

# Transparency of Climate-Related Risks and Opportunities: Determinants Influencing the Disclosure in Line with the Task Force on Climate-Related Financial Disclosures



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## ABSTRACT

The number of companies publicly reporting in line with the Task Force on Climate-Related Financial Disclosures (TCFD), a framework introduced in 2015 aiming to improve and increase the reporting regarding climate-related financial information, is still relatively low. In 2019, 42% of corporations with a market capitalization greater than \$10 billion disclosed information in line with the TCFD to some extent (TCFD, 2020c). Previous research has shown that economic, political, and institutional factors impact the disclosure of climate-related information. This paper explores the determinants influencing the level of disclosure in line with the TCFD recommendations, across different sectors with a major focus on publicly listed companies in the global North. The study contributes to a better understanding of the approach needed to increase the number of companies reporting in line with TCFD.

The research was executed in both quantitative and qualitative methods. The empirical research methods are based on a throughout literature review on climate-related risk disclosure, which is based on scientific literature, reports, and websites of official institutions. An online survey was published to be filled in by professionals with insights into environmental, social, and corporate governance-related topics within their company. Also, eight interviews were conducted with sustainability experts from companies, consultants, policy makers, and investors with a background in climate-related risk disclosure. The interviewees were chosen based on their work experience regarding TCFD disclosure. The research aim was to answer the following question: What are substantial factors that influence whether a company is disclosing information in line with the Task Force on Climate-related Financial Disclosures?

Overall, ten determinants have been identified, as they have occurred repeatedly throughout the empirical data collection. They can be divided into factors that derive out of intrinsic and extrinsic motivation. The others emerge from the given characteristics of corporations. Policy and legal reforms, the aim for strategy adaption, the availability of data, and the alignment of other sustainability initiatives with the recommendations of TCFD, were mentioned the most as determinants on the level of disclosure in both the survey and the interviews. Further research might investigate how the identified factors differ in importance across diverse industries.

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The effects of climate change around the world are increasing in frequency and scope. Droughts and subsequent bush fires, heavy rainfalls, and floodings are also no rarities in Europe anymore (EASAC, 2018). Therefore, companies must increasingly incorporate climate-related risks into their overall risk management to oversee and mitigate potential impacts and to achieve climate targets (European Commission, 2019; European Central Bank, 2020).

In the Global Risk report of 2020 published by the World Economic Forum, the potential failure of climate action and extreme weather have been identified as the risks that are most likely to occur and that will have the largest impact in 2020. The unexpected outbreak of COVID-19 at the beginning of 2020 was not taken into account in the risk report, as the risk of a pandemic was last included in the top five global risks in terms of impact in 2008. In a report, recently published by the World Economic Forum on challenges and opportunities in the Post-COVID-19 world it states, that the COVID-19 crisis should sharpen our thinking about climate change, in the sense that “early intervention is vastly more effective and less costly than waiting until the crisis hits” (World Economic Forum, 2020, p. 23). Meanwhile, Larry Fink, the Chairman and Executive Officer of BlackRock, states that “disclosure should be a means to achieving more sustainable and inclusive capitalism” (BlackRock, 2020, para. 23). His text affirms the significance of climate risk disclosure to the company, the belief that sustainability should be a new standard for investing and calls BlackRock’s clients for action.

Stakeholders increasingly tend to evaluate organizations by the triple bottom line, which incorporates economic, ecological, and social impacts (Parris, Dapko, Arnold & Arnold, 2015). More and more institutional investors join organizations such as “Climate Action 100, the Portfolio Decarbonization Project, the Global Investor Coalition on Climate Change, and Principles for Responsible Investment” (p. 1) to address climate-risk related matters together. Many investors believe that the current disclosures on climate risks are not precise enough for investors to evaluate companies properly (Ihan, Krueger, Sautner, & Starks, 2019) and miss an adequate preparation for the physical impacts (Goldstein, Turner, Gladstone & Hole, 2019).

To address this mismatch, the Financial Stability Board established the “Task Force on Climate-related Financial Disclosures” (TCFD) in 2015. The task force developed a set of voluntary recommendations to encourage firms to align their disclosures with the needs of investors and to support them to assess whether climate risks are appropriately priced in the valuation of the company. The initiative recommends companies to distinguish between transition risks and physical climate risks. Transition risks include potential changes in a legal, technological, reputational or market-related context, and physical risks refer to acute and chronic effects on a company due to rising temperatures. The recommendations also refer to opportunities arising from climate change. TCFD asks for climate disclosure in four different thematic areas which represent the core elements of how organizations operate, including Governance, Strategy, Risk Management, and Metrics and Targets. Within these elements, the initiative asks for eleven recommended disclosures (TCFD, 2017).

The problem is that “climate-related risks are not yet properly included in corporate risk management frameworks, systems, and processes” (TCFD, 2020b, 1:02). A large percentage of multinational corporations only discloses very limited information regarding climate risks in their sustainability report (Kouloukoui, da Silva Gomes, et al., 2018). What factors influence whether or not a company is disclosing information about climate-related risks and their impact on the organization? To answer these questions, this paper explores the internal and external factors that influence the disclosure of climate-related risks in line with TCFD.

## REVIEW OF RELATED LITERATURE

### VOLUNTARY ENVIRONMENTAL DISCLOSURE

Voluntary disclosure can include both financial and non-financial information, as well as strategic information and is disclosed by the cooperation’s management beyond obligatory reporting guidelines (Rezaee & Tuo, 2017). The request for sustainability-oriented change of companies is increasing globally (Corporate Reporting Dialogue, 2019c; Rupley, Brown & Marshall, 2017). Environmental sustainability practices have progressively become a competitive strategy for companies to be successful (Lu & Tay, 2016). The environmental, social and governance (ESG) factors may traditionally not be a part of the corporations’ financial analysis but might have

a financial relevance (Kell, 2018). Kell (2018) mentions, among others, the firm’s response to climate change, the supply chain management, the corporate culture and the respective impact on the company’s innovation.

**TRANSPARENCY**

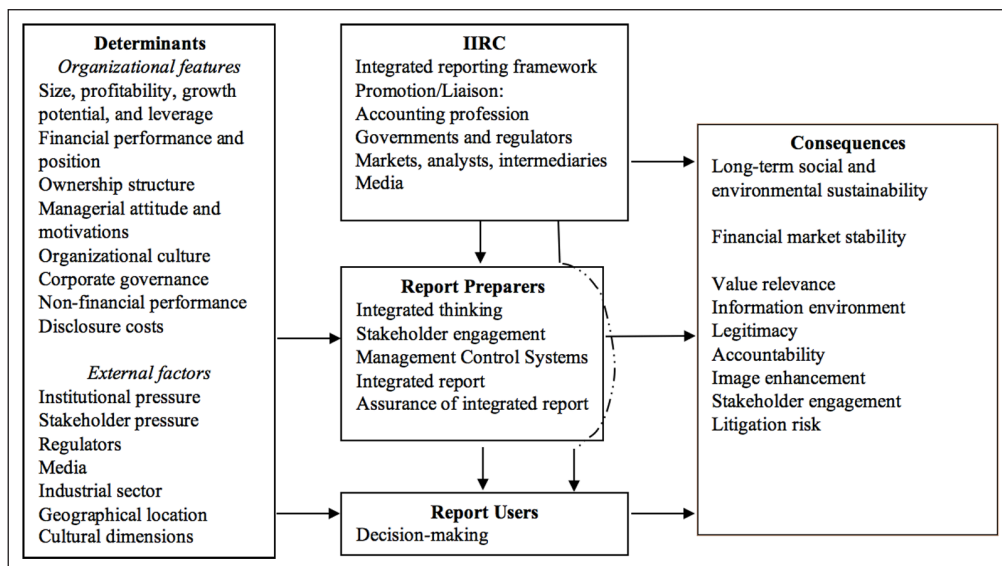
The fact that investors tend to be less likely to invest in companies that do not implement recommendations such as TCFD, urges companies to be transparent and to disclose more information (Eccles & Krzus, 2018).

