitative research, 12 multinationals were analysed and separated into three groups: top performers, runners-up and followers. Semi-structured interviews were then held and coded and group mental maps were developed. Comparison of the different mental models indicated that the followers mainly focused on risks while the runners-up and top performers identified more variables, resulting in more differentiated and integrated mental models. Thus, based on these results, company managers with higher sustainability performances appear to exhibit a greater sense of complexity as they recognise more drivers and related influences.

Aligned with the above finding, it has been shown that more complex mental models tend to support better decision making and result in higher corporate social performances (Gröschl et al., 2017). For instance, Wong et al. (2011) highlighted that company leaders with higher cognitive complexities, including stronger abilities to link information, achieved higher levels of corporate

social performance. Furthermore, Hahn et al. (2014) suggested that decision-makers with more complex mental models have more proactive responses to sustainability challenges.

Specific research on the complexities of institutional investors and their decisions on climate resolutions has not previously been undertaken. However, based on the above literature, it appears that investors who actively support sustainability-related actions, such as climate resolutions at fossil fuel companies, may have more complex mental models than those who do not support a sustainability-oriented resolution. This leads to the following hypothesis shown below, which relates to RQ2 'In what respect do mental models differ across the three types of voting behaviours?':

*H<sub>2</sub>: Institutional investors who vote in favour of climate resolutions have more complex mental models than investors who vote against them or vote abstain.*

### **Potential drivers of institutional investors' voting decisions**

To elicit the mental models of investors that influence their voting decisions and to identify in what respect the mental models differ, it is necessary to identify the potential drivers that exist in their mental models. Research to date has not comprehensively identified the different driving forces behind the voting behaviour of institutional investors towards climate resolutions. However, the literature review provided below highlights some potential drivers and their relationships based on research that analysed investor views on climate change, fossil fuel investments and CSR strategies (see Table 1 for a complete overview). The drivers are explained based on four categories: risk mitigation, market opportunities, feeling of responsibility and other reasons, which includes all the drivers that do not fit precisely into a theme.

#### ***Risk mitigation***

Overall, investors' interests in fossil fuel investments and CSR-related matters appear to be largely based on the perception of investment risk. The importance of perceived risk mitigation was especially emphasised in the research of Petersen & Vredenburg (2009a, 2009b), which is the only research that has elicited institutional investors' mental models by utilising a cognitive mapping technique. The researchers first conducted in-depth interviews with senior officers and coded and

categorised the information into a conceptual model. The model was then tested through surveys to measure the level of agreement on the identified variables. This research provided an understanding of whether social responsibility had any influence on the decision making of institutional investors related to investing, selling or holding fossil fuels investments (Petersen & Vredenburg, 2009a). For instance, investors within this research identified public perception and negative media related to their fossil fuel investments as important variables as they indirectly affected financial performance ('Reputation risk' in Table 1).

Other research that did not focus on eliciting mental models has concluded that investors perceive climate change not only as a direct financial risk but also as a reputation or regulation risk (Christophers, 2019). Moreover, investors recognise the risk of court rulings (Carney, 2015; Covington et al., 2016; TCFD, 2016;) and understand that the physical risk of climate change can indirectly influence their shares (Carney, 2015; Christophers, 2017; Fink, 2020; TCFD, 2016). All these perceptions of risks are closely related to investors' beliefs in the existence and effects of climate change (Bremer & Linnenluecke, 2016; Christophers, 2019; Guyatt, 2019).

### ***Market opportunities***

Climate change or CSR-related matters could also influence market opportunities for fossil fuel investments, as some institutional investors believe that socially responsible corporations have a competitive advantage (Petersen & Vredenburg, 2009b) – although this also depends on whether investors foresee a future in fossil fuel investments (Christophers, 2019; Gupta et al., 2020). Furthermore, employee satisfaction and retention may play a role as some investors perceived a higher employee satisfaction and retention as a consequence of CSR (Petersen & Vredenburg, 2009b). Another potential driver related to market opportunity is the perception of a lack of sustainable alternatives, as that was mentioned as a reason for investors to keep fossil fuel shares in their portfolios (Gupta et al., 2020).

### ***Feeling of responsibility***

Investors strongly emphasise the indirect financial risk of climate change, while moral reasoning sometimes seems to be lacking (Christophers, 2019; Petersen & Vredenburg, 2009a). However, other research has mentioned that investors exhibit a certain level of responsibility towards the environment and society (Gupta et al., 2020; Petersen & Vredenburg, 2009b).

### ***Other reasons***

Besides the three themes outlined above, other topics have also been identified as potential drivers behind the voting decisions of investors. For instance, investors often tend to have short investment horizons i.e. not looking more than 5–7 years ahead (Carney, 2015; Christophers, 2019). Moreover, research that has explicitly mentioned the visualisation of investor mental models on climate-related risks has highlighted the importance of openness in a company (Guyatt, 2019), which could indicate that ‘Support of own company’ is a driver (Table 1). Moreover, research that has explicitly mentioned the visualisation of investor mental models on climate-related risks has highlighted the importance of openness in a company (Guyatt, 2019), which could indicate that ‘Support of own company’ is a driver (Table 1). This research underlined the need for openness from the management board towards their voting managers to internally discuss climate change topics based on survey responses followed by semi-structured interviews at the individual level in asset owner organisations (Guyatt, 2019). However, a clear mental model approach or cognitive model visualisation was missing from this research.

A report by ShareAction (2020) briefly mentioned a few arguments that are given by investors regarding climate resolutions. Their report highlighted that, in general, members of the large investment group Climate Action 100+ (CA100+) were in greater support of ESG-related resolutions than non-members (ShareAction, 2020). This raises the suggestion that CA100+ could also be a driver behind investors’ voting behaviour. Furthermore, investors justified their ‘against’ votes by arguing that engagement is very important and that the fossil fuel company was already doing better than its peers (ShareAction, 2020).

**Table 1***Derived drivers from literature including definitions*

Recognize d theme	Potential drivers and their definitions	Reference ( <i>mental model research highlighted in italic</i> )
<i>Risk</i>	<i>Reputation risk</i>	Christophers, 2017; Gupta et al., 2019; Guyatt, 2019;
<i>Mitigation</i>	The risk of harming the positive reputation of the investment company towards the outside world (e.g. pensioners, government bodies and peers) for example through media and NGO's campaigns.	Hancock, 2005; Petersen & Vredenburg, 2009a, 2009b; TCFD, 2016;;
	<i>Financial risk</i>	Byrd & Cooperman, 2017;
	The risk of financial loss, for instance, due to stranded assets. Stranded assets are assets of, for example, fossil fuel companies that are not performing as expected and can be seen as a loss of profit.	Carney, 2015; Christophers, 2019; Fink, 2020; Gupta et al., 2020; TCFD, 2016;
	<i>Regulation risk</i>	Christophers, 2019; Fink, 2020 ; Gupta et al., 2020;
	The risk of upcoming policies that would affect the investments' value or directly the investment company. For example, the earlier implemented EU ETS system.	Hancock, 2005; TCFD, 2016
	<i>Legal risk</i>	Carney, 2015; Covington et al., 2016; Hancock, 2005; TCFD, 2016
	The risk of court rulings towards fossil fuel companies. Such court cases could influence the value of shares and license to operate. Direct court ruling towards investors themselves could also play a role. For example, court cases that accuse the targeted party of doing too little to mitigate climate change.	
	<i>Physical risk</i>	Fink, 2020; Christophers, 2017; TCFD, 2016; Carney, 2015
	The direct risks of climate change, such as flood and storms, which damage property or disrupt trade.	
	<i>Questions effect climate change</i>	Bremer & Linnenluecke, 2016; Christophers, 2019; Guyatt, 2019;
	Not being sure about the actual effect of climate risks on investments or having overall climate scepticism.	
<i>Market opportunities</i>	<i>Competitive advantage</i>	Petersen & Vredenburg, 2009b
	The advantage of the investment company themselves or fossil fuel companies due to a better position in the market.	
	<i>Belief in fossil fuel future</i>	Christophers, 2019; Gupta et al., 2020
	Belief that fossil fuels will stay important and, therefore, will still be valuable in the future.	

	<i>Employee satisfaction and retention</i>	<i>Petersen &amp; Vredenburg, 2009b</i>
	Employee satisfaction and retention due to enthusiasm of employees on the sustainable strategy of the institutional investment company.	
	<i>Substitutes are lacking</i>	Gupta et al., 2020
	Comparable substitutes of sustainable investments are perceived as lacking.	
<i>Feeling of responsibility</i>	<i>Social responsibility</i>	<i>Petersen &amp; Vredenburg, 2009b</i>
	The feeling of responsibility towards society to ensure energy and/or a sustainable future.	
	<i>Environmental responsibility</i>	Gupta et al., 2019
	The feeling of responsibility to prevent further damage on the environment.	
<i>Other reasoning</i>	<i>Short-term investment horizon</i>	Christophers, 2019; Carney, 2015
	The short investment horizon of investors (e.g. investors particularly do not look further than 5-7 years)	
	<i>Support of own company</i>	<i>Guyatt, 2019</i>
	The notion of trust, culture and personal relationships inside an organization which provides the opportunity for investors to discuss climate change topics internally with other employees and management team.	
	<i>Membership of Climate Action 100+</i>	ShareAction, 2020
	Being member of sustainability related advocate investment groups. Climate Action 100+ highlights the need for climate change related actions by companies.	
	<i>Prioritizes engagement</i>	ShareAction, 2020
	The investor highlights the importance of engagement with the targeted company. The engagement relations could be harmed by supporting a resolution.	
	<i>Satisfied with measures taken</i>	ShareAction, 2020
	The perception that the fossil fuel company is already doing better than its peers, more pressure to change is not needed or seen as unfair.	
	<i>Following voting advice</i>	Logsdon & Van Buren, 2009
	Investors follow the voting advice of the company board. For instance, if the company board advice to vote against, the investor will follow this advice blindly.	

## Methodology

To investigate the different reasoning behind investors' voting decisions, a mental model method was followed. The mental models of investors were elicited and compared using the online M-tool and a survey regarding investors' voting behaviour. An in-depth explanation of M-tool can be found in van den Broek (2020b) and examples of the tool are provided in Appendix A. The mental models were then investigated using a quantitative approach followed by a complementary descriptive approach. This section will describe the steps that were followed to collect and analyse the mental models, as shown in Figure 3.

This section first elaborates on the mental model technique used and then explains the steps taken to build, apply and share the online M-tool. This includes identification of the drivers included in M-tool, the recruitment strategy used and the procedure followed by the investors. Finally, the data analysis section explains how the data derived from M-tool were transformed into quantitative data and how H1 and H2 were subsequently tested using significance tests. A descriptive approach is also presented.

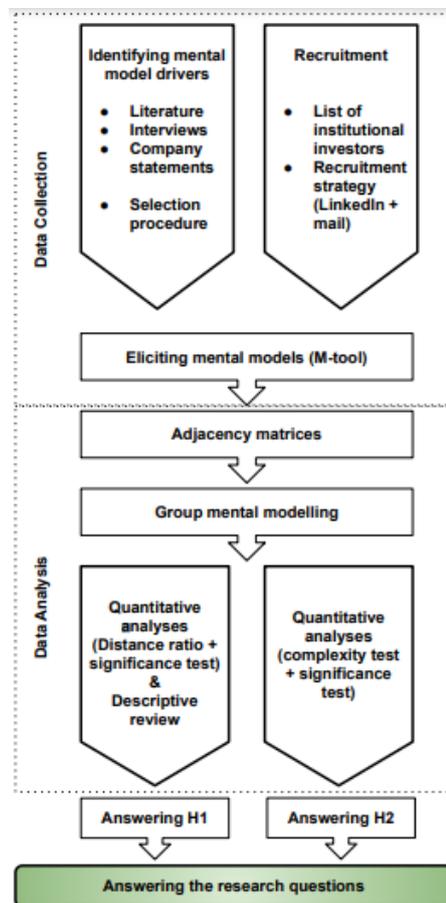
### Data collection

#### *Mental model elicitation*

Mental model research and elicitation methods can focus on an individual, shared or group mental model depending on the purpose of the research (Jones et al., 2011; Langan-Fox et al., 2001; Moon et al., 2019). Eliciting the individual mental models of investors and aggregating these into

**Figure 3**

*Overview of the methodology used*



*Note.* This figure provides an overview of the data collection and data analysis approaches taken to test the hypotheses and answer the final research questions. (Source: own creation.)

specific group mental models was identified as the most appropriate method for this study, as eliciting individual mental models highlighted the decision-making process of each investor. However, it was also important to gain a clear perception of the mental models held by investors with different voting behaviours to test the hypotheses. Therefore, group mental models were constructed by aggregating individual mental models that followed the same voting behaviour. Eliciting a shared mental model would not have fitted the purpose of this study, as this is used to understand how people in a group perceive certain situations or act on them by, for instance, placing them together in a room (Klimoski & Mohammed, 1994; Langan-Fox et al., 2001; Moon et al., 2019).

The individual mental models were elicited through a cognitive mapping technique called causal cognitive mapping (CCM) and by using a direct elicitation method. Thus, the participants visualised their own cognitive map by selecting the perceived relevant drivers and relationships within M-tool. This direct elicitation approach was chosen as it is less reliant on the researchers' skills than the indirect elicitation method, where the researchers themselves elicit the models (e.g. from interviews) (Jones et al., 2011; LaMere et al., 2020). However, it does have a limitation, as the models are dependent on the limited knowledge of the participants (LaMere et al., 2020).

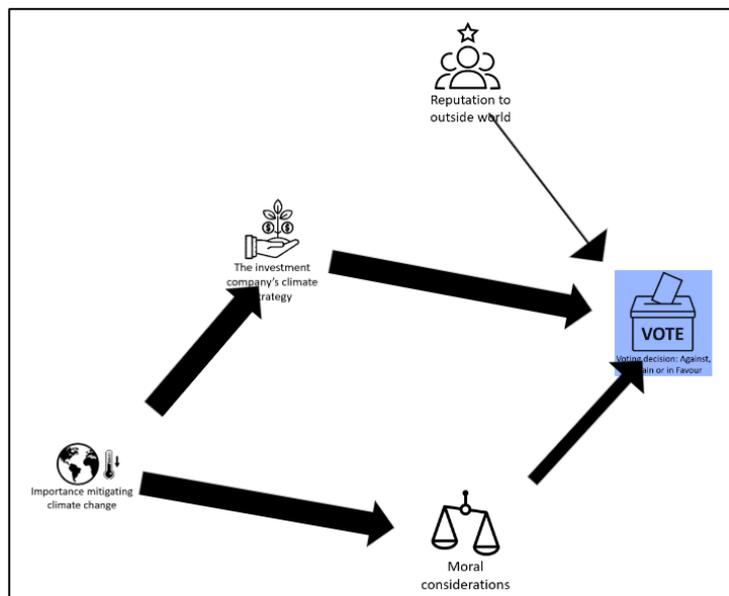
Various techniques exist within the direct elicitation method. CCM was chosen here due to its ability to show causal relationships and its limited complexity for the participants (Hodgkinson et al., 2004; Langfield-smith & Wirth, 1992). Other methods, such as the conceptual content cognitive map (3CM) technique, which has the primary goal of understanding concepts, and the fuzzy cognitive mapping (FCM) technique, which aims to explore complicated dynamic behaviours, were considered inappropriate (Byrch et al., 2007; Kosko, 1986; Özesmi & Özesmi, 2004).

Following the CCM technique, participants visualised the perceived causal relationships between the perceived drivers that influenced their decision-making processes by connecting them with arrows within the online M-tool (Figure 4). In this case, the arrows could be given three different levels of thickness to indicate the level of strength and visualise the level of influence. Within the CCM technique, arrows can also indicate a negative (-) or positive relationship (+)

(Hodgkinson et al., 2004; Tegarden & Sheetz, 2003). However, polarity was not applied within this research as it could have made the task for participants too complex.

**Figure 4**

*Visualised mental model of one of the participants*



*Note.* A visualised mental model map of one of the participants following the causal cognitive mapping (CCM) technique. The thickness of each arrow indicates the strength of the relationship. For example, the company's reputation had a low but existing influence on the participant's voting decision, whereas the investment company's climate strategy greatly influenced their voting decision and was also influenced by the perceived importance of mitigating climate change. (Source: own creation.)

### ***Identification of the mental model drivers***

The drivers that participants could select within the M-tool were derived from published literature, interviews and company statements. An overview of all the identified drivers, including definitions and the selected drivers, can be found in Appendix B.

