HUMBOLDT-UNIVERSITÄT ZU BERLIN

Faculty of Life Science

Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences

Outcomes of climate change litigation: an international empirical analysis

(topic of thesis)

Master thesis in the study program: Integrated Natural Resource Management

submitted by: Schäfer, Neele

(family name, first name)

1st Examiner (Supervisor): Prof. Dr. Klaus Eisenack

(academic degree, first name, family name)

Division or Institution: Resource Economics

2nd Examiner: Prof. Daniel H. Cole

(academic degree, first name, family name)

Division or Institution: Indiana University Maurer School of Law, Indiana University School of Public and Environmental Affairs

Berlin, 10.03.2021

Table of Content

List of Tables

List of Figures

Abbreviations

CCPI	Climate Change Performance Index
CFPP	Coal-fired Power Plants
DF	Degrees of Freedom
EIA	Environmental Impact Assessment
EIL	Environmental Impairment Liability
ENGO	Environmental Non-governmental Organization
ETS	Emissions Tradings System
EU	European Union
GHG	Greenhouse Gas
IAD	Institutional Analysis and Development
IPCC	Intergovernmental Panel on Climate Change
NDC	Nationally Determined Contribution
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
OAS	Organization of the American States
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States of America
WJP	World Justice Project

Abstract

As a part of the polycentric climate governance system, litigation cuts through the multiple scales and levels of climate governance and brings different stakeholders together. In doing so, climate change litigation addresses market and policy failure. While climate change related lawsuits continue to increase, scholars have primarily focused on individual high-profile cases or on the U.S. context. Therefore, this thesis sets out for a comprehensive analysis of the outcome of climate cases on a global scale outside of the U.S. The study explores factors that determine the outcome by focussing on strategies, trends, the geography, key stakeholder as well as the primary climate topics and legal obligations of climate change litigation. The objective is to empirically inquire whether climate change litigation has recently achieved more promising results, and whether it is an effective tool for climate activism and governance. Through a qualitative content analysis of 263 climate cases that were decided between 1994 and 2019 categories and variables are developed to identify important distinctive and joint characteristics. These are subsequently analyzed by descriptive statistics and a logistic regression analysis to determine significant predictors on the outcome. The findings reveal that while litigation - outside of and in contrast to the U.S. - has resulted in judgements favoring pro-regulatory positions to climate change, overall, cases were not more successful in recent years. However, the data show that strategic litigation and human rights issues have become more important, particularly in the Global South. Strategic cases, driven by ENGOs and other advocacy groups, are more successful by addressing specific climate topics rather than seeking to enforce or increase mitigation (ambition) of governments. To a great extent, routine litigation contributed to positive outcomes for climate protection by addressing emissions trading systems, private construction and renewable projects. The data also suggest that anti-regulatory goals in climate change litigation have generally decreased. Overall, climate change litigation poses high risks, particularly for corporations as well as petitioners suing governmental bodies. Ultimately, the study indicates that there is still great unused potential to hold major greenhouse gas emitters accountable under liability law.

1. Introduction

The immense danger the world is facing from climate change has lead to a variety of creative human responses to the complex problem - one of them is climate change litigation. In recent years, it has made impressive progress and yielded important successes on a global scale (Burger & Gundlach, 2017; McCormick et al., 2018; Peel & Osofsky, 2015; Setzer & Byrnes, 2019). In short, climate change litigation is litigation (explicitly) related to or about climate change that concerns mitigation and adaptation measures as well as the loss and damage from climate change impacts (Bouwer, 2018; Peel & Osofsky, 2015; Setzer & Vanhala, 2019). Since the first climate change related lawsuit occurring in 1986 in the U.S., the key jurisdiction, and in 1994 outside of the U.S., the role of courts in the debate about climate change has become more and more visible (Setzer & Vanhala, 2019).[1] Simultaneously, new rights and duties have been created in a growing number of specific laws codifying national and international responses to climate change. Litigation is a tool that is able to challenge their validity or appropriate implementation (Burger & Gundlach, 2017; Townshend et al., 2013). If institutions and other stakeholders fail to properly address human-induced climate emissions, advocates for climate policy exert their right to litigative measures to try to force action (Averill, 2007; Bouwer, 2018). Their goals range from increasing mitigation ambition, enforcing existing mitigation and adaptation targets, clarifying existing law, to changing corporate behavior, assigning responsibility for climate change impacts, and seeking damages for climate-related injuries (Averill, 2007; McCormick et al., 2018; Setzer & Byrnes, 2019). Further, climate change litigation has the potential to change the public debate about climate change issues and to stimulate political advocacy by raising awareness and educating the public. In doing so, climate cases uniquely unite elements of the law, policy, science, and ethics (Averill, 2007).