According to Granados, Gupta & Kauffmann, (2010) organizational transparency has numerous benefits. Firstly, it advantages the employees, in the sense that the sharing of information within an organization and across departments and teams leads to more engaged employees with better performances. Workers gain a better understanding of their role within the company, they trust the management board more, and they can make better decisions in line with the firm’s strategic goals. Secondly, transparency benefits customer and partner relationships, in so far as external stakeholders then perceive the company as being more credible. Additionally, the Financial Stability Board (2017) highlights that the implementation of the recommendations are likely to improve the engagement of the board and senior management on climate-related issues and enhance the understanding of future financial impacts on the company. Thirdly, transparency improves the understanding of the competition throughout the whole organization, but it also facilitates greater collaboration and cooperation with stakeholders (Granados, Gupta & Kauffmann, 2010). Transparency can also be achieved through several other sustainability rankings, including the Carbon Disclosure Project (CDP), Dow Jones Sustainability Index (DJSI), or the Science Based Targets initiative etc.

Next to general transparency, there is an increased demand for comparability and accountability of reporting systems, for which Integrated Reporting is often mentioned as an appropriate method (Rupley, Brown & Marshall, 2017) to enhance compliance. Integrated reporting (IR) aims to communicate a company’s performance, strategy, governance, and prospects based on a “multiple capitals” approach that outlines an organization’s value creation process over the short, medium, and long term (Simnett & Huggins, 2015, p. 1). TCFD and the IR Framework “speak the same language” (van der Lugt, 2017, para. 1), as both frameworks emphasize integrated thinking, interconnect different types of capital, aim to create value in the long term and increase transparency.

**DETERMINANTS INFLUENCING THE LEVEL OF DISCLOSURE ON CLIMATE-RELATED INFORMATION**

As the aim of this paper is to provide a better understanding of what hinders or motivates companies to report on TCFD it is crucial to identify which factors influence the disclosure of information in general. The conceptual framework developed by De Villiers, Hsiao, and Maroun (2017) examines the disclosure of an integrated report, which in many ways resembles the TCFD framework as described in the previous paragraph (see *Figure 1*).



**Figure 1** Conceptual model of influences around Integrated Reporting.  
 Source: De Villiers, Hsiao & Maroun (2017, p. 4).

## ORGANIZATIONAL FEATURES

Additionally, to the framework by De Villiers, Hsia & Maroun, (2017), Kouloukoui, Sant'Anna, et al. (2018) mention the type of industry and the country of origin as factors that influence climate disclosure specifically, through respective laws and rules. However, Giannarakis, Andronikidis and Sariannidis (2019) conclude that the sector dimension does not play a significant role in the level of disclosure. They only highlight that companies in the consumer non-cyclical sector are more likely to report environmental improvement.

Moreover, the activity sector, the continent, and the efficiency of the board of directors are decisive. Asian companies are disclosing most information on climate risks, which may relate to the vulnerability regarding climate change consequences of several Asian countries. The size of the country of origin and the development status of a country do not necessarily influence the level of climate-related risk disclosure (Kouloukoui, Sant'Anna et al., 2018).

When it comes to the board of directors, companies with a larger share of women tend to be more committed and disclose more information (Kouloukoui, Sant'Anna et al., 2018; Pucheta-Martínez and Gallego-Álvarez, 2020).

Pucheta-Martínez and Gallego-Álvarez (2020) highlight, that the variety of cultures across nations has an effect on the disclosure of environmental information. They specifically refer to individualist, masculine and indulgent cultures as being less likely to disclose information. Lastly, the larger a company, the more likely it is to disclose environmental information, which is mainly due to “stakeholder scrutiny, and political and regulatory pressures” (Giannarakis, Andronikidis & Sariannidis, 2019, p. 100).

## EXTERNAL FACTORS

Overall, various stakeholders wish for a stronger connection between ESG and financial information (The Corporate Reporting Dialogue, 2019a). Ihan, Krueger, Sautner, & Starks, (2019) found that 59% of investors participating in their research plan to engage companies on reporting in line with TCFD. More than half of the respondents believe that “climate risk reporting is as important as traditional financial reporting” (p. 4). Companies that make an effort to identify climate risks will be better at explaining those and their response to the investment community. When firms reveal their preparedness on the impact of climate change on their operations, the uncertainty is partially alleviated, and the value of their stocks and bonds are likely to rise (Hahn, Reimsbach & Schiemann, 2015).

Another crucial factor highlighted by Eccles and Krzus, (2018) is that climate-related risk disclosure will likely further be regulated in the future. Those who come late will experience tremendous disadvantages through time pressure and high costs. The author proposes an increase of product standards and climate adaption incentives as effective measurements for improvement. Setzer and Byrnes (2019) found that climate change litigation continues to expand. Moreover, they have recognized an increase of plaintiffs against “investment funds and companies for failing to incorporate climate risk into their decision-making, and for failing to disclose climate risk to their beneficiaries” (p. 1). The authors claim that more cases of this nature are expected in the foreseeable future, as investors and insurers pay increasing attention to the gap between scientific knowledge of climate change and adaptation endeavors.

Finally, TCFD recommendations are increasingly integrated into other sustainability ratings and initiatives and will therefore likely be required by even more investors and benchmarks in the foreseeable future. In 2020, the non-profit organization Carbon Disclosure Project (CDP), which aims to engage companies and cities to disclose their environmental impact, has committed to align its questionnaire with the TCFD recommendations. Since then, CDP has put a greater emphasis on board oversight, climate risk management, and the “implementation of forward-looking scenario analysis to determine the resilience of a company’s strategy to climate risks” (CDP, 2020a, p. 5). This has an enormous impact on the level of implementation of the TCFD recommendations as more than 500 investors request companies to disclose through CDP and more than 8400 companies report sustainability efforts through CDP (CDP, 2020b). SAM, an annual assessment of the sustainability performance of companies, is also involved in a collaborative initiative with TCFD (SAM, 2020).

The initiative ‘Corporate Reporting Dialogue’ mapped various frameworks and standards with the aim to “ensure coherence, consistency and comparability of disclosures” (Corporate Reporting Dialogue, 2019b, p. 2). The results show that there are significant alignments between the different initiatives, including CDP, GRI, SASB for the TCFD’s illustrative example metrics. In the report, they further highlight that “80% of the TCFD’s metrics are fully or reasonably covered by the indicators of GRI, SASB, and CDP” (p. 2).

## **BARRIERS TO DISCLOSE CLIMATE-RELATED INFORMATION**

Eccles and Krzus, (2018) investigated why the number of companies reporting on climate risks in their official filings is still relatively small. According to their findings, one reason might be a litigation risk, implying that some lawyers have expressed concerns that a scenario analysis could be interpreted as a forecast by investors, and if proved inaccurate, could lead to a prosecution. This is a problem, as scenarios are not intended to represent a full description of the future. Rather than forecasts, predictions or sensitivity analyses, scenario analyses are “hypothetical constructs” (TCFD, 2017, p. 25).

According to Burton (2010), another challenge is that possible climate change effects are extremely difficult to quantify. The availability and requested granularity of the data poses a challenge for many organizations. Assessing various “energy and technology pathways or carbon constraints in different jurisdictions and geographic locations” (The Financial Stability Board, 2017, p. 30), can hinder companies to take on the challenge. Companies might struggle to price and hedge climate risks because of “their systematic nature, a lack of disclosure by portfolio firms, and challenges in finding suitable hedging instruments” (Krueger, Sautner & Starks, 2020, p. 1069).

Corporations might also just underestimate or misunderstand the impacts climate change can have on their business operations (Goldstein, Turner, Gladstone & Hole, 2019). Further, companies often miss necessary frameworks to explain how climate risk management differs from usual risk management. Another reason for underplaying climate risk disclosure might be that physical climate change risks put some companies at a competitive disadvantage, which may stimulate companies to hide these risks from investors, and any interested party. Lastly, the authors highlight that responsible people within the company may “face psychological barriers in understanding extreme risks and weighting the need for radical change” (p. 23).