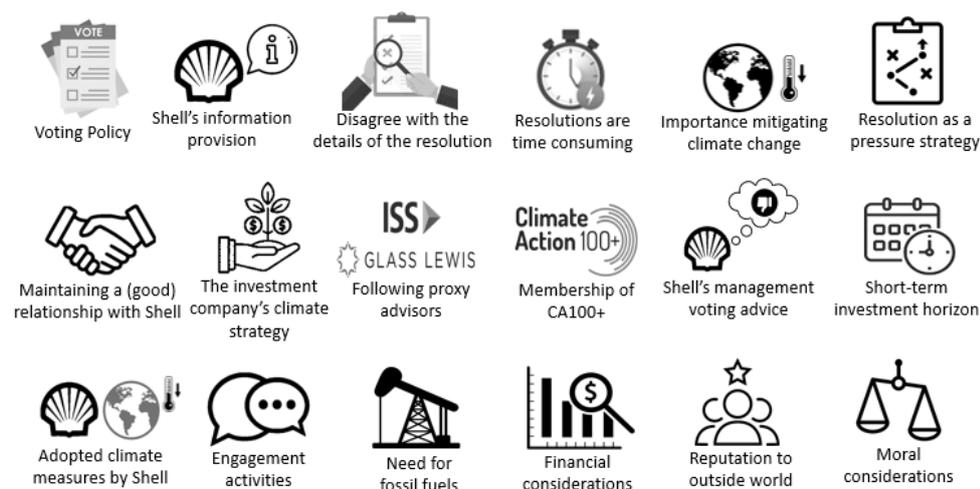
Potential drivers were first derived from the literature, as mentioned in the Theory section above. Thereafter, semi-structured interviews were held with four investors with different voting behaviours (see Appendix C and Appendix D). A qualitative analysis of the interviews was then conducted to identify drivers using an inductive and deductive coding approach within NVivo. Inductive coding was first used to review the interviews based on the drivers previously recognised from the literature. A deductive coding approach was then followed to identify additional drivers

that were not found in the literature but were considered relevant by the interviewees. In addition, 26 company voting rationales (see Appendix E) that were derived during the sampling strategy were coded to minimise the chance of missing important drivers. Finally, all codes were reviewed, merged if they contained similarities and finally rewritten as neutral drivers to make them relevant for all voting behaviours.

The above steps resulted in the identification of 30 drivers (see Appendix B). Since the inclusion of too many drivers within M-tool could be overwhelming for the participants, a selection procedure was followed to establish the 18 most important drivers. This selection procedure included three steps. Firstly, the expert interviews were identified as the most important source, so the drivers were arranged in sequence from those that were recognised in the highest number to the lowest number of interviews. Secondly, the frequency of appearance within the published company rationales was used. Thirdly, drivers that were only mentioned once or not at all were excluded, as was the driver 'Knowing the Dutch context' due to its specificity. As a final step to implementing the drivers in the M-tool, appropriate icons that provided visual representations of the meanings of the drivers and had the same style were searched for (see Figure 5 and Appendix F for more details).

### Figure 5

*The 18 drivers that were selected and presented to the investors*



*Note.* See Appendix F for the sources of the icons (Source: own creation.)

### ***Sampling strategy and participant selection***

Once the online M-tool had been finalised, it was shared with participants of the target group, which included institutional investors who were actively involved in the decision making on the vote cast on the climate resolution filed at Royal Dutch Shell in 2020. However, it was challenging to gather enough participants, as voting at AGMs of companies, particularly on shareholder resolutions, is very discreet and confidential within the investor community.

To address this, a comprehensive list of 420 institutional investor organisations was collated. This list was mainly obtained from a proxy voting overview by the organisation Proxy Insight (n.d.) and, to a lesser extent, through reports of VBDO (2020) and ShareAction (2020). The Proxy insight list contained an overview of Total SE investors, a French fossil fuel company, who voted on a similar climate resolution. Therefore, since investors generally have shares in a number of fossil fuel companies, every organisation was reviewed to determine if it had shares in Shell, which resulted in 219 investment companies being identified (Appendix G). In addition, any published voting rationales of these companies were included and used for driver identification, as explained in the previous section.

As a final step, a list was created of individuals within the organisations, who were mainly identified through a LinkedIn Premium Sales account or, if not found, through organisational reports and websites. This resulted in approximately 380 employees being approached through LinkedIn or by e-mail. The study was also advertised on LinkedIn.

This recruitment strategy resulted in 27 respondents, despite more investors showing interest. The respondents were reviewed based on their decision-making power (>2 on a 5-point Likert scale) and whether their organisation had voted, as identified through a survey. This selection resulted in 23 suitable participants: 11 who voted in favour, 6 who voted against and 6 who voted abstain.

Of the 23 participants, 19 were asset managers, 3 were active in a pension fund and 1 was active in an insurance company. The companies were based in various countries, such as the USA,

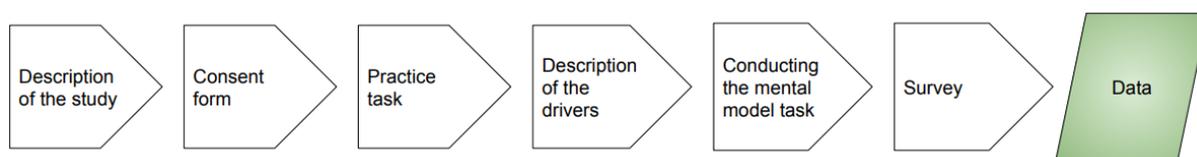
Canada and Germany, although most were based in the Netherlands (7 participants). Additionally, 70% of the participants were male and the average age of the participants was 41. The sample contained investors with high decision-making powers, indicated by a mean of 4.4 on a 5-point Likert scale. See Appendix H for further details on the characteristics of the participants.

### **Procedure**

All participants followed the steps shown in Figure 6 within M-tool to elicit their individual mental models and gather the survey data.

**Figure 6**

*Procedure followed by the participants*



*Note.* Source: own creation.

The purpose of the study was first explained and a consent form was signed. Participants were then provided with an example task that needed to be completed. Upon successful completion of this, a video was shown that defined all of the drivers, including their icons, to prevent different driver interpretations. These definitions were based on a combination of the literature and interview interpretations.

Once the drivers had been explained, each participant was asked to include the drivers they deemed relevant to their voting decision and to indicate causal relationships, including their associated strengths, by adding arrows between the drivers or directly from a driver to the end variable ‘voting behaviour’ (see Figure 4). Once this task had been completed, the participants were asked to complete a survey that included background questions on items such as their age and nationality, as well as the vote they cast and their decision-making power. See Appendix A for an example of the steps taken by participants within M-tool and Appendix I for an overview of the survey questions.

## Data analysis

### *Adjacency matrices and group mental modelling*

M-tool's output for each participant included the present drivers, the relationships between them and the strengths of these relationships. This information was transformed into individual adjacency matrices, as are often applied within CCM. An adjacency matrix is an  $n \times n$  matrix, where  $n$  is the total number of drivers considered (Langfield-Smith & Wirth, 1992). The presence of a driver within the mental model was entered in the corresponding cell of the matrix by writing down the relationship strength. The adjacency matrix applied in this research contained 18 rows (18 drivers) and 19 columns (18 drivers and a fixed factor, the final voting decision).

To transform the individual matrices into three group mental models with relationship strengths ranging from 0 to 3, they were summed and normalised for each group size by dividing the total by the number of participants who highlighted the existence of that specific relationship. See Appendix J for the group adjacency matrices.

### *Testing the hypotheses*

H1 and H2 were tested by performing a quantitative analysis. In addition, a complementary descriptive analysis was undertaken on the elicited group mental models to gain a more comprehensive understanding of them.

**Hypothesis 1: Quantitative analysis.** To test H1, 'There is a difference in the contents of the group mental models of investors who vote in favour of, vote against or vote abstain on a climate resolution.', a content analysis was done to determine the level of difference between the mental models. This first involved analysis comparing the aggregated group mental models. Thereafter, the individual mental models of the investors within each group were compared with the other group mental models to determine whether there was a statistically significant difference.

The level of difference between the mental models was determined by calculating the distance ratios (DRs) within the program MATLAB. The DR tested the similarity between two mental models on three levels: the indicated perceived (non-)existence of drivers, the perceived (non-

)existence of relationships and the difference in relationship strengths derived through a comparison of the adjacency matrices (Langfield-Smith & Wirth, 1992). The numerator of the DR formula included the actual similarity of the two mental models, which was calculated by subtracting each corresponding cell of the adjacency matrix while the denominator included the maximum amount of similarity the models could potentially have. This resulted in a number between 0 and 1, where 0 indicated identical mental model maps and 1 highlighted complete non-similarity (Markóczy & Goldberg, 1995). To apply the DR formula, the following parameters were chosen:  $\alpha = 1$ ,  $\beta = 3$ ,  $\gamma = 1$ ,  $\delta = 0$  and  $\epsilon = 1$ . See Appendix K for a justification of the chosen parameter values and Markóczy and Goldberg (1995) for more information on the DR formula.

In the first instance, the DR was calculated by comparing the group mental models of investors with three specific voting behaviours. For instance, the group mental model 'Against' was compared with the group mental model 'In Favour', with the resulting DR value indicating the level of distance between the Against and In Favour groups. However, while this derived DR value showed the overall level of difference between the group mental models, it did not provide further insights into whether the individual mental models of investors in one group were statistically different from those of investors with the opposite voting behaviour.

To determine whether the mental models of individual investors with different voting behaviours differed significantly from each other, the following steps were taken. Firstly, DRs between the mental model of each investor with a given voting behaviour and their own group mental model were calculated. These are referred to as the 'within DRs' and indicate the differences between the mental models of investors who had the same voting behaviour. Then, for each group, DRs were calculated between the individual mental models of that specific group and the group mental models of the other investor groups. These are referred to as the 'between DRs' and indicate how different the mental models of the investors within one group were from the other group mental models. Comparison of the within DRs and between DRs indicated the level of difference between the groups, based on the expectation that the within DRs would be smaller than the

between DRs. So, for example, to compare the In Favour and Against groups, the within DRs of the In Favour and Against groups were compared with the between DRs derived from comparing the In Favour individuals with the Against group mental model and the Against individuals with the In Favour group mental model.

The derived sequence of DR values allowed significance testing to be conducted. Two different significance tests were applied, depending on the characteristics of the samples being compared. The Mann-Whitney test was chosen if a normal distribution could not be assumed (Jenkins & Johnson, 1997; Markóczy & Goldberg, 1995; Özesmi & Özesmi, 2004), while the two-sample independent t-test was conducted where a normal distribution could be assumed based on the Shapiro-Wilk test (Özesmi & Özesmi, 2004).

The significance levels for the Mann-Whitney test and t-test were both set at 5%, with  $p < .05$  indicating that the investor groups significantly differed and so H1 could be accepted. Due to the small sample sizes, a post-hoc power analysis was also conducted using the program Gpower to determine how robust the results were.

**Descriptive approach.** Due to the small sample size, a descriptive approach was applied to identify the actual differences between the drivers and direct relationships that influenced the voting decisions of the institutional investors. The differences between the groups were determined by comparing the most important drivers between the groups and then the most important direct relationships with the voting decision for each investor group.

The perceived importance of the drivers and relationships within the group mental models were identified by dividing the number of perceived drivers within each individual mental model by the total number of investors that had the same voting behaviour, as outlined in Özesmi and Özesmi (2004). Comparing the frequency of each driver and their relationships between the group mental models allowed more information to be obtained on whether the drivers and their relationships were perceived as important within the group mental models. However, it is important to note that this method, which was chosen due to the limited time span of this research, is only one way of

measuring the perceived importance. Other indicators, such as the centrality test and relationship strength, could provide additional information on the perceived importance of the drivers and relationships within the investors' mental models (Gray et al., 2015; Tegarden & Sheetz, 2003; Özesmi & Özesmi, 2004;).

Firstly, the frequency of drivers mentioned within each investor group was calculated to provide insights into which drivers were most frequently ( $\geq 50\%$ ) mentioned as having an influence on the voting decision. Highlighting and comparing the frequency of each driver allowed an impression to be gained of the different reasoning of each investor group. For example, if none of the investors in one group perceived a given driver in their mental model while investors in another group did, this indicated that the driver was perceived as being more important by the latter investor group in their decision making. Moreover, if a majority of the investors within the Against group indicated the perceived influence of a given driver on the decision-making process, whereas a minority of investors within the Abstain group did so, this would indicate that there was a difference in the decision-making processes between the group mental models.

Secondly, a more profound understanding of the drivers that were directly related to investors' decision making was required to answer RQ2. This was obtained by determining the existence and frequency of drivers that directly influenced the end variable 'voting decision'. A list was made from the most to the least frequently mentioned relationship within each group mental model. Additionally, the strength of each relationship was calculated by dividing the sum of the strengths by the number of group participants who highlighted the influence of this relationship within their mental model. When two relationships occurred at the same frequency but one of them had a higher relationship strength, the latter was considered more important to the decision-making process. Due to limited time, the three most important relationships were compared between the three groups.

**Hypothesis 2: Quantitative analyses.** To test H2, 'Institutional investors who vote in favour of climate resolutions have more complex mental models than investors who vote against them', the

complexities of the three group mental models were investigated and compared. Firstly, this was achieved by comparing the numbers of drivers and relationships that influenced the investors' voting behaviours between the different group mental models. Then, the level of complexity per group model was calculated by conducting three tests (the actual relationship density test, potential relationship density test and comprehensiveness test) to determine the significance of the possible differences in complexity between the mental models.

Comparisons of the numbers of drivers and relationships between the group mental models and visualisation of the group mental models provided an indication of which group mental model seemed to have the highest complexity (i.e. the highest numbers of drivers and relationships). However, it was expected that the sample size differences (In Favour = 11 participants; Abstain and Against = 6 participants each) could influence the perceived complexity, as a larger number of investors could form a group mental model together, with more perceived drivers and relationships. Therefore, to reduce the possible effect of the sample size differences, an additional comparison was made based on those drivers and relationships that were considered relevant by at least 25% of the participants.

The above review of the group mental models only indicated which investor group perceived the mental model with the highest complexity. Therefore, the actual relationship density, potential relationship density and comprehensiveness tests were applied to identify significant differences between the individual mental models of the investors with different voting behaviours.

The actual relationship density indicated the level of complexity and was calculated by dividing the number of relationships by the number of drivers within the mental model (Nadkarni & Narayanan, 2005). The potential relationship density was calculated by comparing the number of indicated relationships with the number of all potential relationships (Gray et al., 2015; Nadkarni & Narayanan, 2005). The number of drivers could also indicate the degree of complexity. Therefore, the comprehensiveness test was performed, whereby the number of drivers seen as relevant within each group mental model was counted (Nadkarni & Narayanan, 2005).

The ratio of receiver drivers (defined as drivers that only receive influences) to transmitter drivers (defined as drivers that only influence other drivers) is also often calculated to indicate mental model complexity (Gray et al., 2015). However, this test was not included in this research, as the investors' group models did not contain any receiver drivers.

Finally, the Mann-Whitney test was applied at the 5% significance level to determine whether there was a significant difference in complexity between the In Favour group and the Against and Abstain groups. If the In Favour group had higher complexity values and the significance values for all three tests and both group comparisons were below 5%, then H2 would be accepted.

## **Results**

This section first presents the findings on how far and in what respect the mental models of investors with different voting decisions varied based on the perceived drivers and relationships. It then shows to what extent the group mental models differed in terms of complexity.

### **Content analysis**

The quantitative analysis section presents the findings on whether there were significant differences between the investor groups. This is followed by a description and comparison of the perceived drivers that directly influenced the decision making of the investors in each of the three groups.

### ***Quantitative analysis***

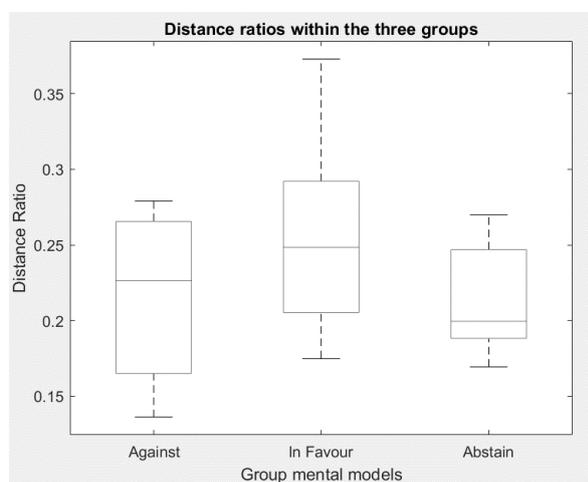
To determine whether the mental models of investors with different voting decisions were different (H1), a significance test based on the DR was performed, the results of which are outlined below.

The DR scores for the group mental model comparisons Against versus Abstain, In Favour versus Against and In Favour versus Abstain were .22, .19 and .17, respectively. These DR values indicate that the group mental models differed. However, these differences were not large as all three values were close to zero, which would have indicated no difference between the mental models of investors with different voting decisions.

Further comparisons indicated that the mental model of each investor also differed to a certain extent from their own group mental model, as shown in the boxplots in Figure 7. The In Favour group exhibited the greatest difference, with a mean DR of .26 (SD = .06), while the Against and Abstain groups had lower mean DRs of .22 (SD = .06) and .21 (SD = 0.04), respectively. This indicated that the individual investors within the In Favour group exhibited slightly greater differences between their mental models on their voting behaviour than the investors within the Against and Abstain groups.

**Figure 7**

*Boxplots of the distance ratios (DRs) within each investor group*



*Note.* These boxplots show that the mental models of individual investors also differ from their own group mental model. The highest variance and DR median occurred within the In Favour group.

Before conducting a significance test to determine whether the within-group differences were greater than the between-group differences, a normality test was performed (see Table 2 for p statistics). This showed that the assumption of normality was not violated for the Against versus In Favour group or the Abstain versus In Favour comparisons. However, the assumption of normality was violated for the Against versus Abstain comparison. Consequently, the two-sample independent t-test was considered appropriate for the first two comparisons, while the Mann-Whitney test was applied for the Against versus Abstain mental model group comparison.