To date, several prominent cases have attracted great public attention, thereby raising public awareness about climate change. Other successfully argued cases have led to the enhancement of climate change policy and corporate behavior (Averill, 2007; McCormick et al., 2018; Peel & Osofsky, 2015). However, there is also a large number of cases that fail to deliver on these promises. While certain authors speak of a second phase in climate litigation in which, fueled by new scientific evidence, success rates are supposedly higher, there is no systematic evaluation of the outcomes of climate litigation cases on a global level (Ganguly et al., 2018; Marjanac et al., 2017; Marjanac

[1] The first climate case in the U.S. brought by a group of cities, states, and environmental groups concerned the failure to prepare an environmental impact statement for Corporate Average Fuel Economy standards by the National Highway Traffic Administration under the National Environmental Policy Act (NEPA) involving air pollution (*City of Los Angeles v. National Highway Traffic Safety Administration*, 1990). The first climate case outside of the U.S. was brought in Australia by Greenpeace Australia Ltd. against the approval of a combustion power plant (*Greenpeace v. Red Bank Power Co*., 1994).

& Patton, 2018; Setzer & Vanhala, 2019). This raises the question whether climate change litigation is an effective tool to regulate climate emissions and adaptation measures with respect to climate governance, and to which extent empirical evidence about the successes of climate change litigation on the international scale confirms or challenges previous scientific research on the effectiveness of litigation (cf. Burger & Gundlach, 2017; Peel & Osofsky, 2013; Peel & Osofsky, 2015; Setzer & Byrnes, 2019; Setzer & Vanhala, 2019). Scholars have thus called for more research into the outcomes and impact of litigation related to climate change (cf. Setzer & Vanhala, 2019; Peel & Osofsky, 2015).

Asking these questions is all the more urgent since climate change litigation can be considered as an integral part of the overall system of climate governance today.[2] Historically, climate governance has focused on the search for a global solution in form of (more or less) binding international agreements. This approach has received major attention as the only strategy to effectively reduce greenhouse gas (GHG) emissions (Ostrom, 2012). Since the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, there have been continuous efforts for international regulation. Serving as the basic global infrastructure for climate change action, the UNFCCC accomplished the first international treaty with binding emissions reduction targets in 1997, the Kyoto Protocol (Peel & Osofsky, 2015). However, major GHG emitters, such as the United States of America (U.S.) and Canada, withdrew from the treaty.[3] With the second commitment period of the Kyoto Protocol ending in 2020, the Paris Agreement was negotiated in 2015 (Rajamani, 2016). In the agreement, UNFCCC countries pledge to keep global warming “well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius“ (UNFCCP, 2016, p.2). While the establishment of the Paris Agreement was overly perceived as groundbreaking and “beyond what was considered politically possible“ (Boom et al., 2017, p.2), the Emissions Gap Report by the United Nations Environment Programme (UNEP) showed that commitments under

[2] The pressing need to stabilize the climate as well as the identification of human actions as the cause for the earth's mean surface temperature rise have been established by climate scientists in the past decades. To date, there is a consensus among climate scientists that human actions are in fact responsible for recent climate changes (Cook et al., 2016) and that the last three decades have been successively warmer than any decade before 1850 due to the accumulation of greenhouse gases in the atmosphere (IPCC, 2014). While anthropogenic greenhouse gas emissions are at the highest level in history, the impacts of climate change can already be observed today: warming of the atmosphere and oceans, ice melting, sea level rise, coastal erosion and increasing risk of floods, droughts, and wildfires due to changing weather patterns (Burger & Gundlach, 2017; IPCC, 2014). As human life depends on the services that our ecosystems provide, we risk a deterioration of our resources, food production, health, livelihoods, and economy with further global warming (IPCC, 2014). Climate change impacts will be “severe, pervasive and irreversible“ (IPCC, 2014, p.8). It is therefore vitally important and urgent to mitigate GHG emissions substantially and sustainably as well as to increase adaptation capacity worldwide in order to deal with irreversible climate change impacts (IPCC, 2014).

[3] The U.S. never ratified the treaty on a domestic level (Hovi et al., 2010). Canada officially withdrew from the Kyoto Protocol in 2011 (Wattie, 2011).

the Paris Agreement are not sufficient to keep global warming well below the two degree goal and would likely result in an average temperature increase of 3.4 degrees Celsius (Graichen et al., 2017; UNEP, 2016). In addition to the ‘ambition gap‘, which describes the disparity between what climate scientists deem necessary to avoid catastrophic climate change and the insufficient mitigation targets that have been set on international and national levels, there is a shortfall between existing and planned climate policies to meet even current mitigation targets, the so-called ‘mitigation gap‘ (Bouwer, 2018; Graichen et al., 2017). International negotiation on climate protection faces a variety of challenges, ranging from a high number of involved state actors with various interests, the choice of instruments, and the admission of responsibility, to the burden of payment and free riding incentives (Cole, 2014; Nordhaus, 2015; Ostrom, 2012). In the literature, global efforts for climate mitigation are *inter alia* associated with “shared irresponsibility“ (Cole, 2014, p.1), a “lack of progress“ (Cole, 2015, p.114), a struggle to achieve GHG emissions reduction goals in time (Osofsky & Peel, 2013), and a “failure to achieve agreement […] on efficient, fair, and enforceable reductions of emissions“ (Ostrom, 2012, p.354). In general, targets of climate change policies are rather based on (political) feasibility than on scientific evidence of what is needed to stabilize the climate (Burger & Gundlach, 2017). However, even more effective international agreements would still struggle to incorporate all the levels at which climate change mitigation and adaption needs to be addressed (Ostrom, 2012; Peel & Osofsky, 2015).