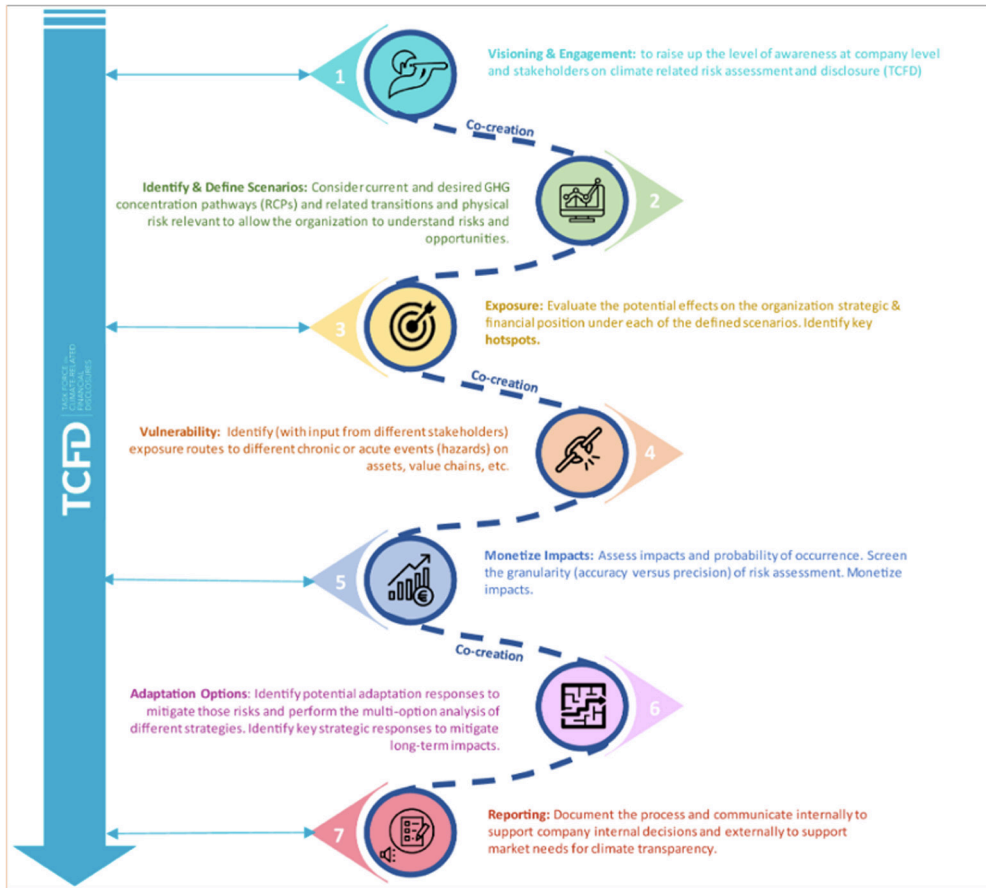
According to Hallegatte, Lecoqand de Perthuis, (2011) the uncertainty of climate risks can be divided into three components, including general uncertainty about the global scenario of climate change, and their impact at the local level, as well as ambiguity of how ecosystems and society as a whole will react to climate change. Adaptation strategy design should incorporate this vagueness from the earliest stages (Hallegatte, Lecoqand de Perthuis, 2011). Burton (2010) also sees uncertainty as one of the greatest concerns as companies have to determine which scientific forecasts are considered to be the most credible and which of these conflicting scientific options are most connected to their management beliefs and corporate culture.

## **APPROACHING THE TCFD RECOMMENDATIONS**

Sanderson et al. (2019) criticize the lack of general guidance on assessing climate risks, estimating costs, and the transitional and systemic risk assessment regarding a company’s value chain. Therefore, they developed a plan about how to best approach a company’s specific climate risk assessment. This blueprint aims to provide companies of all sectors with a guide to “internalize the environmental externalities” (*Figure 2*).

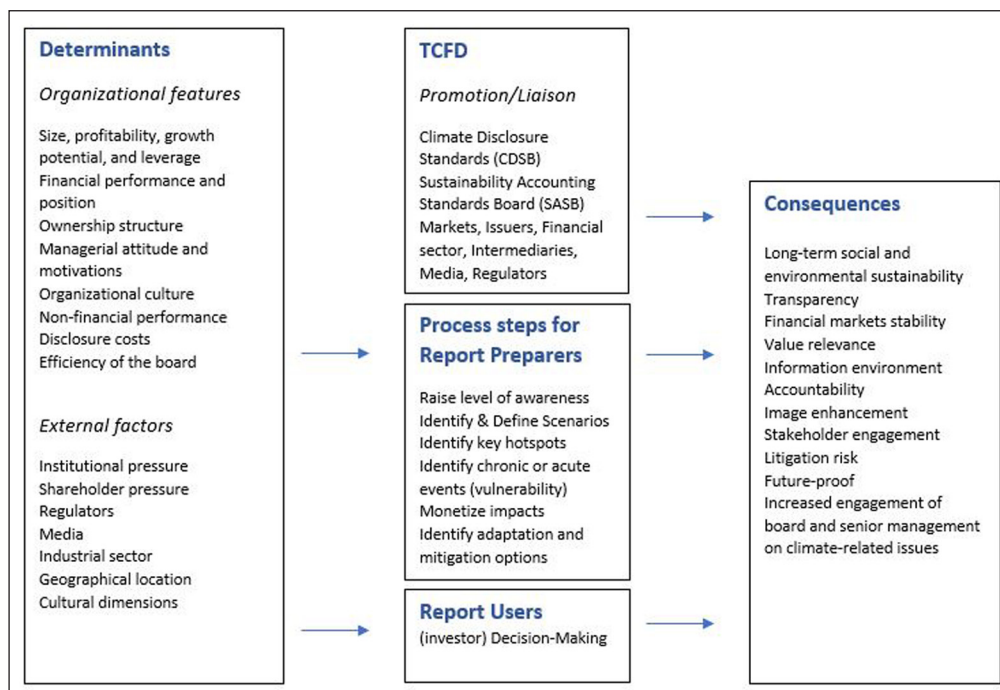
The blueprint highlights that potential adaption and mitigation responses must be identified to manage long term impacts actively. It is crucial to not only identify historical trends within a business, but to also look for quantitative risk analysis models, and to implement a “stress testing and scenario analysis of the financial sector” (Burton, 2010, p. 1302). The author concludes, that it is crucial for the management to first identify risks that are reasonably likely to occur and to find out what impact the occurrence of a risk would have on the company’s business situation, because “only then the focus turns to what those disclosures will mean for the company” (p. 1302).

As a result of the findings presented in the literature review, a new framework has been developed especially designed as a research basis for this paper. The presented framework is based on the “Conceptual model on influences around Integrated Reporting” by De Villiers,



**Figure 2** Initial climate risk assessment iterative process.  
 Source: Sanderson, Irato, Cerezo, Duel, Faria, & Torres (2019, p. 3).

Hsiao, & Maroun, (2017) and the blueprint on “Initial climate risk assessment iterative process” by Sanderson et al., (2019). The most relevant information was merged and completed with the insights gained in the literature review (Figure 3).



**Figure 3** Conceptual Model on TCFD Reporting: Achenbach, M. (2020).

## DESIGN AND METHODS

For this cross-sectional, exploratory research a mixed approach of both qualitative and quantitative methods has been used, which facilitated an enhanced understanding compared to a single method approach. The first method involved the collection of quantitative data through an online questionnaire, whereas the aim of the second method, in the form of interviews, was used to illustrate and extend the quantitative findings.

The data collection started in February 2020 with an intensive literature review. In March 2020, the survey,<sup>1</sup> which was based on the literature review, was published online. The aim of the survey was to gain quantitative insights with a focus on the identified internal determinants. The questionnaire was administered using the SurveyMonkey online survey generator and publicly shared from the account of the researcher, as well as through the official LinkedIn page of the internship providing company. Furthermore, the link to the survey was shared by some of the consultants of the internship company and via the external newsletter of the internship company and was finally closed by the end of April.