To determine the significance of the differences between groups, the within DRs were compared with the between DRs. This showed that the between DR values were slightly higher than

the within DR values for all three comparisons (see Table 2). For instance, the In Favour versus Against comparison had a mean within DR of .24 (SD = .06, N = 17) and a mean between DR of .29 (SD = .07, N = 17). The individual mental models within the In Favour group significantly differed from the mental models of the Against group ( $t(32) = -2.09$ ,  $p = .04$ ). By comparing the related Within DR (Mdn = .20) and Between DR (Mdn = .28), the Against versus Abstain investors' mental models were also significantly different,  $U(N_{\text{within}} = 12, N_{\text{between}} = 12) = 95.00$ ,  $z = -3.15$ ,  $p = .002$ . However, there was no significant difference between the related Within ( $M = .24$ ,  $SD = .05$ ,  $N = 17$ ) and Between DR ( $M = .31$ ,  $SD = .07$ ,  $N = 17$ ) of the Abstain and In Favour investors' mental model comparisons ( $t(32) = -1.62$ ),  $p = .11$ ). A visualisation of the sample distributions is provided in Figure 8.

Together, these results suggest that the perceived mental models of investors with different voting decisions differed between the In Favour and Against investors and the Against and Abstain investors, leading to the partial acceptance of H1. Nonetheless, some caution is required, as two of the three tests were underpowered, with Abstain versus In Favour and In Favour versus Against having powers of .35 and .53, respectively (Table 2).

**Table 2**

*Overview of the samples compared and the significance test results*

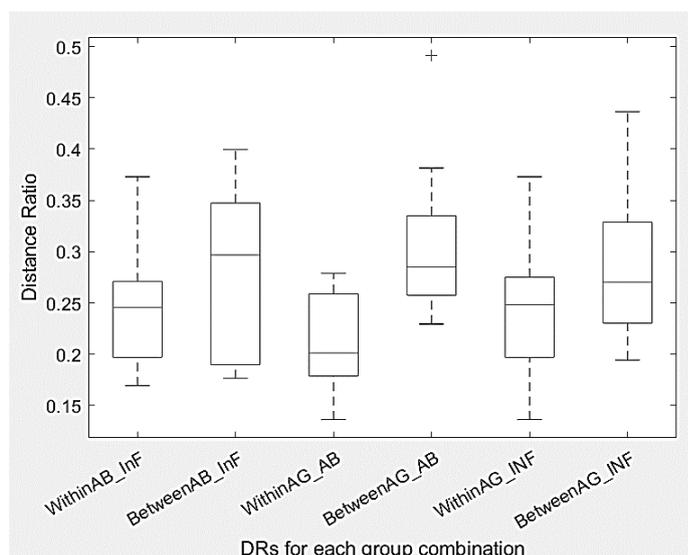
	Stats DRs Within	Stats DRs Between	Normality significance test	Significance test and results	Post-hoc Power analysis
In Favour versus Against	M = .24 SD = .06	M = .29 SD = .07	<i>Within DRs</i> .90 <hr/> <i>Between DRs</i> .24	Two independent t- test .04*	.53
Against versus Abstain	Mdn = .20	Mdn = .29	<i>Within DRs</i> .41 <hr/> <i>Between DRs</i> .02*	Mann Whitney test .002*	.93
Abstain versus In Favour	M = .24 SD = .05	M = .31 SD = .07	<i>Within DRs</i> .18 <hr/> <i>Between DRs</i> .06	Two independent t- test .11	.35

*Note.* The first column indicates the comparisons that were made between groups of investors with different voting behaviours. The second and third columns show the means or median and SD of the distance ratios (DRs), which were derived by summing the within and between DRs of both groups. The fourth column shows the results of a normality test, which was conducted for each group, while the fifth column shows the type of significance test performed and the result, indicating the extent to which the investor group mental models differed. Finally, the results of the post-hoc power analysis in the sixth column show how robust the data were, with a power of .80 generally being considered sufficient.

\*p < .05.

**Figure 8**

Boxplots showing the distance ratio (DR) of each sample of investors that was compared in the significance testing



*Note.* These boxplots show the distribution of each investor sample that was included in the significance test. It can be seen that WithinAB\_InF and BetweenAB\_InF completely overlap, indicating no significant difference between the two. The labels Within and Between correspond with the explanation given in the text followed by the abbreviation of the compared investor groups (AB = abstain, InF = In Favour, AG = Against).

### **Descriptive approach**

**Frequency of mental model drivers having a perceived influence on the voting decision.** It appears that most of the drivers that were presented in M-tool were perceived as having an influence on the investors' decision-making processes and voting decisions, with only 'Short-term investment horizon' not being perceived as a driver in any of the mental models (see Table 3). The Abstain group perceived the fewest drivers, with none of the investors in this group placing 'Need for fossil fuels', 'Shell's management voting advice', 'Short-term investment horizon' or 'Resolutions are time consuming' in their mental models. In contrast, only the Against group did not perceive 'Reputation to outside world' as a driver, besides 'Short-term investment horizon', while the In Favour group only perceived 'Short-term investment horizon' as having no influence on their decision-making.

Seven drivers were included in all three group mental models by the majority of investors, indicating that all three investor groups perceived these drivers as being important in their decision

making and having an influence on their voting decision. A further six drivers were mentioned most frequently by one or two of the groups (see highlighted cells in Table 3), while the remaining drivers were perceived as having an influence on the decision-making in the minority of investor mental models within all three groups.

By reviewing the six drivers that were not perceived in the majority of mental models of each group, a difference between the three investor groups can be noticed. 'Moral considerations' was clearly more important to the In Favour investor group than the other groups, with 55% of the participants mentioning it compared to only 17% of those in the Against and Abstain investor groups. By contrast, these latter groups included 'Disagree with the details of resolution' in the majority of their mental models, whereas only 18% of the In Favour investors perceived this driver as an influencing factor in their voting decisions. In terms of the Against group, only 'Shell's information provision' (83%) and 'Following proxy advisors' (67%) were indicated as perceived drivers within the majority of their investors' mental models, compared to 45% and 45%, respectively, for the In Favour group and 33% and 17%, respectively, for the Abstain group. By contrast, a majority of investors in the Against group did not include the driver 'Membership of CA100+' (17%) within their mental models, whereas 100% of the Abstain investors perceived this driver as having an influence on their decision making. The driver 'Reputation to outside world' was included in the mental models of the majority of Abstain (67%) and In Favour (73%) investors, while it was not perceived as a driver for decision making by any of the investors in the Against group.

**Table 3**

*Frequency of each perceived driver within the three investor voting behaviour groups*

	In favour (N = 11) %	Against (N = 6) %	Abstain (N = 6) %
<i>Drivers within the M-tool</i>			
1. Adopted climate measures by Shell	82	67	67
2. Engagement activities	91	50	83
3. Financial considerations	55	50	50
4. Moral considerations	55	17	17
5. Maintaining a good relationship with Shell	9	17	17
6. Importance mitigating climate change	100	50	100
7. Membership of CA100+	64	17	100
8. Shell's information provision	45	83	33
9. Voting policy	82	100	67
10. Need for fossil fuels	9	33	-
11. The investment company's climate strategy	91	50	83
12. Disagree with the details of the resolution	18	67	50
13. Shells management voting advice	9	33	-
14. Short-term investment horizon	-	-	-
15. Reputation to outside world	73	-	67
16. Resolution are time consuming	9	33	-
17. Resolution as a pressure strategy	55	67	50
18. Following proxy advisors	45	67	17

**Note.** The table shows the 18 drivers that all the investors could select during their mental model task. The grey highlighted areas indicates the drivers that were at least perceived as having an influence on the voting decision by half of the investors within each group.

The comparisons outlined above and Table 3 show that there are differences between the mental models of investors with different voting decisions. It appears that while some investor groups perceived certain drivers as influencing their decision making, investors that voted in a different manner did not perceive these drivers as being important. Moreover, it is noticeable that while some drivers were perceived as having an influence on decision making by at least half of the investors, they were not perceived as a driver behind decision making by the majority of investors with a different voting behaviour.

**Most important relationships between drivers and the voting decision.** The analysis presented in the previous section only showed whether and how frequently drivers were perceived within the decision-making mental models of investors with different voting decisions. This section will provide more detailed insights by highlighting only those drivers that had a direct relationship on investors' voting decisions, as well as their perceived relationship strengths (see Table 4). Thus, the results presented below are based on the perceived drivers within the investor mental models that were directly connected with an arrow to the end variable 'Voting decision' in M-tool.

Two of the 18 drivers, 'Short-term investment horizon' and 'Need for fossil fuels', were not perceived as having a direct influence on any of the voting behaviours. Of the 16 drivers that played a direct role in the decision making, 7 drivers and their corresponding relationships were perceived as having an influence within all three of the investor groups – for example, 'Adopted climate measures by Shell' and 'Voting policy' (Table 4). Some relationships that directly influenced the voting behaviour were perceived as important by one investor group but not by the investors within a different group. Examples include the relationships for the drivers 'Moral considerations' and 'Importance mitigating climate change', as the former relationship was only perceived as having a direct influence on the voting behaviour within the In Favour group, while the latter was perceived as being important within both the In Favour and Abstain groups but not the Against group.

The Against group perceived the fewest drivers as influencing their decision making, while the In Favour group perceived the most. Moreover, the investors within the In Favour and Abstain groups showed the greatest similarity – for instance, investors in these groups perceived that four particular drivers ('Importance mitigating climate change', 'Disagree with the details of the resolution', 'Reputation to outside world' and Resolutions as a pressure strategy') had a direct influence on their voting decisions, while those in the Against group did not consider these to be important.

Comparison of the three most important relationships for each group as indicated by the frequency and strength of relationship showed that the In Favour group perceived three different

relationships as being most important in their voting decision. Contrary to the Against and Abstain groups as they perceived two of the same relationships, albeit with different strengths. See Appendix L for a full list of the relationships that influenced the voting decisions, arranged in decreasing order of importance.

The In Favour group perceived the influence of 'The Investment company's climate strategy' most frequently (45%), with a relationship strength of 2.4, while 'Adopted climate measures by Shell' and 'Resolution as a pressure strategy' were considered second most important, being perceived by 45% of the investors with an average relationship strength of 2.2.

By contrast, the Against group mentioned 'Disagree with the details of the resolution' most frequently (50%), although with a relatively low relationship strength of 1.7. The Abstain group also perceived the same relationship as being most important (50%), with a slightly higher relationship strength of 2. Furthermore, 'Financial considerations' was most frequently perceived as being important by both groups, although with different frequencies and relationship strengths – the Against group had a frequency of 33% and gave it a relationship strength of 3, while the Abstain group had a higher frequency of 50% but gave it a slightly lower strength of 2.3. Finally, 'Following proxy advisors' was only placed in the top three relationships by the Against investors (frequency = 33%, relationship strength = 3) and 'Reputation to outside world' was only placed in the top three relationships by the Abstain investor group (frequency = 50%, relationship strength = 2).

**Table 4***Perceived presence of driver relationships directly towards their voting decision*

Total overview of drivers	In favour	Against	Abstain
1. Adopted climate measures by Shell	2.2 (0.45)	2 (0.33)	2.5 (0.33)
2. Engagement activities	2.5 (0.36)	2 (0.17)	2.5 (0.33)
3. Financial considerations	2 (0.27)	3 (0.33)	2.3 (0.5)
4. Moral considerations	2 (0.18)		
5. Maintaining a good relationship with Shell			1 (0.17)
6. Importance mitigating climate change	3 (0.27)		2.5 (0.33)
7. Membership of CA100+	2.3 (0.27)		3 (0.17)
8. Shell's information provision	1.8 (0.36)	1 (0.17)	3 (0.17)
9. Voting policy	2.8 (0.36)	2.5 (0.33)	2 (0.33)
10. Need for fossil fuels			
11. The investment company's climate strategy	2.4 (0.45)	2 (0.17)	2 (0.33)
12. Disagree with the details of the resolution	2 (0.09)	1.7 (0.5)	2 (0.5)
13. Shells management voting advice		2.5 (0.33)	
14. Short-term investment horizon			
15. Reputation to outside world	1.4 (0.45)		2 (0.5)
16. Resolution are time consuming		3 (0.17)	
17. Resolution as a pressure strategy	2.2 (0.45)		1.5 (0.33)
18. Following proxy advisors	2 (0.27)	3 (0.33)	

*Note.* The highlighted areas show the top 3 relationships of each investor group, identified by the frequency and subsequently relationship strength.

No clear patterns can be recognised in the results outlined above. For instance, it does not appear that a certain voting decision by one investor group was mostly influenced by Shell-related drivers (e.g. 'Shell's information provision' or 'Shell's management voting advice') or internally related drivers (e.g. 'Voting policy' or 'Investment company's climate strategy'). However, the results do provide insights into the differences between the three voting behaviours based on the perceived drivers and, most significantly, the differences in their frequencies. Moreover, there was a noticeable difference in the existence and relationship strengths of specific drivers that led to the voting decisions, as highlighted above, with the top three relationships of the Against and Abstain groups being more similar to each other than to those of the In Favour group.

### **Complexity analysis**

To determine whether the In Favour group had a higher mental model complexity than the other groups, the numbers of drivers and relationships are first reviewed using a descriptive

approach. The results derived from the three complexity tests, including their significance levels, are then presented to test H2 'Institutional investors who vote in favour of climate resolutions have more complex mental models than investors who vote against them'.

### ***Quantitative analysis***

Comparison of the total group mental models, as visualised in Appendix M, indicated that the In Favour group was more complex than the other groups, with a higher number of drivers and relationships. The In Favour group perceived 17 drivers and 61 relationships as being relevant to its decision making, which is higher than both the Against (drivers = 16, relationships = 42) and Abstain (drivers = 14, relationships = 36) investor groups.

When the group mental models containing only those drivers and relationships that were considered relevant by at least 25% of the investors were compared, the In Favour group still appeared to have a greater complexity than the Abstain and Against groups. At least 25% of the In Favour investors perceived 12 drivers and 17 relationships as relevant, compared with 8 drivers and 11 relationships for the Against group and 10 drivers and 12 relationships for the Abstain group. The group mental models meeting this 25% threshold are shown in Figure 10, Figure 11 and Figure 12 at the end of this section.

However, these findings only provide an overall indication of the differences in complexity between the groups. Therefore, to further investigate H2 quantitatively, three complexity tests were conducted for each group. The comprehensiveness test indicated that the In Favour group had more perceived drivers (17 drivers) than the Against (16 drivers) and Abstain (14 drivers) groups. Similarly, the actual and potential relationship tests also indicated that the In Favour mental model group had the highest complexity, with values of 3.56 and .22, respectively, compared with 2.63 and .18, respectively, for the Against group and 2.57 and .20, respectively, for the Abstain group. However, the significance tests (Table 5) and boxplots (Figure 9) clearly showed that these differences were insignificant, with p values ranging from .29 to .77. A post-hoc power analysis showed that the

analysis were strongly underpowered (Table 5), indicating that the sample size was far too small to detect any significant effects.

Thus, although the mental model of the In Favour group appeared to have a higher complexity than those of the Against and Abstain groups, significance testing indicated that this perceived difference in complexity was not significant, so H2 cannot be accepted. Instead, the apparent higher complexity of the In Favour group mental model may have been due to the fact that more In Favour investors were included in the analysis, leading to the aggregation of more perceived drivers and relationships, as the significance tests are less influenced by the different numbers of investors included in the group mental models.

**Table 5**  
*Significance and power analysis results for the complexity tests*

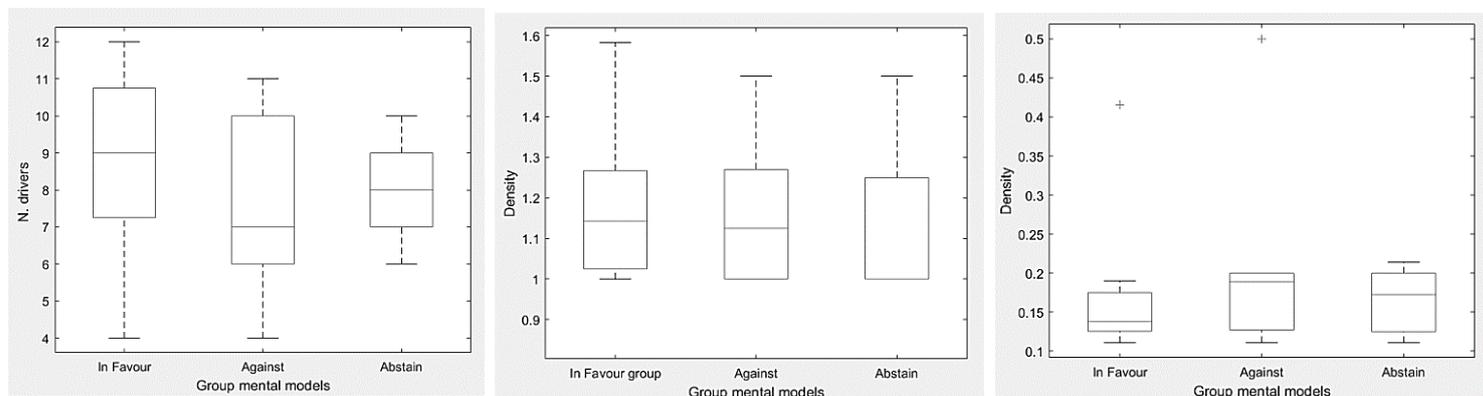
	Comprehensiveness test	Actual relationship density	Potential relationship density	Power analysis		
In Favour versus Against	.29 (U = 110)	.75 (U = 203.50)	.29 (U = 88)	.23	.06	.17
In Favour versus Abstain	.31 (U = 110)	.32 (U = 109)	.32 (U = 109)	.19	.13	.05

*Note.* Power analyses were conducted for all three tests whereas the p value is shown and the related U statistic of the Mann Whitney test. The In Favour group contained 11 values (N = 11) and the Against and Abstain group contained both 6 values (N = 6). The power analysis shows that these tests were clearly underpowered since a power of .80 would be considered sufficient.

\*p < .05.

**Figure 9**

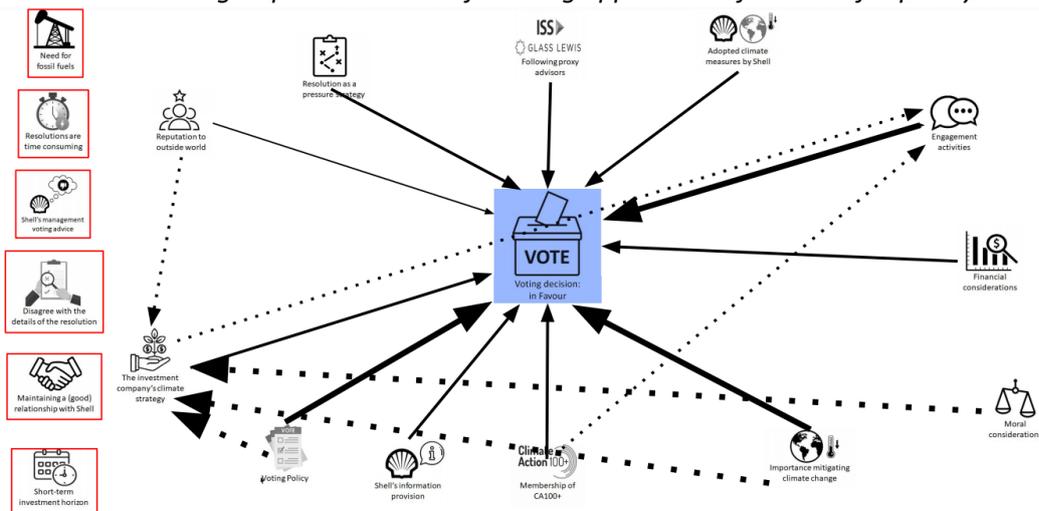
*Boxplots: three complexity tests (Comprehensiveness, actual and potential relationship density test)*



*Note.* The first figure shows the results of the comprehensiveness test, the second visualised the boxplot of the actual relationship density followed by the potential relationship boxplots. The boxplots clearly show that none of the sample distributions for the complexity tests were significantly different, as they all clearly overlap.

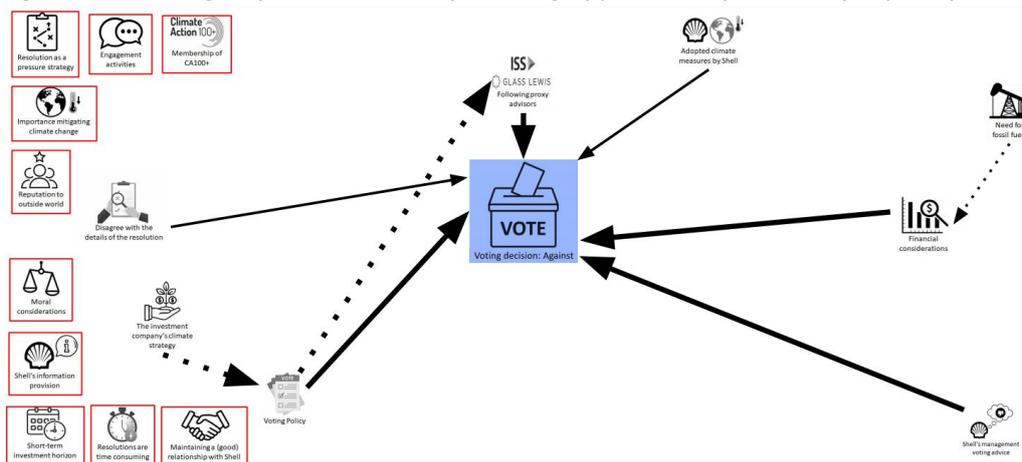
**Figure 10**

*In Favour investor group mental model following application of the 25% frequency threshold*



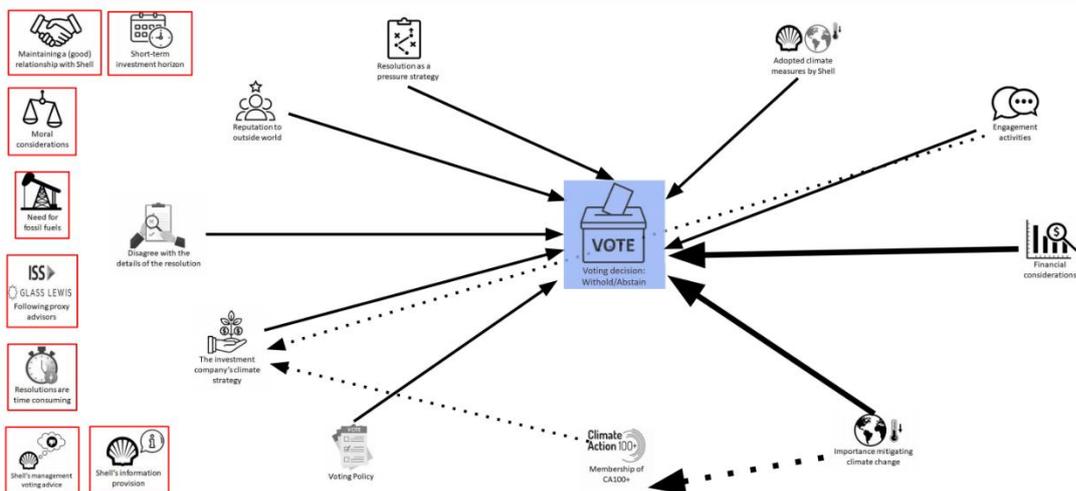
**Figure 11**

*Against investor group mental model following application of the 25% frequency threshold*



**Figure 12**

*Abstain investor group mental model following application of the 25% frequency threshold*



## Discussion

This section discusses the results in light of the initial hypotheses, published literature and statements made by the interviewees. Firstly, the research questions and results relating to the hypotheses are discussed. Thereafter, the scientific and theoretical implications of this study are highlighted. Finally, the limitations section underlines some of the weaknesses of this study and how these could be prevented in further research, avenues for which are suggested in each section.

This is the first scientific study to have investigated the decision-making processes and voting behaviours of institutional investors on climate resolutions filed at fossil fuel companies. In particular, this thesis aims to understand to what extent (RQ1) and in what respect (RQ2) the mental models of institutional investors who voted differently vary. The voting behaviours investigated included voting in favour, voting against or voting abstain on the climate resolution filed at Shell in 2020. It was hypothesised that investors who made these different voting decisions would have different mental models behind their decision making. Moreover, it was expected that the investors who supported the climate resolution would have more complex mental models.

Regarding RQ1, it appeared that the mental models of the investors with different voting behaviours did differ to a certain extent, as there were significant differences between the Against and Abstain groups, as well as the In Favour and Against groups. These results support the arguments made in previous mental model research that different mental models lead to different decision-making processes (Hockerts, 2015; Senge, 1990; Özesmi & Özesmi, 2004). However, contrary to expectation, there was no significant difference between the mental models of the Abstain and In Favour groups. This lack of difference is difficult to explain, as this study did not focus on why mental models differ.

It seems possible that this lack of difference between the mental models of the Abstain and In Favour investor groups could have resulted from geographical differences. A review of the investor characteristics indicated a difference between the locations of the investment organisations, with at least half of the Abstain and In Favour investors being based in the United Kingdom or the

Netherlands, whereas none of the Against investors were based in these countries. Thus, the In Favour and Abstain investors may have held more similar views on voting on climate resolutions due to their similar geographical contexts. The literature supports the idea that different geographical contexts influence social responsibility and sustainable investment (Hartman et al., 2007; Louche & Lydenberg, 2006), and one of the interviewees also supported this suggestion by mentioning the following:

*For Dutch investors, Shell is a Dutch company [Shell is a British–Dutch multinational]. So foreign investors would much more likely look at a voting policy, the advice of management or the advice of the proxy voters. ... We understand a little more the local context of the discussions.*

*(Anonymous 'In Favour' investor, personal communication, March 10, 2021)*

However, this suggestion should be treated with great caution as more research is needed.

Another aspect of this research, addressed in RQ2, was to determine whether there was any difference in the complexity of the group mental models of investors with different voting behaviours. Contrary to the expectations arising from Hockerts' (2015) research, there were no significant differences in complexity between the mental models of the In Favour investors versus the Against and Abstain investors.

There are several possible explanations for this lack of significant difference in complexity. Firstly, the significance test was strongly underpowered, so it could be that increasing the power would result in a statistically significant difference being detected. However, it is also possible that repeating the test with higher power would still result in an insignificant result (Christley, 2010). Therefore, no strong conclusions can be made on the insignificant results, as further highlighted in the Limitations section.

Another possible explanation is the methodological differences between this study and the research of Hockerts (2015). Hockerts (2015) based his conclusion solely on qualitative analyses that considered the number of perceived relationships. If this study had followed the same approach, the same conclusion as Hockerts (2015) would have been drawn, as the In Favour group contained a

higher number of drivers and relationships. However, by following a quantitative approach, the levels of complexity were tested at a more rigorous level, indicating that there was no significant difference.

Other studies have also indicated that there is a positive association between corporate social performances and the level of mental model complexity (Gröschl et al., 2017; Hahn et al., 2014; Wong et al., 2011). Based on these studies this study suggested that investors who voted in favour of the climate resolution had higher corporate social performances than those who voted against or voted abstain. However, these previous studies were not based on investor mental models, so it is possible that investors show different trends.

Moreover, although the hypothesis was based on the idea that those investors who voted in favour of the climate resolution would perceive higher corporate social performance, those who voted against or voted abstain could still have a high perceived corporate social performance, as they undertook other activities, such as engagement activities or involvement in environmental awareness clubs such as CA100+ (ShareAction, 2020). For instance, Logsdon and van Buren (2009) suggested that more impact is made during conversations between fossil fuel companies and investors (i.e. engagement) rather than by putting climate resolutions to vote. Moreover, indicated by a report of Climate Action 100+ (2020), some investors also stress out the achieved successes related to corporate social performances due to their engagement activities. Therefore, it could be that the different voting behaviours of investors were not necessarily related to their different perceptions or achieved levels of corporate social performance, resulting in the findings differing from the expectations arising from the literature.

The above findings only provided insights into whether there were significant differences in the mental models of investors with different voting behaviours. Therefore, a descriptive approach was also used to provide further insights into what extent the mental models behind the different decisions differed based on the perceived drivers and relationships for each investor group.

Identification of the perceived drivers and relationships clearly showed that there were some similarities between the mental models of investors with different voting decisions, as some drivers were perceived as being important by the majority of investors in all three models. However, some differences were also noticeable both in terms of the perceived drivers included in the mental models and the most important drivers that had a direct relationship with the voting decision. Since a large number of results were obtained, only the most prominent findings are discussed here by focusing solely on the direct relationships between the decisions of investors and the drivers 'Reputation to outside world', 'Following proxy advisors' and 'Resolution as a pressure strategy'. These drivers are highlighted because they exhibited clear differences between the models, with each being perceived as one of the top three drivers influencing decision making in one group but not being seen as an influencing driver in another voting behaviour group.

Interestingly, the Abstain investors most frequently perceived a relationship between the driver 'Reputation to the outside world' and their voting decision, although this was closely followed by the In Favour group. By contrast, none of Against investors considered this driver to have influenced their decision making. This could indicate that voting against climate resolutions was seen as a risk for their investment company's reputation by the Abstain and In Favour investors. This perceived importance of reputation risk towards the outside world is in line with previous findings (Guyatt, 2019; Hartman et al., 2007; Petersen & Vredenburg, 2009b; Roehrich et al., 2014; ShareAction, 2020). For example, Guyatt (2019) argued that most investors saw reputation risk as a serious concern when they did not integrate climate-related impacts into investment decisions. This was also indicated by one of the In Favour interviewees:

*Journalists pay already more attention now to the voting behaviour. ... I think that it is more dangerous for investors to not deviate from other Dutch investors. ... And yes, I think that if there is even more attention from journalism about the voting behaviour, about that transparency, then that will be an even greater reason to vote for the resolution as well. (Anonymous 'In Favour' Investor, personal communication, February 26, 2021)*

Focusing on the Against investor group, it appears that 'Following proxy advisors' was perceived as an important relationship by the majority of Against investors, who gave this a higher relationship strength than the In Favour investor group. By contrast, the Abstain group did not perceive that this driver was directly related to their voting decision on the resolution.

This latter result makes sense, as none of the proxy voting agencies advised investors to vote Abstain on the resolution (M. van Baal, personal communication, July 10, 2020). A possible explanation of why the advice provided by proxy voting advice agencies was followed may be that analysing the shareholder resolution was perceived to be too time-consuming for the investment companies, as suggested by two interviewees. However, if that were the case, it would be expected that the Against investors would have perceived the driver 'Resolutions are time-consuming' more frequently within their mental models, which was clearly not the case. One of the other interviewees provided a possible explanation by mentioning that foreign (i.e. non-British/Dutch) investors might more quickly follow proxy voting agencies due to a lack of local context (as indicated in an earlier quote). Nonetheless, a clear reason for the higher perceived relevance of 'Following proxy advisors' for the Against group cannot be given.

Focusing on the In Favour investor mental models, it appears that the In Favour investors most frequently perceived the driver 'Resolution as a pressure strategy' to be directly related to their voting decision, whereas the Against group did not highlight this direct relationship at all. A review of the individual mental models of the In Favour investors showed that one investor highlighted a relationship between 'Climate measures taken by Shell' and 'Resolution as a pressure strategy'. Moreover, two investors perceived a relationship between 'Engagement activities' and 'Resolution as a pressure strategy'. These connections suggest that the In Favour investors were unsatisfied with the climate measures being taken or their engagement activities with Shell, leading to their decision to use their voting power. The fact that some investors perceived the resolution as a pressure strategy was also highlighted in the report of ShareAction (2020) and further stressed by one of the interviewees:

*We think that that company can take more steps than it's taking now and that if they take the steps that they're proposing themselves they're not going to get to the Paris agreement adequately ... the 2020 resolution submitted by Follow This is much better for that. ... The resolution provides additional strength and power to the previous expressions in the dialogue [engagement] with the company [Shell]. (Anonymous 'In Favour' investor, personal communication, March 10, 2021)*

One additional relationship is also worth highlighting, despite it not being considered the most important influence within the mental models, as it contradicts the findings of previous studies. It appears that the sense of social or environmental responsibility to mitigate further climate change was most frequently perceived to influence decision making by the In Favour investors, whereas only one Abstain and one Against investor included 'Moral considerations' as an indirect relationship in their mental models. These findings contradict the suggestion made by Christophers (2019) that there is no hope for environmental groups to believe that the investment industry can help pressure groups to change fossil fuel companies into cleaner forms of energy due to, among other reasons, a lack of moral reasoning. However, within this thesis some of the In Favour investors actually perceived 'Moral reasoning' as one of the reasons to support pressure groups by voting in favour of the climate resolution.

In conclusion, the findings of this study suggest that investors have different mental models which, to a certain extent, include different drivers and relationships, leading to different decision-making processes. Moreover, it was possible to identify the specific drivers and relationships that were perceived as having different levels of influence on their decision making. These results have some interesting scientific and theoretical implications, as explained in the next section.

## **Implications**

### ***Scientific implications***

The results of this thesis have several theoretical implications and raise opportunities for further research. It was suggested that applying mental model research to the field of shareholder

activism had the potential to increase the knowledge and understanding of why investors vote in certain ways on climate resolutions. Supporting this, it appeared to be possible to identify the different reasoning used by investors when making their voting decisions by eliciting and comparing their mental models. This supports and expands on existing literature that has highlighted the potential of mental model research for identifying decision-making processes (Hine et al., 2005; Langfield-Smith & Wirth, 1992; Schaffernicht & Groesser, 2011).

The methodology that was used, whereby cognitive maps were elicited through the online M-tool and the different mental models behind the different voting decisions were quantitatively compared between individual and group mental models, is relatively new in the scientific field of decision making (Markóczy & Goldberg, 1995; van den Broek, 2020b). M-tool has been identified as a promising tool for further research within this field, as it provides a practical and effective way of eliciting the mental models behind investors' decision making. This supports and extends the research of van den Broek (2020a), which stated that M-tool is a promising instrument for addressing conservation challenges among stakeholders.

Furthermore, this study applied a new quantitative approach for comparing different mental models of decision-making between group- and individual mental models. Although, the DR is often applied within mental model research (Hine et al., 2005; Langfield-Smith & Wirth, 1992; Schaffernicht & Groesser, 2010), few studies have investigated on a significant level the differences based on individual mental models and group mental models (Markóczy & Goldberg, 1995). Comparing the DRs within the same decision-making group with the DRs of another decision-making group provides a new approach for measuring significant differences between decision-making processes.