The conduction of the interviews<sup>2</sup> started while the survey was still open. However, at that time, trends were already detectable which is why it was already possible to dive deeper into the results of the survey. LinkedIn served as a platform to get in contact with experts on climate-related risk disclosure. The method of sampling is described in chapter 3.2. The outline of the interview was sent to the respective interviewee beforehand to avoid any misunderstandings in the addressed topics and potential mismatches. As soon as the interviewee confirmed the required knowledge on the questions, a day and time was agreed upon. However, the questions in the email only served as a general guideline, as all interviews followed a semi-structured approach and lasted up to one hour. This approach was chosen as the aim was to detect trends from the interviews, while still allowing for flexibility to gain potential new insights. An overview of the interviewees is included in [Table 1](#). To ensure anonymity, the names of the organizations are not mentioned. Every survey respondent was explicitly informed beforehand that their answers will stay anonymous. The interviews took place from the 7th of April until the 14th of May 2020.

## METHODS OF SAMPLING

The online survey was executed with a non-probability design. To set a research sampling frame to increase the chance of a representative sample, the post description of the survey on LinkedIn highlighted that people filling in the questionnaire should work for a publicly listed company on sustainability related issues. However, it is impossible to state how many of the survey participants truly fulfilled these criteria. To be able to categorize the answers, the survey included a demographic section including questions regarding the size of the company in terms of employees and the participants' job description.

For the interviews non-probability sampling in the form of a purposive sampling was used. Prospective interviewees were identified by the researcher based on their job description on LinkedIn and contacted when they referred to TCFD-related topics in their profile summary. Interviewees for example mentioned "Sustainability Services – TCFD & climate change" or "20 years of professional work experience in the areas of Strategy, Investor Relations, Sustainability, Reporting, Project Management, (..)"

This enabled the researcher to select a sample based on personal preferences and to gain insights into the topic from a broad range of perspectives from people with respective experiences. In a few cases the researcher also got in contact with respective interviewees via snowball sampling.

## RESPONDENT CHARACTERISTICS

In total 41 company representatives filled in the survey, of which almost half work for corporations with more than 10.000 employees worldwide and 80% for publicly listed companies. 53% of the operations of the participating companies take place in a European country. In contrast, one-quarter of the respondents operates in Asian countries. Twenty-five percent of the respondents operate in America, Africa, and Australia. The participants represent diverse industries and range from the pharmaceutical-, over financial-related industries to the automotive and energy sectors. Only three of the participating companies, who know TCFD, but are not yet disclosing in line with it, are not planning to implement TCFD within the next two years. All other respondents claim to plan the implementation and disclosure of climate-related risk information in line with TCFD until 2022. Only two of the participants who have never heard of the recommendations

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1 For detailed information regarding the survey (list of questions etc.), please contact the author.

2 For detailed information regarding the interview guide/transcript of the interviews please contact the author.

before, measure environmental risks by participating in the CDP rating. In other words: 36,5% of the participants do not report on climate risks at all. Most companies indicate that they do not disclose in line with TCFD yet, because options for necessary frameworks are missing, there is no feeling of urgency, or best practice examples are missing. When studying those companies that have not yet disclosed any information it is noticeable that no specific characteristics are striking, as these companies come from all sorts of industries, have different headcounts, and operate in various countries.

To gain insights from a representative sample, the interviewees represented various stakeholder groups from different continents. In total eight interviews were conducted. **Table 1** provides an overview of the functions and origin of all interviewees.

SECTOR	FUNCTION	COUNTRY
Bank	Investment Analyst	Netherlands
Consultancy	Consultant	USA
Insurance	Sustainability Manager	Switzerland
Political institution	Head of office of German sustainability code at council for sustainable development	Germany
Electricity	Sustainability Manager	South Africa
Investment Management	ESG Advisor	Netherlands
Oil & Gas	Sustainability Manager	Austria
Management Consultancy	Consultant	Germany

**Table 1** Interviewees.

## DATA ANALYSIS

The research started with an extensive literature review to develop a theoretical framework which is presented in **Figure 3**. This sequence was carried out as this research is based on an inductive approach. This procedure enabled the researcher to develop distinct links between the objective of this research and the raw data.

In the first stage of the data analysis, all survey responses were converted to Excel and all interview transcripts were read through carefully. Secondly, Excel was used for simple descriptive statistics to calculate the standard deviation, proportional trends, and nonparametric tests to compare two groups. After all raw data was collected, the interviews were transcribed. Since half of the interviews were conducted in German, relevant parts of the transcripts were translated. The conversation was transcribed to get familiar with the obtained data. The transcript was then sent to the interviewee to make sure that they truly agree with what they said in retrospect. Furthermore, this enabled the clarification of some questions which came up while reading through the interview again. Afterwards, all relevant quotes of the interview were color-coded per a respective coding guide.<sup>3</sup> Lastly, the results in Excel were converted into illustrations, and in each category of the interviews, sub-topics were created. This last step helped to gain a better overview of the entire data. Finally, a complete and clearly arranged text with all relevant findings was composed.

## SCOPE AND LIMITATION

This study mainly concentrates on publicly listed companies as they are in close contact with investors, lenders, and insurance underwriters, which are the main target audience of TCFD (European Commission, 2019). Furthermore, this research focuses mainly on the global North, because companies in respective countries were easiest to reach out to as a student from the Netherlands. Various stakeholders were interviewed to provide an analysis from different view points, however future research might focus on a specific target group to come to a more definite research outcome for a specific sector for example.

The research has several limitations which should be considered as they might negatively influence the generalizability of this study for the research population. First, this research is cross-sectional, indicating that the results only represent the identified factors of the whole study population at a certain point in time. Furthermore, no distinction was made between sectors,

3 For the detailed coding guide please contact the author.



countries, or the size of the company, resulting in a large population. This made it challenging to get access to a representative sample and a respective sampling frame. Moreover, it was challenging to attract the appropriate person to fill in the survey, as specific knowledge was required to be able to fill in the survey accordingly. Therefore, there is no assurance that all data is correct, due to unknowledge and falseness. The sampling method used for the interviews also has some limitations, in the sense that it has a high risk of sampling bias and a limited opportunity to derive at valid statistical inferences about the entire population. Lastly, the sample is relatively small, due to the time constrain of only four months, a limited budget and a low response rate of people contacted.

## RESULTS AND DISCUSSION

Throughout the research, ten determinants have been identified, influencing whether a company is reporting in line with the TCFD framework. These factors have been identified through answering the sub-questions addressing the consequences of climate-related disclosure, the procedure of companies gathering data and the relationship between organizational features and the transparency of climate risks. Lastly, the influence of external stakeholders on the level of transparency was covered. The determined factors can be categorized as intrinsic and extrinsic motivational factor and corporate characteristics influencing the probability of a disclosure of climate-related financial data disclosure in line with TCFD.

### INTRINSIC FACTORS

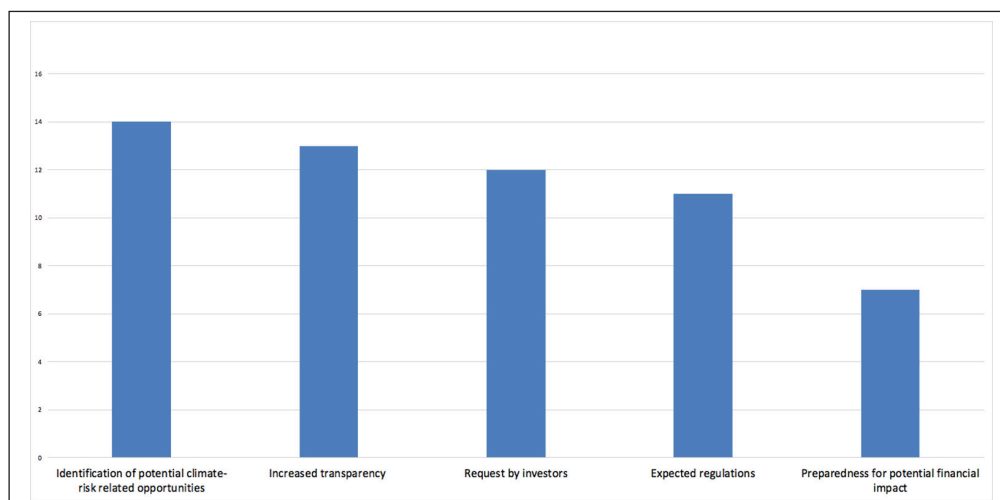
The identified intrinsic motivational factors for a disclosure in line with TCFD include the identification of potential opportunities, the engagement with stakeholders and the desire for strategy adaption.