While this study provides empirical insights into which drivers played a role in the decision-making processes of investors and which drivers were directly related to the voting decisions within the mental models of investors, it did not provide any insights into the interrelationships between such drivers. Such an understanding is an important aspect within mental model research and could

provide an increased understanding of the voting reasoning of investors. For instance, it would be interesting to know which drivers influenced the perceived importance of 'Reputation to the outside world'.

### ***Practical implications***

This study aimed to provide additional insights into why investors would support climate-related resolutions, as mitigating further climate change is of high societal relevance. Use of a mental model approach clearly showed that some institutional investors perceived certain drivers and relationships as leading to their voting decisions, whereas others did not consider these drivers to be important. Moreover, it was found that the decision to support or oppose climate resolutions contained different voting decision drivers and relationships. These insights can be used by both institutional investors and environmental awareness groups, as they reveal the different perceptions of investors, allowing different communication measures to be adopted (Jones et al., 2011; Vecchiato, 2019), as suggested in this section.

Overall, the results suggest that mental models differ to a certain extent between investors. Therefore, the different drivers should be considered to increase the understanding of investors and environmental groups on why investors vote in a certain matter. For instance, the drivers that were perceived as being very important to the Against group should be reviewed by the investors who file climate resolutions to see if the resolutions can be adapted to reduce the identified reasons for investors in a fossil fuel company to vote against them. Thus, reviewing Table 3 and Table 4 is recommended for all investors or interest groups who have conversations around climate resolutions and voting behaviour.

Climate resolutions should also be reviewed to make them more readily accepted by proxy advisors, as negative voting advice by these advisors was perceived as one of the most important drivers behind the decisions of investors to vote against the climate resolution investigated here. Another aspect that could be considered when writing and filing a resolution is the strong perceived importance of financial considerations by both the Against and Abstain investors. Thus, such

considerations should be included in resolutions to make them more appealing to a broader group of institutional investors.

To keep the In Favour investors on board with related climate resolutions in the future, it is also recommended that the different drivers that the In Favour investors perceived as important are kept in mind. For instance, the In Favour investors perceived that the adopted climate measures by Shell were of high importance, so changes to these climate measures could change their attitudes.

### **Limitations**

This research provided a deeper understanding of the voting decisions of investors. However, it is important to consider its most important limitations. The primary limitation of this study was the small sample size, which means that great caution should be taken in generalising the conclusions. In particular, the small sample size means that there is a risk that the group mental models were inaccurate, as highlighted by Aminpour et al. (2020). In addition, the significance tests were underpowered, further limiting the generalisability of the results and increasing the risk of drawing incorrect conclusions (Charles et al., 2009; La Caze & Duffull, 2010; Zhang & Hughes, 2019). Indeed, studies that are underpowered but show significant results have an increased chance of falsely rejecting the null hypotheses, as indicated by Christley (2010). Thus, although the investor mental models of the In Favour and Against groups were perceived as being significantly different, this conclusion should be treated with caution due to the underpowered test. Therefore, further research should include a broader range of investors to generate more robust results.

Although this research used frequencies to compare the groups, the larger size of the In Favour group could also have biased the results. Since mental models show the drivers and their relationships as perceived by the investors, the inclusion of more mental models could have led to the perception of more drivers and relationships (Aminpour et al., 2020). Therefore, it is possible that those connections that were not perceived as relevant within the Abstain and Against groups may have been detected if more investors would have been included in the study.

Another important limitation is related to the decision to use an indirect elicitation method. The methodology used gave the investors the ability to visualise their perceived mental model independently, without the presence of a researcher, which resulted in an uncontrolled situation in terms of the time taken by participants to complete M-tool. Thus, it is possible that some investors perceived more drivers and relationships than indicated but did not take enough time completing the M-tool, whereas other investors did. This influence of time on correctly eliciting mental models was also highlighted by LaMere et al. (2020). Moreover, the elicited mental models entirely depended on the recognised, perceived influences by the participants, who may not necessarily have been aware of all the factors that influenced their decision making, leading to the visualisation of incomplete mental models (Özesmi & Özesmi, 2004).

Another limitation related to the mental model approach used is that the investors could only choose from a pre-defined list of drivers, so other drivers that were not included within M-tool could also have played a role in their decision making. To determine the importance of this limitation, the investors were asked within the survey if certain drivers had been missed. Although the majority did not indicate any missing drivers, some did. For instance, one investor mentioned the perceived importance of governmental measures in influencing his decision making, which was not included within the tool. Further research with a larger timeframe could follow a broader mental model methodology that would reduce all of these limitations. For instance, by conducting interviews with stakeholders, more profound knowledge could be gained on their understanding of their visualised perceived mental model. A promising approach that would be interesting to apply for further research combines the indirect and direct elicitation methods, as proposed by LaMere et al. (2020).

Furthermore, an important limitation of this research is the fact that mental models are dynamic and thus can change over time (Moon et al., 2019; Otto-Banaszak et al., 2011). The participants in this study were asked in the first quarter of 2021 about which drivers they perceived to have influenced their voting decision on a resolution they voted on in 2020. Thus, it could be

expected that the investors would have been less aware of their perceived influences a year after their actual decision making. Moreover, it could be that, at the time of the study, participants perceived other drivers for a similar resolution filed in 2021, resulting in them mixing their perceived drivers and influences on voting decisions together. One survey respondent suggested this limitation by mentioning an aspect that was typical of the resolution of 2021 rather than 2020.

This dynamic aspect of mental models also provides some interesting opportunities for further research – for instance, to what extent do the mental models of investors change over time? To answer this, the mental models of investors who show different voting behaviours over time could be monitored. The visualisation of such behavioural changes through mental model changes would provide a more detailed insight into which factors in their mental models seemed to have led to their changes in voting behaviour.

Lastly, it is important to note that this research was solely focused on understanding the voting decision at the climate resolution filed at Royal Dutch Shell in 2020. The identified drivers and relationships behind the voting decisions of investors on other fossil fuel companies could be different. For instance, the driver 'Shell's [e.g. another company name] information provision' could be different per fossil fuel company, depending on their activities related to providing information around climate resolutions. Nonetheless, it can be expected that most drivers identified in this study will be applicable in a broader range of fossil fuel-related decisions, as most drivers such as 'Voting policy', 'Financial considerations' and 'Engagement activities' are relevant topics for each institutional investor in their overall work.

### **Conclusion**

This research aimed to identify the different reasoning behind institutional investors' voting decisions on the climate resolution filed at Royal Dutch Shell in 2020. The quantitative analysis showed that the mental models of investors with different voting decisions significantly differed between the In Favour and Against groups and between the Against and Abstain investor mental model groups. However, there was no significant difference between the mental models of the

Abstain and In Favour groups. There was also no significant difference in the mental model complexity of the In Favour group and either the Abstain or Against groups. Additionally, a review of the frequencies of perceived drivers and relationships indicated that these to a certain extent differed between investor groups with different voting decisions.

While the small sample size limits the generalisability of the results, the approach used provides new insights into how mental model research can add value to the field of shareholder activism. For instance, investors who voted abstain perceived that their reputation to the outside world was of high importance, while those who voted against the climate resolution did not perceive this as being a factor that influenced their decision making. Moreover, the investors who voted in favour most strongly perceived moral considerations as having an influence in contrast to the investors who voted abstain and against.

To better understand the implications of the results, future studies could use a more comprehensive mental model approach and investigate the interrelationships between investors' perceived influences. Investors themselves and the shareholder groups that file climate resolutions can review the perceived drivers and relationships for each investor group to see if the communication they use towards the investors and within the resolution is appropriate for the different views. Nonetheless, further research is needed with larger sample sizes to provide any robust conclusions.

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## Appendix

### Appendix A: M-tool steps

Below are all steps in the M-tool visualised that the participants followed.

#### Step 1: Welcome text

Thank you very much for participating in this study, please turn on the volume of your device and follow the instructions.

The aim is to identify the reasoning of institutional investors' voting behaviour on the shareholder Paris Climate resolution filed at Royal Dutch Shell in 2020\*. Through this online tool, you can map out the reasoning behind the decision-making that led to an against, abstain, or in favour vote.

The mapping exercise will take approximately 15 minutes and is entirely anonymous. The next steps include an introduction video with a practice example, the mapping exercise of the decision-making process on the actual casted vote, and a short survey. Please be aware that completing the short survey is crucial for the data to be usable.

\*See here the resolution (p. 6): <https://go.shell.com/3tQQHFr>

Start

#### Step 2: Consent form

##### Consent Form

I confirm that:

- I am satisfied with the received information about the research;
- I have been given opportunity to ask questions about the research and that any questions that have been risen have been answered satisfactorily;
- I had the opportunity to think carefully about participating in the study;
  - I will give an honest answer to the questions asked.

I agree that:

- the data to be collected will be obtained and stored for scientific purposes;
- the collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;
- video and/or audio recordings may also be used for scientific purposes.

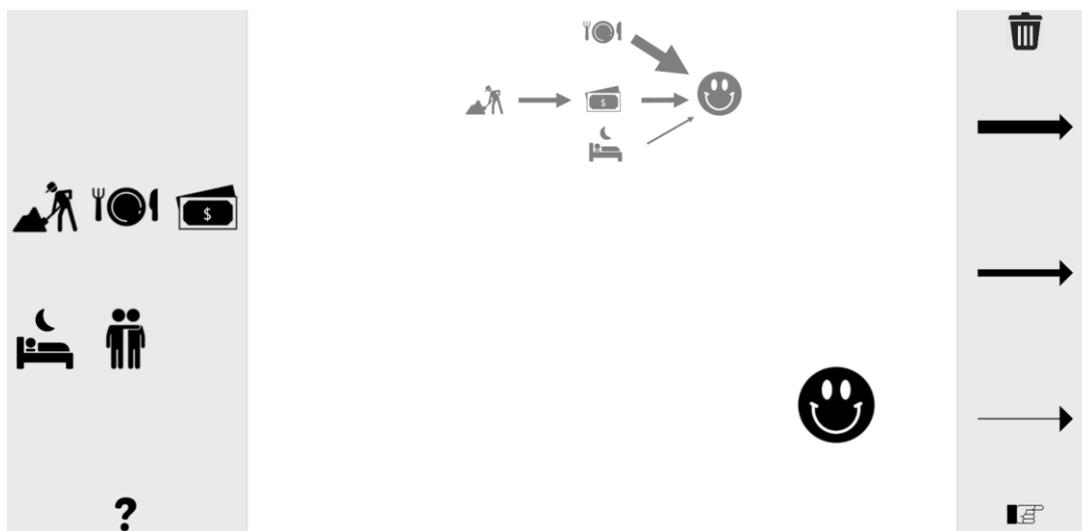
I understand that:

- I have the right to withdraw my consent to use the data;
- I have the right to see the research report afterwards.

Accept

Decline

Step 3: Explanation video and example task. The participants needed to replicate the mental models as shown in the upper part of the image.



Step 4: A video including the definition of each driver included within this study was provided

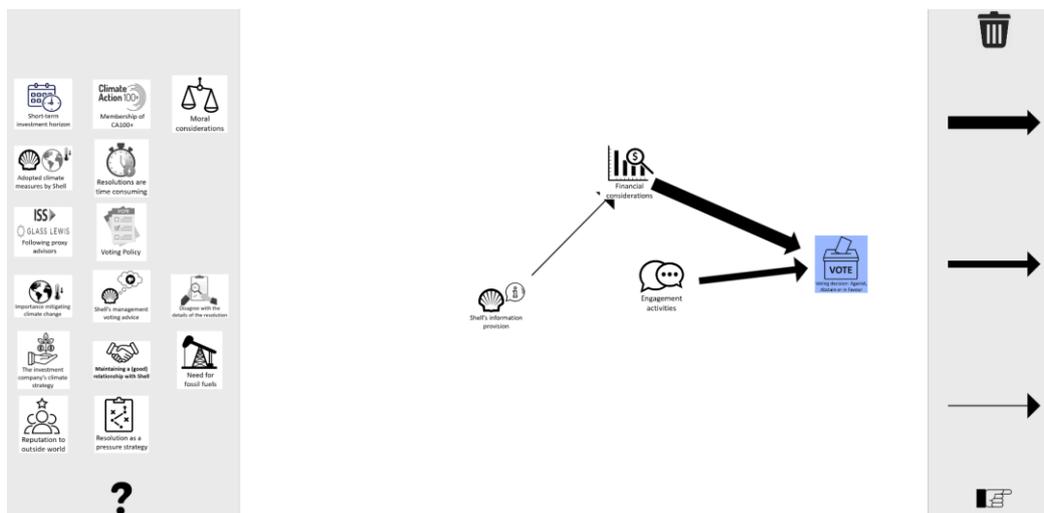
In the next task, you will use different icons to illustrate your decision making model. You can select these icons if you identify them as factors that influenced your investment company's voting decision. These identified factors could have influenced each other or directly influenced the voting decision. I will now briefly describe them.



*The final voting decision of your investment company on the shareholder climate target resolution (N.21) filed at Shell in 2020. This could include a voting against, abstain or in favour of the resolution.*



Step 5: The participants were asked to visualise the drivers and relationships that led to their voting decision.



Step 6: A thank you message was shown and the participants were requested to fill in the included survey.

Please complete the survey through the link below. This is an essential part of this study.

After the survey, your participation is complete. Thank you very much for your assistance, it is greatly appreciated. If you would like to receive the results when they are available in September 2021, please contact me on LinkedIn or send an email to rooswijker@gmail.com.

Feel free to share this tool\* with other investors or share my LinkedIn message in your network to help me reach more institutional investors. LinkedIn message: <https://rb.gy/ck8gi4>

\*Tool link: <https://m-tool.lambdaforge.io/studies/a48c179b-92dd-4daf-ba48-60b7a585d2b3>

Survey Info

[Survey Link](#)

## Appendix B: Derived and selected drivers

Beneath, all the identified drivers are shown, including their definition derived out of the literature review, interviews and company statements. The last three columns indicate if the driver was identified during the literature review and how many of the interviews and/or company statements recognised these drivers or additional drivers. Following the selection procedure, drivers 1 to 18 were included while 19 till 30 were seen as less relevant and excluded.

Drivers	Definitions	Theory	Interviews (No. 4)	Company statements (No. 26)
1. Adopted climate measures by Shell	The measures, including the announced climate ambition, that Shell has adopted to reduce their impact on climate change.	No	4	18
2. Engagement activities	The current and future engagement activities involving Shell and the investment company.	Yes	4	4
3. Financial considerations	The financial risks or opportunities related to fossil fuel companies and climate change.	Yes	4	2
4. Moral considerations	The sense of social and/or environmental responsibility to mitigate further climate change.	Yes	4	1
5. Maintaining a (good) relationship with Shell	The importance of maintaining a good relationship with Shell for political, commercial, or business-related reasons.	No	4	0
6. Importance mitigating climate change	The perceived importance of mitigating climate change.	No	3	3
7. Membership Climate Action 100+	The investment company's membership of the Climate Action 100+.	Yes	3	1
8. Shell's Information provision	Shell's information provision towards the investment company about the effectiveness of their taken climate measures and/or announced climate ambition.	No	3	1
9. Voting Policy	The voting policy of an investment company that steers the voting decision due to specific rules on its voting behaviour.	No	3	1
10. Need for fossil fuels	The expected future need for fossil fuels.	Yes	3	0

11. The investment company's climate strategy	The investment company underlines the importance of climate change in their policies.	No	3	0
12. Disagree with the details of the resolution	Supporting the intention of the resolution but disagreeing on some specific requests or details in the resolution.	No	2	4
13. Shell's management voting advice	The voting recommendation of Shell's Board with regard to the shareholder resolution in 2020 (n. 21).	Yes	2	0
14. Short-term investment horizon	<i>The short term investment considerations due to a limited investment horizon.</i>	Yes	2	0
15. Reputation to outside world	The reputation of the investment company towards the outside world (e.g., clients, pensioners, government bodies, and peers).	Yes	2	0
16. Resolutions are time consuming	Analysing the resolution and considering the different arguments to decide on the voting decision requires a lot of time and/or capacity.	No	2	0
17. Resolutions as a pressure strategy	Attitudes towards filling resolutions as a strategy to pressure companies to change.	No	2	0
18. Following Proxy Advisors	The published voting advice by proxy advisors, such as ISS and Glass Lewis.	No	2	0
<i>Fixed factor (or target variable) Within the M-tool.</i>	The final voting decision of your investment company on the shareholder climate target resolution (N.21) filed at Shell in 2020.			
<i>The following drivers were identified, but due to the selection procedure not included in the M-tool.</i>				
Driver	Definitions	Theory	Interviews	Company statements
19. Knowing the Dutch Context	As Shell is a Dutch-oriented company, Dutch investors could better understand the local context and could more easily discuss such matters with Shell and/or other Dutch investors.	No	2	0
20. Another way of showing dissatisfaction	An investor could prefer other ways of showing dissatisfaction besides engagement and resolutions, for example, voting against the reappointment of members of the board.	No	1	0

21. Equal treatment between oil companies	It could be seen as not appropriate/fair to support a company that already took measures while other oil companies are still lacking in taking climate measures.	No	1	0
22. Support of own company	The notion of trust, culture and personal relationships inside an organization that provides investors with the opportunity to discuss climate change topics internally with other employees and the management team could influence their voting behaviour.	Yes	1	0
23. Physical risk	The direct risks of climate change, such as flood and storms, which damage property or disrupt trade.	Yes	1	0
24. Responsibility role Shell	The view of in how far and if Shell has a responsibility in taking steps.	No	0	1
25. Promotes better management ESG opportunities and risk	Unknown exact meaning, 'Promotes better management ESG opportunities and risk' is the only statement given by an online published investor document.	No	0	1
26. Substitutes are lacking	Comparable substitutes of sustainable investments or energy strategies are perceived as lacking.	Yes	0	0
27. Regulation Risk	The risk of upcoming policies that would affect the investments' value or directly the investment company. For example, the earlier implemented EU ETS system.	Yes	0	0
28. Legal risk	The risk of court rulings towards fossil fuel companies. Such court cases could influence the value of shares and license to operate. Direct court ruling towards investors themselves could also play a role. For example, court cases that accuse the targeted party of doing too little to mitigate climate change.	Yes	0	0
29. Employee satisfaction and retention	The employee satisfaction and employee retention due to employees' enthusiasm for the institutional investment company's sustainable strategy.	Yes	0	0
30. Competitive advantage	The advantage of the investment company themselves or fossil fuel companies due to a better market position.	Yes	0	0

## **Appendix C: Interview guide**

### **Informed-consent process: verbal preview**

*Thank you very much for your willingness to participate in this study. Before we begin, I want to highlight that this interview will be used as basis for my research in order to identify the drivers of why investors vote in a certain way in regards of the climate-target resolutions at Shell in 2020 (I will show a digital example of the shell resolution). All of your responses will be anonymous and confidential and, if approved, a recording will be made in order to transcribe the interview. This information will only be shared with my university team and will approximately take 25 minutes.*

*Do you give permission to record this interview?*

### **Outline of questions – own reminder**

Reminder note for interviewer: The interview should be hold in an open ended way where the interviewer does not impose any possible answer in order to keep it neutral. The first, broad questions, are there to make them comfortable in the topic and let them already think about their reasonings. The funnel questions are meant to specifically identify their drivers and can be followed up by follow up questions, depending on the type of provided information.

### **Broad questions**

*To start the interview I have some background and introduction questions, there are no wrong or right answers during this interview, so feel free to mention what directly comes to your mind.*

- 1. How does your company look at the topic of climate change and their holdings in fossil fuel shares?*
- 2. What is your opinion about the mentioned climate-target shareholder resolution?*

### **Funnel questions – more-specific questions**

*For the following questions I would like to ask you to re-imagine the AGM period of previous year where you and your company were deciding on what to vote for the earlier shown resolution.*

- 3. Which discussions or topics are coming to your mind when thinking about how the voting decision was made within your organization?*

**a.** I will ask them to elaborate a bit more on the mentioned aspects. For example:

Interviewee: The pressure of the media to vote in favor of the resolution. Interviewer:

What kind of pressure did this entail and do you feel this was appropriate?

4. *Are there any other motivations or barriers which comes to your mind that influenced the voting behavior of [The institutional investment company's Name].*
5. *To what extent could you identify reasonings of other institutional investors who voted e.g. 'Against' [Name the opposite what they voted] the resolution filled at Shell?*
6. *And in how far could you identify reasonings of other institutional investors who decided to vote e.g. 'Abstain' [Name the voting type which is not yet discussed]?*
7. *[only necessary if there is a different voting behaviour for the different oil companies]. What where the reasons behind the different voting behaviours on the same kind of resolutions filled at Shell/Total/Equinor?*

#### **Wrap-up questions**

*Thank you very much for the elaborated answers, I got a good overview.*

8. *Is there anything else you would like to add or want to ask?*
9. *Would you be open for follow-up contact if I have any further questions?*

## Appendix D: Consent Form Interviewees



Utrecht University

### INFORMED CONSENT FORM for participation in:

#### The Master Thesis research of Roos Wijker

**Research title: Mental models of the drivers of fossil fuel investors' voting behavior on Paris Climate target resolutions**

#### To be completed by the participant:

I confirm that:

- I am satisfied with the received information about the research;
- I have been given opportunity to ask questions about the research and that any questions that have been risen have been answered satisfactorily;
- I had the opportunity to think carefully about participating in the study;
- I will give an honest answer to the questions asked.

I agree that:

- the data to be collected will be obtained and stored for scientific purposes;
- the collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;
- video and/or audio recordings may also be used for scientific purposes.

I understand that:

- I have the right to withdraw my consent to use the data;
- I have the right to see the research report afterwards.

Name of participant: \_\_\_\_\_

Signature: \_\_\_\_\_ Date, place: \_\_\_ / \_\_\_ / \_\_\_, \_\_\_\_\_

#### To be completed by the investigator:

I declare that I have explained the above mentioned participant what participation means and the reasons for data collection.

I guarantee the privacy of the data.

Name: \_\_\_\_\_

Date: \_\_\_ / \_\_\_ / \_\_\_\_ (dd/mm/yyyy)

Signature: \_\_\_\_\_

## Appendix E: Voting rationales

Beneath, all published voting rationales used for the identification of drivers are listed.

Investment organisations	Voting	Source
Aegon	For	<a href="https://nieuws.aegon.nl/aegon-nederland-steunt-duurzame-resoluties-avas-olie--en-gasbedrijven/">https://nieuws.aegon.nl/aegon-nederland-steunt-duurzame-resoluties-avas-olie--en-gasbedrijven/</a>
APG	Abstain	<a href="https://www.abp.nl/over-abp/actueel/nieuws/abp-kiest-voor-concrete-actie-bij-shell.aspx">https://www.abp.nl/over-abp/actueel/nieuws/abp-kiest-voor-concrete-actie-bij-shell.aspx</a>
Robeco	Abstain	<a href="https://www.robeco.com/docm/docu-0920-robeco-proxy-voting-season-overview.pdf">https://www.robeco.com/docm/docu-0920-robeco-proxy-voting-season-overview.pdf</a>
Van landschot kempen	Abstain	<a href="https://vds.issgovernance.com/vds/#/NzcyMA==/">https://vds.issgovernance.com/vds/#/NzcyMA==/</a>
Aberdeen Standard Investments	Against	<a href="https://www.aberdeenstandard.com/en/responsible-investing/voting#_ga=2.238655492.589187292.1612442858-1242550697.1612442858">https://www.aberdeenstandard.com/en/responsible-investing/voting#_ga=2.238655492.589187292.1612442858-1242550697.1612442858</a>
M&G	For	<a href="https://www.mandgplc.com/our-business/mandg-investments/responsible-investing-at-mandg-investments/voting-history">https://www.mandgplc.com/our-business/mandg-investments/responsible-investing-at-mandg-investments/voting-history</a>
Baillie Gifford	Against	<a href="https://www.bailliegifford.com/en/uk/about-us/literature-library/corporate-governance/voting-disclosure-company-engagement/voting-disclosure-report-q2-2020/">https://www.bailliegifford.com/en/uk/about-us/literature-library/corporate-governance/voting-disclosure-company-engagement/voting-disclosure-report-q2-2020/</a>
BlackRock	Against	<a href="https://www.blackrock.com/corporate/literature/press-release/blk-vote-bulletin-shell-may-2020.pdf">https://www.blackrock.com/corporate/literature/press-release/blk-vote-bulletin-shell-may-2020.pdf</a>
Storebrand AM	For	<a href="https://www.storebrand.no/asset-management/barekraftige-investeringer/aktivt-eierskap/proxy-voting-stemmegivning">https://www.storebrand.no/asset-management/barekraftige-investeringer/aktivt-eierskap/proxy-voting-stemmegivning</a>
DNB AM	Against	<a href="https://dnb-asset-management.s3.amazonaws.com/ESG-SRI-pdf/Stemmegivning-p%C3%A5-generalforsamlinger-i-2020-1.pdf?mtime=20210202153356&amp;focal=none">https://dnb-asset-management.s3.amazonaws.com/ESG-SRI-pdf/Stemmegivning-p%C3%A5-generalforsamlinger-i-2020-1.pdf?mtime=20210202153356&amp;focal=none</a>
The Church of England Pension Board	Against	<a href="https://www.churchofengland.org/news-and-media/news-and-statements/church-england-pensions-board-vote-against-follow-resolution">https://www.churchofengland.org/news-and-media/news-and-statements/church-england-pensions-board-vote-against-follow-resolution</a>
Neuberger Berman	Against	<a href="https://www.nb.com/en/global/esg/nb-votes">https://www.nb.com/en/global/esg/nb-votes</a>
Candrium (vote instruction)	For	<a href="https://www.candriam.com/en/professional/market-insights/sri-publications/proxy-voting-candriams-votes-2020-h1/">https://www.candriam.com/en/professional/market-insights/sri-publications/proxy-voting-candriams-votes-2020-h1/</a>
UBS Asset Management	Abstain	<a href="https://vds.issgovernance.com/vds/#/MjU0/">https://vds.issgovernance.com/vds/#/MjU0/</a>
Capital International (limited) Group	Against	<a href="https://www.capitalgroup.com/content/dam/cgc/tenants/europe/documents/responsible-investing/CIL_report_FINAL.pdf">https://www.capitalgroup.com/content/dam/cgc/tenants/europe/documents/responsible-investing/CIL_report_FINAL.pdf</a>

Invesco Advisers, Inc.	For & Against (depending on fund)	<a href="https://vds.issgovernance.com/repo/3970/policies/IVZ%20ShareHolder%20Rights%20Directive%20(SRD%20II)%20Significant%20Vote%20Disclosure.pdf">https://vds.issgovernance.com/repo/3970/policies/IVZ%20ShareHolder%20Rights%20Directive%20(SRD%20II)%20Significant%20Vote%20Disclosure.pdf</a>
Alberta Investment Management Corporation (AIMco)	Against	<a href="https://viewpoint.glasslewis.com/WD/MeetingDetail/?siteId=AIMCo&amp;securityId=50753&amp;meetingId=954809">https://viewpoint.glasslewis.com/WD/MeetingDetail/?siteId=AIMCo&amp;securityId=50753&amp;meetingId=954809</a>
British Columbia Investment Management Corporation (BCI)	Against	<a href="https://www.bci.ca/approach/esg/influence/proxy-voting/">https://www.bci.ca/approach/esg/influence/proxy-voting/</a>
Brunel Pension Partnership	For	<a href="https://www.brunelpensionpartnership.org/stewardship/voting-records/">https://www.brunelpensionpartnership.org/stewardship/voting-records/</a>
KBI Global Investors Ltd.	For	<a href="https://vds.issgovernance.com/vds/#/Nig2OA==/">https://vds.issgovernance.com/vds/#/Nig2OA==/</a>
La Française Asset Management	For	<a href="https://www.la-francaise.com/en/regulatory-information/exercise-of-the-voting-rights/">https://www.la-francaise.com/en/regulatory-information/exercise-of-the-voting-rights/</a>
MD Funds Management	Against	<a href="https://vds.issgovernance.com/vds/#/MTE3MzE=/">https://vds.issgovernance.com/vds/#/MTE3MzE=/</a>
NEI Investments	Abstain	<a href="https://vds.issgovernance.com/vds/#/ODI3Mg==/">https://vds.issgovernance.com/vds/#/ODI3Mg==/</a>
Wespath Investment Management	Against	<a href="https://viewpoint.glasslewis.com/WD/MeetingDetail/?siteId=UMC&amp;securityId=50753">https://viewpoint.glasslewis.com/WD/MeetingDetail/?siteId=UMC&amp;securityId=50753</a>
Vision Super	For	<a href="https://viewpoint.glasslewis.com/WD/?siteId=Vision%20Super">https://viewpoint.glasslewis.com/WD/?siteId=Vision%20Super</a>

## Appendix F: Icons and their sources

For all icons included in the M-tool, below is where they were uploaded. Each icon was adjusted, if necessary, to a black colour. The names were later on added to the icons.



Adopted climate measures by Shell

- <https://www.allegria.at/kunde/shell-austria/>
- [https://www.vhv.rs/viewpic/hxTihhi\\_earth-png-black-and-white-transparent-png/](https://www.vhv.rs/viewpic/hxTihhi_earth-png-black-and-white-transparent-png/)
- [https://www.infowine.com/es/articulos\\_tecnicos/efecto\\_de\\_la\\_sinergia\\_entre\\_temperatura\\_de\\_conservacin\\_y\\_etanol\\_sobre\\_el\\_crecimiento\\_de\\_brettanomyces\\_bruxellensis\\_en\\_vinos\\_merlot\\_sc\\_16996.htm](https://www.infowine.com/es/articulos_tecnicos/efecto_de_la_sinergia_entre_temperatura_de_conservacin_y_etanol_sobre_el_crecimiento_de_brettanomyces_bruxellensis_en_vinos_merlot_sc_16996.htm)



The investment company's climate strategy

- [https://www.flaticon.com/premium-icon/investment\\_1293921](https://www.flaticon.com/premium-icon/investment_1293921)



Engagement activities

- [https://www.pngitem.com/middle/iwhJxmJ\\_bubbles-talk-chat-conversation-more-wait-comments-conversation/](https://www.pngitem.com/middle/iwhJxmJ_bubbles-talk-chat-conversation-more-wait-comments-conversation/)



Disagree with the details of the resolution

- <https://www.shutterstock.com/nl/image-vector/businessman-magnifier-check-list-on-clipboard-438666094>



Financial considerations

- <https://icon-library.com/icon/chart-icon-free-20.html>



Shell's management voting advice

- <https://www.allegria.at/kunde/shell-austria/>
- <https://flyclipart.com/bubble-cloud-dream-handdrawn-think-thinking-thought-icon-thinking-cloud-png-407421>



Moral considerations



Short-term investment horizon

- [https://favpng.com/png\\_view/moral-icon-ethics-clip-art-png/7QnAgRLk](https://favpng.com/png_view/moral-icon-ethics-clip-art-png/7QnAgRLk)



Maintaining a (good) relationship with Shell

- [https://www.clipartkey.com/view/oixThm\\_step-by-step-hand-shake-drawing-hand-shaking/](https://www.clipartkey.com/view/oixThm_step-by-step-hand-shake-drawing-hand-shaking/)

- [https://www.flaticon.com/de/kostenloses-icon/kalender\\_1571653](https://www.flaticon.com/de/kostenloses-icon/kalender_1571653)



Reputation to outside world

- [https://www.pincliptart.com/pindetail/ibboTwo\\_reputation-management-for-hotels-differentiation-icon-clipart/](https://www.pincliptart.com/pindetail/ibboTwo_reputation-management-for-hotels-differentiation-icon-clipart/)



Importance mitigating climate change

- [https://www.vhv.rs/viewpic/hxTihhi\\_earth-png-black-and-white-transparent-png/](https://www.vhv.rs/viewpic/hxTihhi_earth-png-black-and-white-transparent-png/)

- [https://www.infowine.com/es/articulos\\_tecnicos/efecto\\_de\\_la\\_sinergia\\_entre\\_temperatura\\_de\\_conservacin\\_y\\_etanol\\_sobre\\_el\\_crecimiento\\_de\\_brettanomyces\\_bruyellensis\\_en\\_vinos\\_merlot\\_sc\\_16996.htm](https://www.infowine.com/es/articulos_tecnicos/efecto_de_la_sinergia_entre_temperatura_de_conservacin_y_etanol_sobre_el_crecimiento_de_brettanomyces_bruyellensis_en_vinos_merlot_sc_16996.htm)



Resolutions are time consuming

- <https://www.vectorstock.com/royalty-free-vector/fast-service-fast-delivery-icon-timely-service-vector-29764703>



Membership of CA100+

- [https://www.ueethical.com/uploads/ClimateAction100\\_withNEWTAGline-V3.jpg](https://www.ueethical.com/uploads/ClimateAction100_withNEWTAGline-V3.jpg)



Resolution as a pressure strategy

- <https://icons8.com/icon/30872/strategy>



Shell's information provision

- <https://www.allegria.at/kunde/shell-austria/>



- <https://ggainc.com/iss-proxy-voting-guidelines-updates-mean-canada/>

- <http://www.glasslewis.com/tag/occidental-petroleum/>



Voting Policy

- <https://www.vectorstock.com/royalty-free-vector/election-paper-icon-flat-style-vector-21420751>



- <https://www.shutterstock.com/nl/image-vector/line-icon-box-vote-hand-vector-1804408621>

Need for  
fossil fuels

- [https://www.pikpng.com/pngvi/ihhhiwJ\\_oil-rig-icon-png-png-download-upstream-oil-and-gas-logo-clipart/](https://www.pikpng.com/pngvi/ihhhiwJ_oil-rig-icon-png-png-download-upstream-oil-and-gas-logo-clipart/)
-

## Appendix G: Overview of identified institutional investor companies

The included institutional companies (No. 1-219) were identified as potential participants. The organisations ranging from 1 to 196 were all approached. The investor organisations ranging from 197 to 219 were identified as suitable but were not contacted since an appropriate contact person could not have been established. The excluded institutional companies (No. 220 – 423) were the investors that most likely would not fit the participant requirements. For example, because they did not contain Shell shares or the information found was insufficient.