#### IDENTIFICATION OF POTENTIAL OPPORTUNITIES

One of the survey questions referring to companies already reporting in line with TCFD addressed why companies decided to disclose information in line with the framework in the first place. **Figure 4** shows that more than 90% of the participating companies in the survey have chosen the identification of potential climate-related opportunities. The aim to identify potential opportunities arising from climate change has also been researched by Gasbarro, Iraldo, & Daddi, (2017). The authors conclude that there are two sorts of opportunity drivers.

The first group of drivers comes in the form of an increase in capital availability and stock prices and wider social benefits. The second group of opportunity drivers consists of market opportunities in the form of new products due to the change in consumer behavior and new product standards. The identification of potential opportunities has also been one of the main drivers for the sustainability manager of a Swiss insurance company. She stated:

“Above all, we hope to identify opportunities and to possibly gain a competitive advantage.”



**Figure 4** Why do companies disclose information in line with TCF – Survey Results.

Interviewees also mentioned the fact that a high rank in the sustainability benchmarks leads to a much wider range of capital as an opportunity driver. For another interviewee, the foremost opportunity has been a Green Bond Fund which can contribute to the way their clients are investing, with specific climate-risks in mind. According to Krueger, Sautner & Starks (2020), investors mainly identify opportunities in the area of “renewable energy, water, management, electric vehicles, and technology” (p. 1104).

## STAKEHOLDER ENGAGEMENT AND ENGAGEMENT OF BOARD AND SENIOR MANAGEMENT ON CLIMATE-RELATED ISSUES, AND THE DESIRE FOR STRATEGIC ADAPTION

Figure 5 shows the result of the survey regarding the expected effects on the company when disclosing information in line with TCFD. Stakeholder engagement has been chosen the most amongst increased engagement of board and senior management on climate-related issues, and the desire to adapt the company’s strategy.

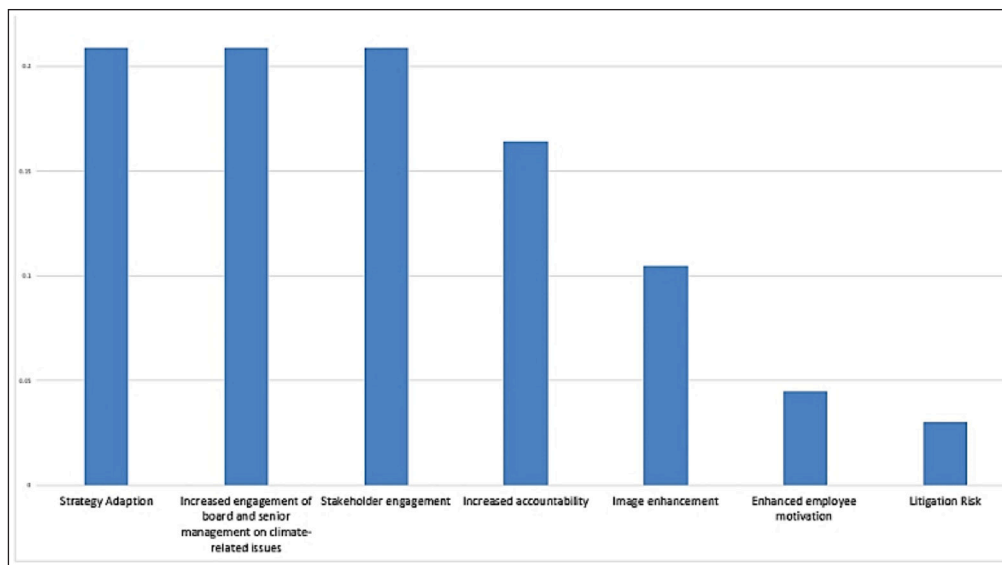


Figure 5 Expected ripple effects when disclosing information in line with TCFD – Survey Results.

Two interviewees with insights from an external point of view on the disclosure of TCFD mentioned the importance of the courage to face the gap. By this, they referred to the fact that many companies still believe that several steps have to be followed before one can report accordingly, which discourages companies from reporting anything at all. Instead, stakeholders increasingly understand that it is no problem not to achieve sustainability goals as long as the company is explaining why. Almost all interviewees agreed that stakeholders will not believe those companies anymore who only state how well they are doing. On the website of the World Business Council for Sustainable Development (2020) one company reports on its own experience and states that they believe that the TCFD recommendations serve as a crucial framework for guaranteeing that their capital market stakeholders fully understand the climate-related risks and opportunities they are facing. Another company representative adds that they have incorporated the TCFD framework in their disclosure regime to offer stakeholders information on the resilience building actions to climate-related risks and opportunities.

The engagement of the board and senior management through the implementation of TCFD has also been addressed by some interviewees. One of the interviewed sustainability managers stated that as soon as a rating reaches a certain level of popularity it can help to convince the board of directors to implement it within the company. The interviewee believes that TCFD has already reached this level. As soon as companies start to disclose climate-related information in their annual reports, the management likely wants to show progress on these matters. From then onwards, the goal is to monitor and track developments to set targets. One interviewee highlighted that if these trends develop negatively, a company will get all sorts of stakeholder requests. Then, at the latest, a corporation must actively engage with stakeholders to avoid potential negative effects.

Figure 5 shows that the desire to adapt one’s strategy has also scored very high as an expected ripple effect of the TCFD recommendations. An interviewee, working as a management consultant,

highlighted that in order to assess how resilient a company is, it is crucial to not only retrospectively comprehend its carbon footprint but to get an understanding of its strategic plans. Furthermore, her insights as a consultant have shown that all other aspects of TCFD have an influence on the strategy. If a company neither has the right metrics nor identified relevant goals, then it will have difficulties to set up a reasonable and key figure-driven strategy. Overall, sustainability reporting is a journey, and the interviews have shown that the longer a company is reporting in line with various benchmarks, the more mature the entire reporting process.

For one of the interviewed company representatives of a large energy- and oil company in Austria, TCFD was a part of refining and expanding the risk management process. The identification of key hotspots in different scenarios was already part of the risk management before, but it was extended to include certain climate risks and groups. The company undertook a TCFD benchmarking to see what they are already good at, what is still missing and where they can adjust the strategy accordingly. This enables a company to understand potential internal gaps, which processes still need to be sharpened, and what Key Performance Indicators (KPI's) should be added.

Figure 6 presents the result of the rank in the survey, regarding the cooperation's efforts of mitigating potential climate-related risks, the use of metrics and targets to assess and manage arising risks and opportunities, the identification efforts and the overall governance around climate-related risks and opportunities. The results have shown that most participants chose "3" in all categories, meaning that they would not rank the company's efforts particularly high nor significantly low (see Figure 6). In total, the greatest effort is being made in terms of identifying the impact of climate change on the organization's business, strategy, and financial planning. In any case, the results show that there is still much room for improvement in terms of the strategic adaptation to climate-related risks within the participating companies.

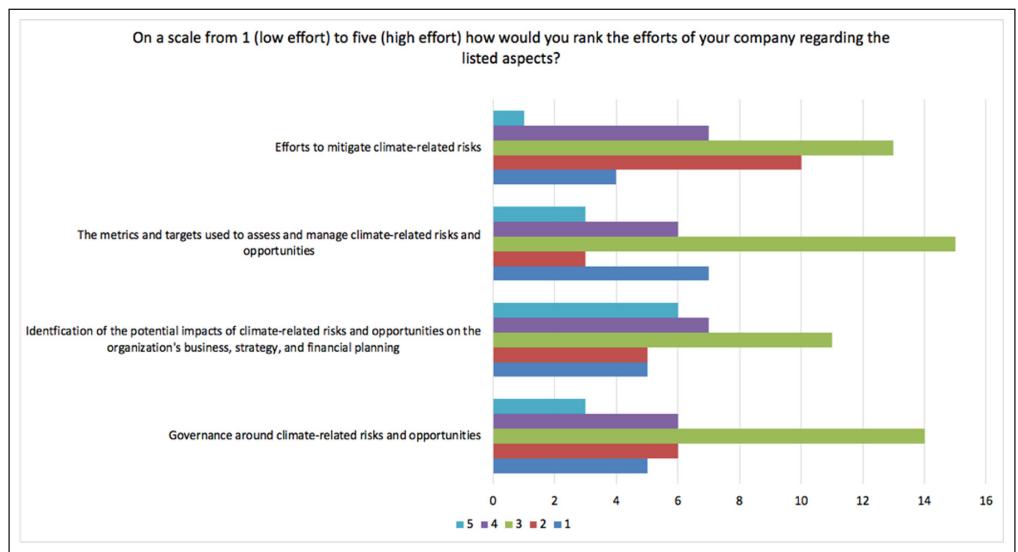


Figure 6 Rank of efforts regarding climate-related risk disclosure, management, and mitigation within the company – Survey Results.