Nr	Included institutional companies	Nr	Excluded institutional companies
1	<i>Jarislowsky Fraser Limited</i>	220	PNC Capital Advisors LLC
2	<i>Aegon asset management</i>	221	Todd Asset Management, LLC
3	<i>NN investment partners</i>	222	Manning & Napier Advisors LLC
4	<i>Achmea / IM</i>	223	Point72 Asset Management
5	<i>Blue Sky Group</i>	224	Sound Shore Management, Inc.
6	<i>Edentree Investment management</i>	225	Crawford Investment Counsel, Inc.
7	<i>Legal &amp; General</i>	226	Cullen Capital Management LLC
8	<i>State Street Global Advisors</i>	227	Kentucky Teachers' Retirement System
9	<i>ABP/APG</i>	228	Alyeska Investment Group
10	<i>Nationwide Fund Advisors (Multi-Managed)</i>	229	Investnet
11	<i>Majedie</i>	230	Brandes Investment Partners LP
12	<i>SunSuper</i>	231	GAMCO Asset Management, Inc
13	<i>Lombard Odier Investment Managers</i>	232	NGAM Advisors, L.P.
14	<i>Parametric Portfolio Associates, LLC</i>	233	Fayez Sarofim & Co.
15	<i>NBIM (Norges Bank Investment Management)</i>	234	Marshall Wace LLP
16	<i>NEI Investments</i>	235	Jane Street Capital
17	<i>Columbia Threadneedle US</i>	236	Nikko Asset Management
18	<i>Brunel Pension Partnership</i>	237	Crossmark Global Investments, Inc.
19	<i>DWS Investment GmbH</i>	238	WEDGE Capital Management
20	<i>GAM</i>	239	Causeway Capital Management LLC
21	<i>HostPlus</i>	240	Waddell & Reed Investment Management Co.
22	<i>HSBC</i>	241	Trustmark Investment Advisors, Inc.
23	<i>UBS Asset Management</i>	242	Sumitomo Mitsui Asset Management

24	<i>MN</i>	243	William Blair & Co. LLC (Investment Management)
25	<i>Delaware Management Company (Macquarie)</i>	244	Comerica Bank & Trust NA
26	<i>Russell Investment Management Co.</i>	245	Guardian Capital Group Limited
27	<i>Hotchkis &amp; Wiley Capital Management LLC</i>	246	Nuveen Asset Management LLC
28	<i>JO Hambro Capital Management</i>	247	1832 Asset Management
29	<i>KBI Global Investors Ltd.</i>	248	Miller/Howard Investments Inc.
30	<i>Credit Suisse Asset Management</i>	249	U.S. Bancorp Fund Services
31	<i>Actiam</i>	250	Kovitz Investment Group, LLC
32	<i>AXA Investment Managers</i>	251	Alameda County Employees' Retirement Association
33	<i>DNB AM</i>	252	Federated Investment Management Co.
34	<i>Van landschot kempen</i>	253	Scout Investments, Inc.
35	<i>CIBC Global Asset Management</i>	254	Nomura Asset Management
36	<i>Robeco</i>	255	AGF Investments Inc.
37	<i>Karner Blue Capital</i>	256	ASR Nederland
38	<i>Fisher Investments</i>	257	Balter Liquid Alternatives LLC
39	<i>Charles Schwab Investment Management, Inc.</i>	258	Bessemer Investment Management LLC (Multi-Managed)
40	<i>SEI Investments Management Corp.</i>	259	Black Creek Investment Management Inc.
41	<i>Nest (British pension fund)</i>	260	Blackstone (Multi-Managed)
42	<i>American Century</i>	261	BPF Schoonmaak
43	<i>Nordea Investment management</i>	262	BPF Zorgverzekeraars (SBZ)
44	<i>Ninety One</i>	263	BPL Pensioen
45	<i>AP2 (Andra AP-fonden)</i>	264	ALPS Advisors, Inc.
46	<i>BMO Global Asset Management</i>	265	AMF
47	<i>Calvert Research and Management, Inc</i>	266	Cadence Capital Management LLC
48	<i>CareSuper</i>	267	Caisse de dépôt et placement du Québec
49	<i>RPMI Railpen</i>	268	California Public Employees' Retirement System (CalPERS)
50	<i>La Banque Postale Asset Management</i>	269	Capital Guardian Trust Co.
51	<i>BlackRock</i>	270	Capital Innovations, LLC

52	<i>Generali Insurance Asset Management</i>	271	Connor, Clark & Lunn Investment Management Ltd.
53	<i>Merseyside Pension Fund</i>	272	Consulting Group Advisory Services LLC (Multi-Managed)
54	<i>New York Life Investment Management LLC</i>	273	Dodge & Cox, Inc.
55	<i>Jackson National Asset Management, LLC (Multi-Managed)</i>	274	Employees Retirement System of the State of Hawaii
56	<i>Pacer Advisors, Inc (Pacer funds trust)</i>	275	Empowered Funds, LLC
57	<i>Principal Global Investors LLC (Multi-Managed)</i>	276	Investnet (Multi-Managed)
58	<i>John Hancock Funds, LLC (Multi-Managed)</i>	277	Equity Investment Corporation
59	<i>SVM Asset Management</i>	278	Exponential ETFs
60	<i>New York State Teachers' Retirement System</i>	279	First Trust Portfolios Canada
61	<i>Lord Abbett &amp; Co. LLC</i>	280	Florida State Board of Administration
62	<i>Amundi</i>	281	Gestion F�rique (Multi-Managed)
63	<i>AP3 third swedish national pension fund</i>	282	Global X Management Co. LLC
64	<i>AllianceBernstein LP</i>	283	Great-West Capital Management, LLC
65	<i>Los Angeles County Employees Retirement Association (LACERA)</i>	284	Great-West Funds, Inc (Multi-Managed)
66	<i>Capital International (limited) Group</i>	285	Hartford Investment Management Co., Inc.
67	<i>PGGM</i>	286	IFM Investors
68	<i>Aperio Group LLC</i>	287	IndexIQ Advisors LLC
69	<i>PIMCO</i>	288	Invesco Capital Management LLC
70	<i>Storebrand AM</i>	289	Investors Group
71	<i>KLP</i>	290	Investors Group (Multi-Managed)
72	<i>Allianz Fund</i>	291	ISS SRI Funds
73	<i>Jupiter Asset Management</i>	292	Janus Henderson Investors (US)
74	<i>T. Rowe Price Associates Inc</i>	293	Lazard Asset Management LLC
75	<i>Aviva Investors</i>	294	Local Government Superannuation Scheme
76	<i>Manulife Asset Management</i>	295	Los Angeles City Employees' Retirement System (LACERS)
77	<i>Cbus Super</i>	296	Los Angeles Fire & Police Pensions

78	<i>Baillie Gifford</i>	297	Luther King Capital Management Corp.
79	<i>RBC Global Asset Management, Inc.</i>	298	MacKay Shields LLC
80	<i>BNY Mellon Investment Management</i>	299	Marsico Capital Management LLC
81	<i>Brinker Capital, Inc.</i>	300	Massachusetts Pension Reserves Investment Management (PRIM)
82	<i>Invesco Asset Management Limited (or invesco capital management LLC idk what the difference is)</i>	301	MetLife Advisers, LLC
83	<i>Aberdeen Standard Investments</i>	302	Migros Pensionskasse
84	<i>MIRABAUD Asset Management Limited</i>	303	Mount Lucas Management LP
85	<i>Invesco Advisers, Inc.</i>	304	Natixis Global Asset Management
86	<i>CalPERS (California Public Employees' Retirement System)</i>	305	New Hampshire Retirement System
87	<i>Schroders</i>	306	Nordea Investment Management
88	<i>SEB</i>	307	North Carolina Department of State Treasurer
89	<i>Vanguard Asset Management</i>	308	National Bank of Canada
90	<i>DNB AM</i>	309	New York City Pension Funds
91	<i>Norges Bank Investment managementnt</i>	310	Ohio School Employees Retirement System (SERS)
92	<i>Victory Capital Management, Inc.</i>	311	Olive Street Investment Advisers, LLC (Multi-Managed)
93	<i>TCW Asset Management Co., Inc.</i>	312	Orange County Employees Retirement System
94	<i>BT</i>	313	Oregon Investment Council
95	<i>Capital Group</i>	314	O'Shares Investment Advisers, LLC
96	<i>CDPQ</i>	315	Ostrum Asset Management (Natixis)
97	<i>Voya Investment Management</i>	316	PanAgora Asset Management, Inc.
98	<i>ProFund Advisors LLC</i>	317	Patient Capital Management Inc.
99	<i>Mine Super</i>	318	Pendal Group
100	<i>M&amp;G</i>	319	PenSam
101	<i>Royal London asset management</i>	320	Pensioenfonds Horeca & Catering
102	<i>J.P. Morgan Asset Management</i>	321	Pensionskasse Post
103	<i>Goldman Sachs Asset management</i>	322	Pensionskasse SBB

104	<i>Federated Hermes International</i>	323	Pensionskassernes Administration (PKA)
105	<i>Newton investmnet management</i>	324	Perpetual
106	<i>Morgan Stanley Investment Management, Inc.</i>	325	PFM Asset Management LLC
107	<i>Trillium Asset Management Corp.</i>	326	Pictet Asset Management Limited
108	<i>Dimensional Fund Advisors, Inc.</i>	327	Principal Global Investors LLC
109	<i>Jennison Associates LLC</i>	328	ProShares
110	<i>Alberta Investment Management Corporation (AIMco)</i>	329	Pzena Investment Management, LLC
111	<i>Baring Asset Management</i>	330	QS Investors, LLC
112	<i>Putnam Investment Management LLC</i>	331	Quantitative Management Associates, LLC
113	<i>Wespath Investment Management</i>	332	RiverFront Investment Group, LLC
114	<i>Wilshire Associates, Inc. (Multi-Managed)</i>	333	Rosenberg Equities
115	<i>Rabobank Pensioenfonds</i>	334	Royal Borough of Kingston Pension Fund
116	<i>AQR Capital Management LLC</i>	335	RR Universite du Quebec (RRUQ)
117	<i>La Française Asset Management</i>	336	San Francisco Employees Retirement System
118	<i>PSP Investments</i>	337	Santa Barbara Asset Management, LLC
119	<i>Fidelity International (there were 4 types, only found this one with shell shares)</i>	338	SEI Investments Canada Company (Multi-Managed)
120	<i>Advanced Asset Management Advisors, Inc.</i>	339	Sentry Investments
121	<i>West Yorkshire Pension Fund</i>	340	Signature Global Asset Management
122	<i>Deka Investment</i>	341	Sprucegrove Investment Management Ltd
123	<i>Ohio Public Employees Retirement System (OPERS)</i>	342	State of Connecticut Retirement Plans & Trust Funds
124	<i>Neuberger Berman</i>	343	State Teachers' Retirement System of Ohio
125	<i>The Church of England Pension Board</i>	344	State Universities Retirement System of Illinois (SURS) (Multi-Managed)
126	<i>Guggenheim Investments</i>	345	Swisscanto
127	<i>Boston Partners</i>	346	Sycomore Asset Management
128	<i>Franklin Templeton Investments</i>	347	TD Greystone Asset Management

129	<i>American Beacon Advisors, Inc. (Multi-Managed)</i>	348	Teacher Retirement System of Texas
130	<i>AP4 FjÄrde AP-fondsen</i>	349	TKP Investments
131	<i>Cohen &amp; Steers Capital Management, Inc.</i>	350	Trim Tabs Asset Management, LLC
132	<i>Ivy Investment Management Company --&gt; IVY Funds</i>	351	United Church Funds
133	<i>Massachusetts Mutual Life Insurance Co. (Multi-Managed)</i>	352	Value Partners Investments
134	<i>Nuveen Asset Management LLC (Multi-Managed)</i>	353	Virginia Retirement System
135	<i>Glenmede Investment Management LP</i>	354	Walter Scott Global Investment Management
136	<i>Guinness Atkinson Asset Management, Inc.</i>	355	Voya Investment Management (Multi-Managed)
137	<i>SunAmerica Asset Management Corp.</i>	356	Wilmington Trust Investment Management LLC (Multi-Managed)
138	<i>Pzena Investment management</i>	357	Davenport & Company LLC
139	<i>Northern Trust asset management</i>	358	Meritage Portfolio Management, Inc
140	<i>Eurizon Capital</i>	359	Segall Bryant & Hamill
141	<i>Liontrust Asset Management</i>	360	Foyston, Gordon & Payne Inc.
142	<i>Union Investment</i>	361	James Investment Research, Inc.
143	<i>Swisscanto</i>	362	Buckingham Capital Management, Inc.
144	<i>Pictet Asset Management</i>	363	Fred Alger Management, Inc
145	<i>Ostrum Asset managemnet</i>	364	World Asset Management, Inc.
146	<i>Swiss Life Asset Managers</i>	365	Lincluden Investment Management
147	<i>Lyxor Asset Management</i>	366	Pinnacle Associates LTD
148	<i>Man Group</i>	367	Advisors Asset Management, Inc
149	<i>Aperio Group LLC</i>	368	Bramshill Investments, LLC
150	<i>Aristotle Capital Management</i>	369	Eagle Global Advisors
151	<i>Lowe, Brockenbrough &amp; Co., Inc.</i>	370	Freestone Capital Management
152	<i>Rockefeller &amp; Co. Inc.</i>	371	Cardinal Capital Management, L.L.C.
153	<i>Archer Investment Corp.</i>	372	WesBanco Bank, Inc.
154	<i>Desjardins Funds</i>	373	Lenox Wealth Management Inc
155	<i>Grantham, Mayo, Van Otterloo Co. LLC (GMO)</i>	374	Moody National Bank

156	<i>Irish Life Investment Managers Limited</i>	375	Fifth Third Asset Management, Inc.
157	<i>Hennessy Advisors, Inc.</i>	376	Logan Capital Management, Inc.
158	<i>Edinburgh Partners Limited</i>	377	Cushing Asset Management, LP
159	<i>MD Funds Management</i>	378	Granite Investment Advisors, Inc.
160	<i>Erste Asset Management</i>	379	Geode Capital Management
161	<i>Thornburg Investment Management, Inc.</i>	380	North Star Investment Management Corporation
162	<i>Tortoise Capital Advisors LLC</i>	381	O'Shaughnessy Asset Management
163	<i>Mondrian Investment Partners</i>	382	RNC Genter Capital Management LLC
164	<i>Thrivent Investment Management, Inc.</i>	383	Thompson, Siegel & Walmsley
165	<i>LSV Asset Management</i>	384	McKinley Capital Management LLC
166	<i>ClearBridge Investments LLC</i>	385	Mirae Asset Global Investments (USA) LLC
167	<i>State of Wisconsin Investment Board (SWIB)</i>	386	Brown Advisory LLC
168	<i>Janus Henderson Investors (US)</i>	387	DWS Investment Management Americas, Inc.
169	<i>SEI Investments Management Corp. (Multi-Managed)</i>	388	Confluence Investment Management
170	<i>Third Avenue Management LLC (Multi-Managed)</i>	389	Strategic Global Advisors
171	<i>US Global Investors, Inc. (Asset Management)</i>	390	Checchi Capital Fund Advisers LLC
172	<i>Candrium (vote instruction)</i>	391	Fort Washington Investment Advisors, Inc.
173	<i>CI Investments (Multi-Managed)</i>	392	Bourgeon Capital Management LLC
174	<i>Colorado PERA</i>	393	CastleArk
175	<i>Danske Bank</i>	394	Becker Capital Management, Inc.
176	<i>ESSSuper</i>	395	GSA Capital Partners, LLC
177	<i>Wilmington Trust Investment Management LLC</i>	396	Meitav Dash Investments Ltd
178	<i>TD Asset Management</i>	397	Ativo Capital Management
179	<i>Horizon Investments</i>	398	Financial Counselors, Inc.
180	<i>Wellington Management Company</i>	399	National Asset Management
181	<i>Delaware Ladera Management Company (Multi-Managed)</i>	400	Bailard, Inc.

182	<i>Employees Retirement System of Texas</i>	401	Scotiabank
183	<i>Equisuper</i>	402	Quest Capital Management
184	<i>Ontario Teachers' Pension Plan (OTPP)</i>	403	Huntington Asset Services, Inc.
185	<i>Renaissance Investments (Multi-Managed)</i>	404	Epoch Investment Partners
186	<i>Wells Fargo Funds Management LLC</i>	405	Rathbone Brothers Plc
187	<i>Johnson Investment Counsel, Inc.</i>	406	Credit Agricole Assurances
188	<i>Arrowstreet Capital</i>	407	Assetmark, Inc.
189	<i>AP Pension</i>	408	Viking Fund Management, LLC
190	<i>Australia Post Super</i>	409	Rothschild Wealth Management (UK) Limited
191	<i>Colonial First State Global Asset Management</i>	410	AlphaMark Advisors
192	<i>Merian Global Investors (Old Mutual) --&gt; taken over by Jupiter!</i>	411	H. M. Payson
193	<i>Pacific Global Investment Management Co.</i>	412	QCI Asset Management, Inc.
194	<i>Vision Super</i>	413	FinTrust Capital Advisors, LLC
195	<i>First Trust Advisors LP</i>	414	Hanson McClain Strategic Advisors, Inc.
196	<i>British Columbia Investment Management Corporation (BCI)</i>	415	Smith Asset Management Group, L.P.
197	<i>Qantas Superannuation Plan</i>	416	Adirondack Research and Management, Inc.
198	<i>Walter Scott Global Investment management</i>	417	Bessemer Investment Management LLC
199	<i>Eaton Vance Management, Inc.</i>	418	Stonebridge Advisors LLC
200	<i>Transamerica Series Trust</i>	419	First Manhattan Co.
201	<i>Tweedy, Browne Co. LLC</i>	420	Thomas J. Herzfeld Advisors, Inc
202	<i>United Services Automobile Association (USAA)</i>	421	Weston Financial Group, Inc.
203	<i>Northwestern Investment Management Co. LLC</i>	422	Brown Brothers Harriman & Co. (Investment Management)
204	<i>Van Eck Associates Corp.</i>	423	Selective Wealth Management, LLC
205	<i>Ohio National Investments, Inc.</i>		
206	<i>TIAA-CREF Asset Management LLC</i>		
207	<i>BofA (Bank of America) Advisors, LLC</i>		
208	<i>Mackenzie Financial Corporation</i>		
209	<i>Altrinsic Global Advisors, LLC</i>		

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210	<i>Chiron Investment Management, LLC</i>
211	<i>Colorado Fire &amp; Police Pension Association (FPPA)</i>
212	<i>Yorktown Management &amp; Research Company, Inc.</i>
213	<i>EuroPacific Growth Fund</i>
214	<i>The Greater Manchester Pension Fund (GMPF)</i>
215	<i>USCA Asset Management, LLC</i>
216	<i>BVK Personalvorsorge des Kantons Zürich</i>
217	<i>ICON Advisers, Inc.</i>
218	<i>Invesco Canada Ltd.</i>
219	<i>Maryland State Retirement and Pension System</i>

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## Appendix H: Participant characteristics

The table shows 27 respondents and their characteristics, including the selection of 23 suitable participants. The crossed participants were excluded due to a decision-power of 1 or because their organisation did not vote at the resolution.