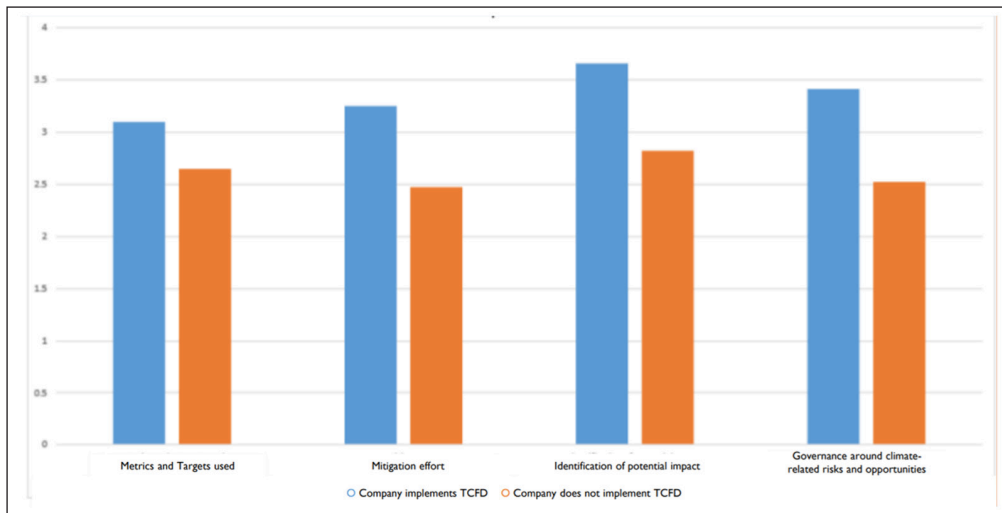
The calculation of a Mann-Whitney U test has shown that the survey respondents who do not yet implement TCFD, generally rank their efforts in all listed categories lower (see Figure 7). More research is needed to find out the cause and effect relationship. The question is whether the implementation of TCFD has increased the effort and the potential strategy adaption in retrospect, or whether the company decided to adapt its strategy at first, and therefore chose to align its reporting to the TCFD recommendations.

## CORPORATE CHARACTERISTICS

The corporate characteristics which have been identified in this study as having an impact on the level of TCFD disclosure include the complexity and length of the supply chain and available financial and human resources.

### COMPLEXITY AND LENGTH OF THE SUPPLY CHAIN

Interviewees mentioned the location and the supply chain as characteristics that influence whether a company is disclosing climate-related risks. In the interviews, it appeared that



**Figure 7** Difference in means, based on the results of a Mann-Whitney U Test – Survey Results.

climate-related risks are not necessarily more relevant for specific industries but rather for those with a long supply chain. Fifty percent of the interviewees mentioned that any sector with a large or complex supply chain must specifically consider climate-related risks.

One interviewee highlighted:

“Any sector with a large, or complex supply chain, will be affected by climate change.”

Over time, global supply chains have become more complex and they increasingly depend on “specialized inputs produced in specific locations with reduced inventories” (Wei & Chase, 2018, p. 18). These are the reasons why supply chains are increasingly vulnerable to climate-related risks. Moreover, these risks increasingly impact the “cost, quality, timeliness, and certainty of supply chain production” (Wei & Chase, 2018, p. 18). As floods, droughts, and similar natural risks resulting from climate change continue to increase, the occurrence of delays, shortages, disruptions, and contaminations in global supply chains will become routine. According to Ghadge, Wurtmann, and Seuring (2020) climate change will likely affect the operations of all businesses, which is why supply chain managers need to obtain a comprehensive understanding of mitigation and adaptation strategies to this evolving threat. To be adequately prepared for potential financial setbacks, the identification, management, and mitigation of climate-related risks is of great value for companies with complex, global supply chains.

## RESOURCES WITHIN THE COMPANY

TCFD is designed for publicly listed companies as they are more reliant on investors’ financial support. The findings of this study have highlighted the importance of a certain degree of available resources as a company to be able to implement TCFD. For one of the interviewees, the largest concern was the constrain in terms of resources and capacity limitation. He stated:

“The implementation is quite a lot of work, and it takes a few hours and some people to dig into the details of the methodology.”

Another interviewee concluded that TCFD is mainly being used by large companies, as investors require them to be transparent. These companies then also have the corresponding resources, which is why the lack of money and time seldomly pose a severe challenge in the implementation of TCFD at this moment.

## EXTRINSIC FACTORS

Extrinsic factors influencing the level of TCFD disclosure include the availability and accessibility of data, investment decisions policy and legal reforms and the risk of litigation.

## DATA AVAILABILITY

All interviewees agreed that the gathering of sufficient and relevant data still poses a significant challenge in the implementation of TCFD. This difficulty mainly occurs in terms of the scenario analysis. Especially from an investor’s point of view the quantification of climate-related risks

is challenging. One of the interviewees, working as an Investment analyst stated that they rely on audited data provided by the companies themselves but often this data is not available or incomplete. The Investor Relations Manager of a large automobile company mentioned to often get requests from investors concerning more detailed financial-related information related to the scenario analysis.

The Head of office of the German Sustainability Code at Council for Sustainable Development, mentioned that three years after the entry into force of the German Directive Transposition Act, which affects companies to disclose information on specific sustainability topics, many still do not have relevant data and do not know how to collect it. She remarked:

“Good quality and comparability of data are essential. Furthermore, data needs to be traceable, to be able to understand to what extent objectives have been achieved.”

The CEO of a company in the US that operates a change provoking algorithm, which measures and manages consumption and promotes efficiency supported this point of view and added that many people do not think about data in terms of climate solutions. He emphasized that data is the way to go for achieving a giant reduction of greenhouse gas emissions. Some companies are gathering the relevant data themselves, but many do not have the necessary capacities and therefore rely on data providers. While looking for a suitable data provider for executing a scenario analysis, the sustainability manager from a Swiss Insurance Company struggled to find one related to the Sustainability Taxonomy. The ESG advisor of a Dutch insurance company adds that their largest constraint was the gathering of data, as they still base much information on assumptions.

All these examples correspond with several other studies. It confirms the statement of Burton (2010), being that one of the main challenges of climate-related disclosure is that potential climate change effects are difficult to quantify. Von Gagern, Erhard, Götz, & Krebs (2019) have addressed the question of how corporations can make use of a scenario analysis to evaluate and identify possible future risks and opportunities. They conclude that the range of data output is insufficient and that more companies need to share their experiences and approaches to scenario analysis to increase the number of corporations using climate-related scenario analysis. Missing frameworks and a lack of best-practice examples were likewise most chosen as a reason not to report any climate-related risk by respective survey participants.

The interviewees also referred to several approaches as potential solutions. The German sustainability code is currently working on an open, account-free accessible database solution where financial market participants can obtain data from the sustainability code and other ESG data providers. Another approach to solving the problem, referred to as PCAF (Partnership on Carbon Accounting for Financials), is an initiative that aims to set a standardized methodology for sustainability metrics. The TCFD website offers numerous examples, but what seems to be missing is awareness amongst companies.

Finally, the findings of this research align with the ones of the Banque de France (2019), stating that tools and methodologies for scenario analysis are underdeveloped, the availability and quality of data are limited, and “further work is needed to translate the science into useful decision making risk assessment information” (p. 10).

## **INVESTMENT DECISIONS**

Interviewed investors highlighted that they increasingly must ask themselves which sectors can master the transition to a green economy and which asset allocations are needed to be prepared for this transition.