<i>Casted vote</i>	<i>Decision-making power</i>	<i>Type of organisation</i>	<i>Company based</i>	<i>Number of employees</i>	<i>Gender</i>	<i>Age</i>	<i>Nationality</i>
In favour	3	Asset manager	NL	≈ 50 to 249	Male	50	Dutch
In favour	5	Asset manager	UK	≈ 10 to 49	Female	30	French
In favour	3	Asset manager	NL	≈ > 250	Male	46	Dutch
In favour	4	Asset manager	Sweden	≈ > 250	Male	56	Swedish
In favour	5	Asset manager	Switzerland & UK	≈ > 250	Male	44	British
In favour	5	Asset manager	Norway	≈ 50 to 249	Female	43	Norwegian
In favour	3	Asset manager	UK	≈ 50 to 249	Female	50	British
In favour	5	Pension fund	NL	≈ 50 to 249	Male	30	Dutch
In favour	5	Asset manager	NL	≈ > 250	Female	28	Dutch
In favour	5	Asset manager	NL	≈ > 250	Male	52	Dutch
In favour	4	Pension fund	NL	≈ 50 to 249	Male	50	Dutch
Against	5	Asset manager	USA	≈ 50 to 249	Male	34	USA
Against	5	Asset manager	Canada	≈ 50 to 249	Male	48	Canada
Against	5	Asset manager	Germany	≈ > 250	Male	44	German
Against	5	Asset manager	Switzerland	≈ > 250	Female	39	Spanish
Against	3	Asset manager	USA	≈ 50 to 249	Male	30	USA
Against	5	Pension fund	Australia	≈ 50 to 349	Female	40	Australia
<del>Against</del>	<del>1</del>	<del>Asset manager</del>	<del>USA</del>	<del>≈ &gt; 250</del>	<del>Female</del>	<del>56</del>	<del>USA</del>
Withhold	5	Asset manager	Canada	≈ 50 to 249	Male	48	Canadian
Withhold	4	Asset manager	UK	≈ > 250	Male	50	British
Withhold	5	Asset manager	Italy	≈ > 250	Male	36	French
Withhold	5	Asset manager	Germany	≈ > 250	Female	31	Bulgarian
Withhold	4	Insurance comp.	NL	≈ > 250	Male	23	Dutch
Withhold	4	Asset manager	NL	≈ > 250	Male	48	Dutch
<del>Did not vote</del>	<del>3</del>	<del>Asset manager</del>	<del>Canada</del>	<del>≈ &gt; 250</del>	<del>Male</del>	<del>35</del>	<del>Canadian</del>
<del>Did not vote</del>	<del>3</del>	<del>Asset manager</del>	<del>NL</del>	<del>≈ 1 to 9</del>	<del>Male</del>	<del>27</del>	<del>Dutch</del>
Did not vote	0	Other: N/A	NL	≈ > 250	Male	34	Dutch & Belgium

## Appendix I: Survey questions

The questions beneath were included in the survey.

Q1 What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

Q2 What is your age?

[Open answer]

Q3 What is your nationality?

[Open answer]

Q4 What type of institutional investor is your organisation?

- Asset manager
- Bank
- School
- Endowment fund
- Hedge fund
- Insurance company
- Investment trust
- Mutual fund
- Pension fund
- Sovereign wealth fund
- Other [Open answer]

Q5 In which country is your company based?

[Open answer]

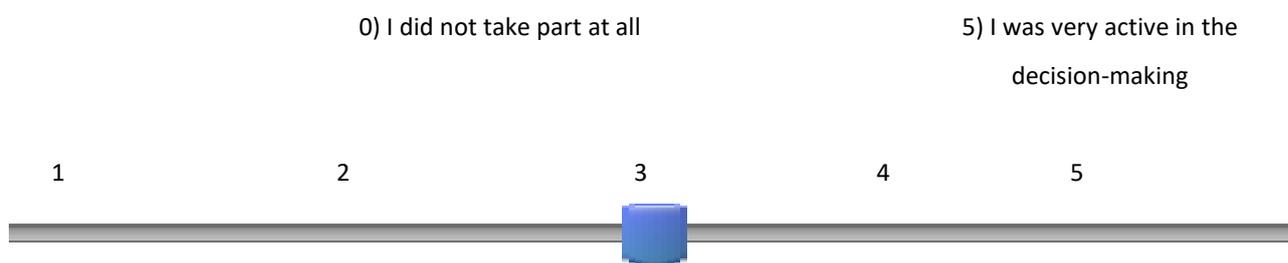
Q6 How large is your organisation?

- Around 1 to 9 employees
- Around 10 to 49 employees
- Around 50 to 249 employees
- Around more than 250 employees
- Not sure

Q7 What did your organisation vote on the shareholder climate target resolution (N. 21) at Royal Dutch Shell in 2020.

- My organization voted in favour
- My organization voted against
- My organization voted withhold
- My organization did not vote at all
- not sure [Open answer]

Q8 To what extent did you take part in the decision-making around the voting behaviour?



Q10 Where there any influences missing in the mapping exercise?

- None
- The following [Open answer]

Q11 Do you have any further comments?

[Open Answer]

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**Appendix J: Group adjacency matrix**

Beneath, the aggregated adjacency matrices are shown per group. A value between 1 to 3 is visualised, indicating a perceived relationship between the two drivers for the specific group mental model. The colours visualise the frequency of perceived relationship: white 1x, blue 2x, green 3x, red 4x, purple 5x and orange 6x. Fav stands for In Favour group, Ag stands for the Against group and AB stands for the Abstain investor group.

Concepts	CL S			Eng; Eng; Eng			Fina Fina Fina			Mor Mor Mor			Rela Rela Rela			Mit Mit Mit			CA1 CA1 CA1			S inf S inf S inf			votivotivoti		
	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB
CL Shell	1			3.0			1.0	3.0														3.0	2.0				
Engag	2	2			2.0		2.0	2.0												1.0							
Finan	3					2.0																		2.0			
Moral	4																2.0	2.0								2.0	
Relation	5				1.0																						
Mit CL	6		3							3.0									1.0	2.5					3.0	2.0	2.0
CA100	7	2		1.7	1.0	3.0										2.0							3.0		2.0	3.0	
S inform	8			2.0																							
voting p	9	3	2	1.5				1.0																			
fossil	10		2				1.0	2.0																			
inv CL	11	3		2.0	2.3	2.0	2.0	2.0								2.0	2.0								2.5	2.5	
det R	12																									1.0	
Shell v	13				1.0																	1.0					
Restr i	14																										
Reput	15										1.0																
R time	16																										
R pres	17				2	2.0	1.0																				
Pr adv	18	2		2																						2.0	

foss 10	foss 10	foss 10	inv 11	inv 11	inv 11	det 12	det 12	det 12	Shel 13	Shel 13	Shel 13	Rest 14	Rest 14	Rest 14	Rep 15	Rep 15	Rep 15	R tir 16	R tir 16	R tir 16	R pr 17	R pr 17	R pr 17	Pr a 18	Pr a 18	Pr a 18	Voting decision		
Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Rest	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB	Fav	Ag	AB
								2.0													3.0				3.0		2.2	2.0	2.5
			2.0		2.0			3.0													2.0	1.0	2.0	3.0		2.5	2.0	2.5	
1.0			2.0	3.0					2.0														1.0			2.0	3.0	2.3	
			2.0											2.0												2.0			
																												1.0	
			3.0		3.0																		2.0	2.0		3.0		2.5	
					1.5																					2.0		3.0	
							1.0	2.0		2.0															2.0	1.8	1.0	3.0	
			2.0		2.0	2.0	3.0		3.0									3.0	1.0					2.0	2.5	2.8	2.5	2.0	
							2.0																		2.0		2.4	2.0	2.0
																										2.0	1.7	2.0	
																											2.5		
			1.7																										2.0
																								1.0	1.0			3.0	
							1.0																	2.0		2.2		1.5	
							3.0		1.0																	2.0	3.0		

## Appendix K: Justification DRs parameters

Justification of the chosen parameters value based on the explanation of Markóczy & Goldberg, 1995

Chosen parameter	Justification
<b>values for DR</b>	
<b><math>\alpha = 1</math></b>	Alpha determines if drivers could influence each other (Yes = 0; No = 1). In this study drivers could not influence themselves.
<b><math>\beta = 3</math></b>	Beta indicates the maximum relationship strength. This research was set on a value of 3 due to the three-level arrow strength (1-2-3).
<b><math>\gamma = 1</math></b>	Gamma highlights if the following two assumptions are correct: 1) Drivers that are not indicated in the map are believed to have no causal relationships, and 2) if an arrow does not exist, there are no causal relationships between the two drivers. Both assumptions were correct, which was translated in a value of 1.
<b><math>\delta = 0</math></b>	Delta should only be included if there is a difference between perceived strength differences. For example, a relationship strength of -1 and -1 is seen as a larger difference than between 1 and 3, although both includes a difference of two steps. As this is not applicable in this study it received a 0.
<b><math>\epsilon = 1</math></b>	Epsilon indicates a difference in polarity between maps. If there is no polarity, it receives the value of 1, which is true in this case.

### Appendix L: Sequence of perceived driver frequency per investor group

Each table represents the sequence of perceived relationship between a specific driver and their voting decision. They are ordered based on sequency and show the top 3 perceived relationship as discussed in the result section.

#### In Favour investors

<i>Drivers</i>	<i>Frequency</i>	<i>Relationship strength</i>
The investment company's climate strategy	0.45	2.4
Adopted climate measures by Shell	0.45	2.2
Resolution as a pressure strategy	0.45	2.2
Reputation to outside world	0.45	1.4
Voting policy	0.36	2.8
New engagement activities	0.36	2.5
Shell's information provision	0.36	1.8
Importance mitigating climate change	0.27	3
Membership of CA100+	0.27	2.3
Following proxy advisors	0.27	2
Financial considerations	0.27	2
Moral considerations	0.18	2
Disagree with the details of the resolution	0.09	2
Maintaining a good relationship with Shell	x	x
Need for fossil fuels	x	x
Shells management voting advice	x	x
Restricted investment horizon	x	x
Resolution are time consuming	x	x

**Against investors**

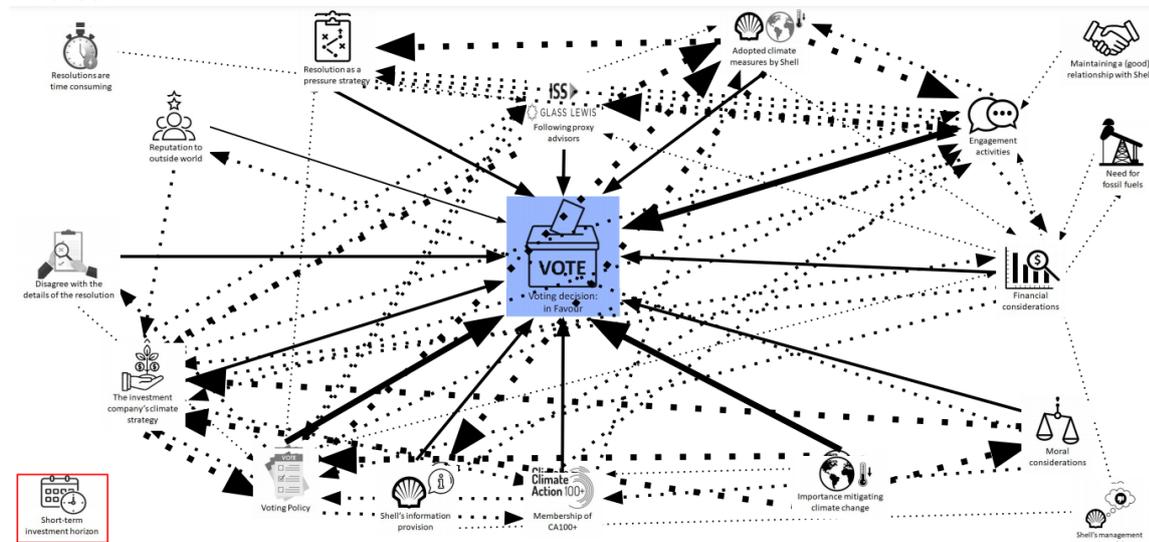
<i>Drivers</i>	<i>Frequency</i>	<i>Relationship strength</i>
Disagree with the details of the resolution	0.5	1.7
Following proxy advisors	0.33	3
Financial considerations	0.33	3
Shells management voting advice	0.33	2.5
Voting policy	0.33	2.5
Adopted climate measures by Shell	0.33	2
New engagement activities	0.17	2
Resolution are time consuming	0.17	3
The investment company's climate strategy	0.17	2
Shell's information provision	0.17	1
Maintaining a good relationship with Shell	x	x
Moral considerations	x	x
Resolution as a pressure strategy	x	x
Membership of CA100+	x	x
Reputation to outside world	x	x
Need for fossil fuels	x	x
Importance mitigating climate change	x	x
Restricted investment horizon	x	x

**Abstain investors**

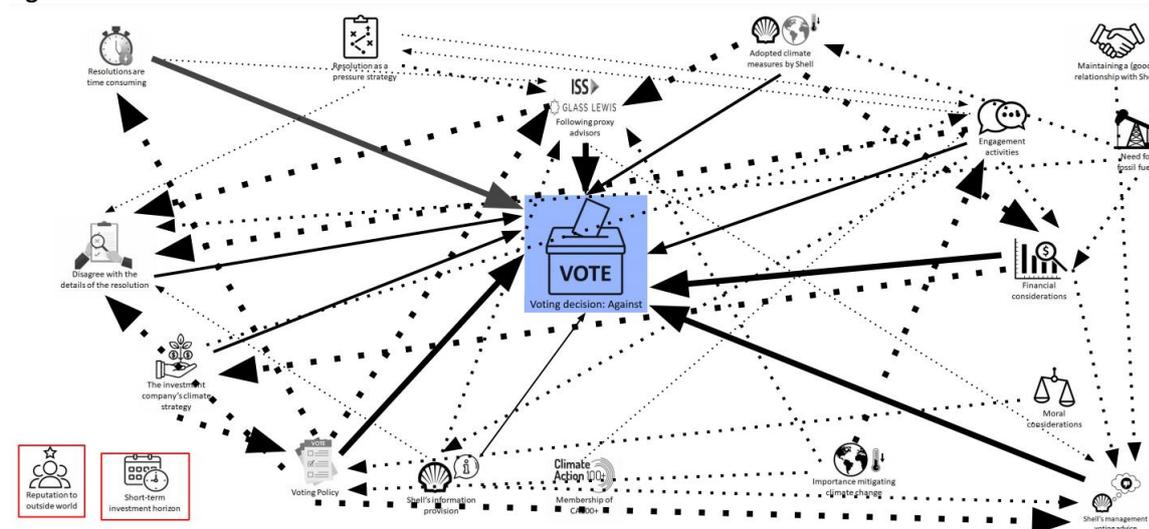
<i>Drivers</i>	<i>Frequency</i>	<i>Relationship strength</i>
Financial considerations	0.5	2.3
Reputation to outside world	0.5	2
Disagree with the details of the resolution	0.5	2
Importance mitigating climate change	0.33	2.5
Adopted climate measures by Shell	0.33	2.5
New engagement activities	0.33	2.5
Voting policy	0.33	2
The investment company's climate strategy	0.33	2
Resolution as a pressure strategy	0.33	1
Shell's information provision	0.17	3
Membership of CA100+	0.17	3
Maintaining a good relationship with Shell	0.17	1
Moral considerations	x	x
Following proxy advisors	x	x
Resolution are time consuming	x	x
Restricted investment horizon	x	x
Shells management voting advice	x	x
Need for fossil fuels	x	x

## Appendix M: Group mental models including all perceived drivers and relationships

### In Favour



### Against



### Abstain