For the ESG advisor of the Dutch Investment company, it is crucial that the companies in sectors in which climate change is expected to materialize in the short-term provide a clear oversight of climate-related risks and opportunities within the board. This refers to the governance aspect of the TCFD framework. They would like to see that companies take specific scenarios in account and that the effect of risks has been measured.

An interviewed investment analyst from a Dutch bank highlighted that there are still large differences in terms of sustainability awareness. He claimed that many asset managers just started to focus on sustainability within the last two or three years. A discount rate based on the weighted average cost of capital of 6% could be altered to 7 or 7.5% based on climate-related

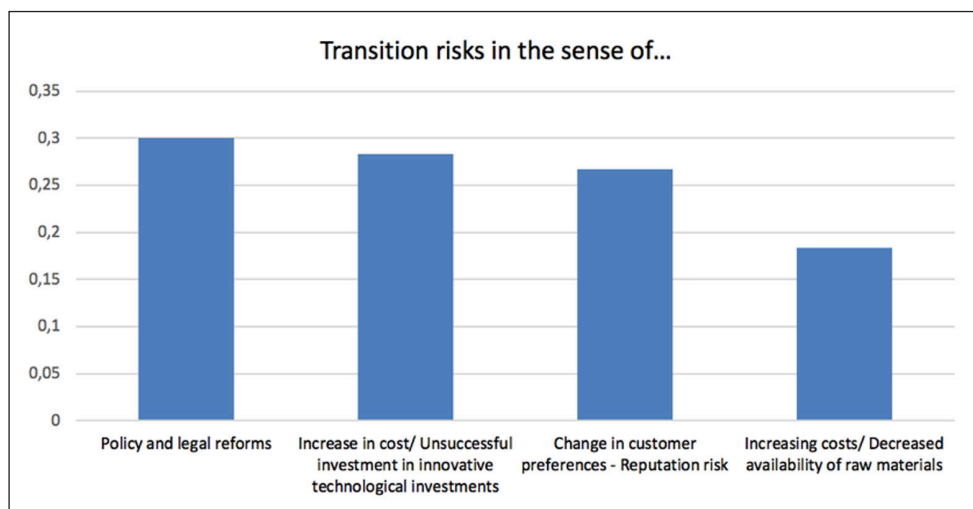
risks. Most interviewees agreed that the pressure on the financial institutions still has to increase. One respondent explained that central banks could play an even stronger role although she already observes a large momentum of the financial market.

While there is no way around TCFD in the oil and gas industry since the capital market strongly drives it, the results of the questionnaire showed that one third of the participants has never heard of TCFD. As these companies are operating in various industries and have more than 10.000 employees, it must be assumed that TCFD has not yet reached an equal level of recognition in all sectors. Even a few survey participants from the banking sector, the target group of TCFD, indicated that they have never heard of the recommendations.

## POLICY AND LEGAL REFORMS

TCFD sets out to challenge governments to complement them with mandatory disclosure policies to increase the information available to investors (TCFD, 2020a). Policy and legal reforms have been mentioned by all interview respondents as a crucial factor that will have a large influence on the future level of TCFD disclosure. Almost 70% of the survey participants expected transition risks in the form of potential changes in a legal, technological, reputational, or market-related context, to pose a larger challenge to their company's operations than physical changes in the climate in the future.

From the options listed in the survey, policy and legal reforms have been chosen as the most influential risk by 30% of survey respondents (*Figure 8*).



**Figure 8** Transition risks, in the sense of... – Survey Results.

Many interviewees mentioned Europe as a frontrunner in terms of non-financial disclosure. Throughout the interviews, European institutions were often referred to as those who push climate-related financial disclosure forward. While one interviewee named the European Green Deal as a driver for more disclosure, the head of office of the German sustainability code highlighted:

I would wish for a social-ecological market economy on a European level, including facets of how sustainability reporting can initiate and intensify processes.

Today, the European Commission requires companies “designated by national authorities as public interest entities” (European Commission, 2020, para. 2) with more than 500 employees to disclose non-financial information in various areas. Some member states have already dropped the employee threshold to 250 employees (EU Technical Group on Sustainable Finance, 2019, p. 6) which indicates that regulations are becoming more relevant to an even broader range of companies.

The European Commission referred to new legally required information on climate-related disclosure and specifically mentioned TCFD as an example framework to report climate-related risks. In the final report of the EU Technical Expert Group on Sustainable Finance (2020), TCFD is referred to as a good practice for issuers to seek external assurance on their disclosures related to the taxonomy. In the report, they specifically refer to TCFD, by stating that the external warranty is “consistent with the recommended approach in the Taskforce on Climate-Related Financial Disclosures (TCFD) framework” (EU Technical Expert Group on Sustainable Finance, 2020, p. 37). Meanwhile, a new law in Canada emerged, stating that companies with

revenues above 300 million dollars that apply for governmental loans, have to publish annual climate disclosure reports, which “must follow the standards set by the Task Force for Climate-Related Financial Disclosures” (Elgie & Moffat, June 5, 2020, para. 3). These trends highlight that legislations are likely to increase in the future and will affect an even wider range of companies.

Still, in Europe, much is voluntary. Some interviewees believe that this is a problem, as it slows down the progress. However, in this regard, all interviewees pointed out that it is crucial to avoid a monopoly within the rankings of sustainability. Others believe that making climate-related disclosure mandatory is not the proper approach. In the words of a sustainability manager:

The increasing interrelation of TCFD in various laws can also lead to a forced implementation of the TCFD guidelines, for those companies, for whom climate-related risks are not necessarily relevant and where society and interest groups might not regard it as relevant.

The interviewee from the German sustainability code strongly advises against enshrining individual instruments as being subject to a disclosure requirement because it could tear TCFD apart, at any time, or prove impractical or not sufficiently concrete. It is always possible that such a standard will disappear and be replaced by a better one. Another interviewee agrees, but points out a more specific recommendation of scenarios, and would be of value for companies.

The opinion on what role governments should play differed very. The interviewee from the US declares that governments do not have the same incentives as corporations or businesses and stated:

Governments operate on different principles: They are very political and mostly short-term.

In contrast, the sustainability representative of an electricity company in South Africa stated:

Climate change is not an individual thing, but mainly the government’s responsibility. Governments set international targets, and it is not the responsibility of companies.

In this regard, the German sustainability code representative highlighted that political communication and the link to disclosure obligations must be made even more precise, as this is still missing.

## **LITIGATION RISK**

Although the potential risk of litigation has not been ranked high in the survey as an expected ripple effect on the company’s operations, it has been referred to by the interviewees from the energy industry and is therefore considered worth to be mentioned. Both respective interviewees from South Africa and Austria mentioned that the assessment of risks and publication of scenario analysis is an issue that needs to be approached very carefully. One stated:

In the worst case, a potential 2-degree scenario has a negative effect on the asset base due to stock corporation law. The publication of such a scenario analysis can lead to specific assumptions, which could mislead a stock market investor if (s)he believes that this would be an expected loss. Not everyone can familiarize themselves with the complexity of scenario analysis in the energy sector to understand which model is truly behind it and whether it is realistic.

This aligns with the findings of Eccles and Krzus, (2018) referring to concerns that a scenario analysis could be interpreted as a forecast by investors and, if proved inaccurate, could lead to a prosecution. Further, the findings are in line with the authors’ statement that the risk of litigation is mostly relevant for the Oil & Gas industry as it is one of the sectors with the largest number of political regulations. However, it does not hinder the companies in the sample to report anything, instead it makes them more cautious about what to disclose.

## **THE ALIGNMENT WITH OTHER SUSTAINABILITY BENCHMARKS**

The research presented in this paper reveals the importance of alignment with other sustainability rankings in the dissemination of TCFD. Both the survey results and the interview

findings highlighted the alignment of TCFD with CDP and the PRI. Loew and Braun (2019) compared TCFD with other international rankings and concluded that CDP is the only one, which has adapted all aspects to its framework. However, the alignment with TCFD of other sustainability benchmarks is increasing continuously.

CDP was mentioned quite frequently throughout the survey. Others have heard of TCFD through the signatory to the UN Principles for Responsible Investments which introduced TCFD-aligned indicators to its Reporting Framework in 2018 and made it mandatory for their signatories in 2020. One interviewed sustainability manager pointed out that both benchmarks are already very closely interlinked. In his opinion, TCFD has a more strategic approach and is slightly more comprehensive to include risk and strategic issues compared to CDP. If a company fills out the strategy communication with the CDP questionnaire, it quickly has a TCFD report. The head of the German sustainability code highlights the importance of integrating TCFD into other frameworks. She refers to the compatibility system with different standards in the German sustainability code. The code refers to TCFD as a useful tool in the areas of climate data and climate scenario analysis. As soon as companies start to get curious, they can find more descriptions and links to TCFD. The interviewee believed this is the role of the sustainability code:

Everyone who decides to approach the issue of sustainability through our code will come across TCFD somewhere.

## CONCLUSION

This study investigated the factors that influence the level of climate-related financial disclosure in line with TCFD. The paper paints a more holistic picture of determinants on the TCFD disclosure than portrayed in the existing literature.

The results show that TCFD has already reached high acceptance among corporations. However, many companies are not yet sufficiently concerned about climate-related risks and opportunities. The findings highlight that those companies who already implement the recommendations of TCFD progressed further in identifying, managing, and mitigating climate-related risks than those companies who do not report in line with TCFD. Further, the findings show that TCFD is more relevant in some industries than it is in others. This research has confirmed the prevailing assumption of the importance of TCFD in energy-intensive industries.

Overall, the study has identified ten substantial factors that have an influence on the level of climate-related disclosure. These can be divided into extrinsic, intrinsic motivation factors and corporate characteristics.

The intrinsic factors include the aim for strategic adaption, the desire to identify potential opportunities, and the will to engage more with stakeholders. Overall, intrinsic motivation factors will likely increase in the future, as competitors increasingly adjust their strategies and the continuous debate about climate change forces companies to adapt to the growing threat from climate change. The number of disclosures will increase if corporations no longer want to suffer the ignominy of permanently failing to meet the standards of the TCFD recommendations set by their competitors. The aim to engage more with stakeholders and potentially identify competitive advantages also increasingly results in the implementation of the TCFD recommendations.

Extrinsic motivational factors have been identified in the form of investor decisions, policy and legal reforms, the risk of litigation, and the alignment with other sustainability benchmarks. Meanwhile, the availability of data still poses a challenge for many corporations. Even though data becomes increasingly available through multiple platforms, many corporations still struggle with obtaining the correct data to draw proper conclusions from it. The findings show that the availability of accurate data will LIKELY pose fewer problems in the future. Interviewees addressed multiple solution approaches, such as upcoming database providers.

All interviewed investors agree that businesses must increasingly demonstrate that they are future proof which is why many companies feel the urge to take climate-related impacts into account when updating their strategies. Companies that will not adjust their business models out of intrinsic motivation will sooner or later likely be forced through either investor requests or governmental regulations on a national or international level to report climate-related risks. The research has shown that politicians worldwide increasingly tend to make climate-risk disclosure mandatory. This will automatically lead to an increase of TCFD disclosures, as more companies are forced to report



climate impacts, and because there are no comparable frameworks in this respect. However, many interviewees have discouraged to make TCFD as such mandatory, since it should always be possible to replace a standard by a more appropriate one and to leave companies free in their decision.

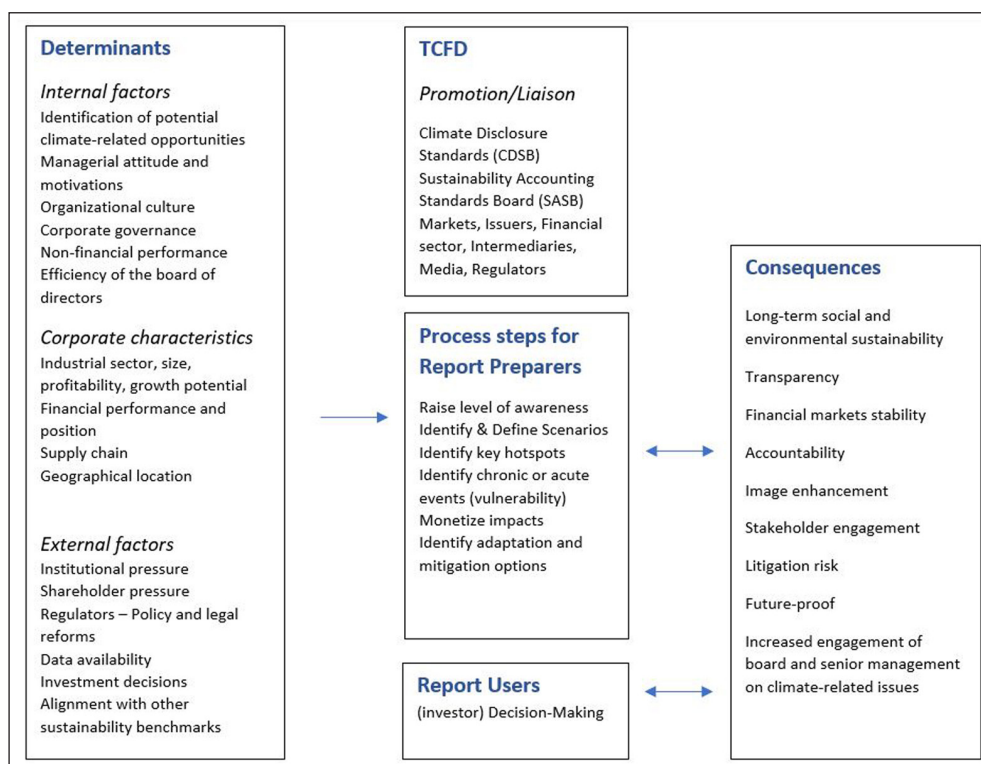
Although litigation has not been ranked high in the survey as an expected ripple effect on the company’s operations, it has been referred to by the interviewees from the energy industry. Both respective interviewees mentioned that the assessment of risks and publication of scenario analysis is an issue that needs to be approached very carefully. The risk of litigation is mostly relevant for energy intensive industries as it is one of the sectors with the largest amounts of political regulations.

Lastly, the alignment of TCFD with other sustainability benchmarks increases the frameworks’ awareness. The study findings confirm that other sustainability rankings increasingly refer to TCFD and engage companies to take the recommendations into account. As sustainability benchmarks and ratings continue to gain importance, the TCFD framework will likely lead to more companies reporting climate-related risks. In this research, CDP and PRI have been named the most in this respect.

The two identified corporate characteristics, influencing the disclosure are the length and complexity of the corporate’s supply chain and the available financial and human resources within the company. Companies with global and complex supply chains are more vulnerable to climate impacts. Secondly, a company needs to have the necessary resources to be able to conduct a complex scenario analysis, as these are time-consuming and cost intensive.

In conclusion, this study predicts that organizations will increasingly feel the urge to report climate-related risks. An increasing number of companies, policymakers, and investors are referring to TCFD as one of the most relevant standards to becoming more transparent on the financial impact that climate change will have on the organization. The research findings lead to the assumption that the relevance of TCFD will even increase in the future, as the risk of litigation and the lack of relevant data are potentially challenging, but do not hinder companies from disclosing. The number of companies that report according to TCFD may also be relatively small, as the recommendations have only been in existence since 2015. It takes some time before such a standard is established.

Finally, a new framework on the determinants influencing the disclosure of TCFD has been created (*Figure 9*). The model summarizes this research’s findings in the revised framework of the version presented in *Figure 3*. Compared to the first version, this model includes the findings of the empirical study. The determinants are clustered into internal and external factors and corporate characteristics.



**Figure 9** Revised version of the model: Determinants influencing the disclosure of TCFD by Achenbach, M. (2020).

Further research is needed to explore how the identified factors influence the in depth of climate-related risk disclosure. Moreover, future researchers could investigate how the relevancy of the identified factors varies in different sectors. In that respect it would also be beneficial to conduct a second round of surveys and interviews in a few years to identify to what extent the influence of the factors has changed, as economic and political developments are fast moving.

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## COMPETING INTERESTS

The author has no competing interests to declare.

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