While acknowledging the necessity of global efforts for a long-term solution, a call for polycentric approaches of governance across levels and scales has emerged (Bouwer, 2018; Cole, 2011; Cole, 2015; Graichen et al., 2017; Ostrom, 2010; Ostrom, 2012; Peel & Osofsky, 2015):

> “The conception of climate change as (solely) an international problem with (solely) international solutions is outdated, as is the understanding that there is a single global panacea for the climate problem. Good responses to climate change need to reflect a variety of regulatory forms across levels or scales of governance“ (Bouwer, 2018, p.494).

Just as the efficiency of a market dissolves in a monopoly situation, Ostrom (2012) argues that a monopoly government is not more efficient than a system of governmental units at different scales. She defines a polycentric system as one that “exists when multiple public and private organizations at multiple scales jointly affect collective benefits and costs“ (Ostrom, 2012, p.355). Cole (2015) identified two main advantages of polycentric approaches to climate governance: a higher level of experimentation and learning opportunities for the improvement of polices as well as an increased level of communication and interaction among parties that helps building trust and facilitates cooperation. The polycentric approach addresses governance at multiple scales, including cooperation between public actors at different levels of government, but also private actors, such as corporations, non-governmental

organizations (NGOs), and citizen groups (Cole, 2015; Setzer & Nachmany, 2018). While effective climate governance happens at different scales of governance, it also uses a variety of regulatory measures, tools, and agencies (Bouwer, 2018).

It is in this polycentric context that litigation must be considered as a crucial tool of climate governance. As part of a polycentric approach of governance, litigation can cut through the multiple scales and levels of climate governance and bring different key stakeholders together in one room that would otherwise not meet (Peel & Osofsky, 2015). Courts are generally more accessible to a broader range of people than other governmental institutions. This accessibility to the public facilitates greater influence on governmental and corporate behavior by individuals. From big to smaller-scale decisions, courts can play an effective role in shaping the outcome of mitigation and adaptation efforts and, by doing so, help to close the mitigation as well as the ambition gap (Kaswan, 2008; Peel & Osofsky, 2015; Setzer & Byrnes, 2019). Moreover, climate change litigation engages in a complex, multi-scalar geography. In addition to formal international legal agreements among nation-states within the UNFCCC structure, there is a variety of agreements and interactions among nation-states and other governmental and non-governmental agents (Osofsky & Peel, 2013):

> "The regulatory dynamics regarding climate change litigation illustrate the ways in which governmental and nongovernmental stakeholders at multiple levels interact outside of the international treaty regime. Over the past decade, there has been an explosion of lawsuits around the world regarding climate change mitigation and adaptation" (Osofsky, 2013a, p.74).

So far, climate change litigation against corporations has mostly targeted 'Carbon Majors' which are corporations largely operating in the fossil fuel, energy, and cement industries and have contributed a significant amount of GHGs over time (Setzer & Byrnes, 2019). Two waves of private litigation have been identified (Ganguly et al., 2018). The first wave beginning in the early 2000's was "largely unsuccessful" (Setzer & Byrnes, 2019, p.8). Petitioners based their tort cases mostly on the public nuisance doctrine but were denied for a lack of standing by raising non-justiciable political questions (Ganguly et al., 2018). However, since then climate change science has become more reliable, exact, and generally accepted. Data on localized climate change effects has grown and the ability to quantify the contributions of certain GHG emitters to climate change has increased. Further, judges have been rethinking "the interpretation of existing legal and evidentiary requirements" (Ganguly et al., 2018, p.841). The new possibilities lead to a second, more promising wave starting in 2015 (Ganguly et al., 2018). These observations form an entry point into my empirical inquiry into climate change litigation. I will check if this second wave that is attested to deliver more promising outcomes can be confirmed.

Beyond the overall outcome, I will focus on the legal obligations on which courtroom decisions and arguments in climate change litigation cases are made. Recent strategic cases against governments or public bodies involve arguments based on the public trust doctrine.[4] These cases compel governments to take responsibility for national public trust resources for future generations and raise questions about fundamental rights, intergenerational equity, and the balance of power between the judicial, legislative, and executive authorities (Burger & Gundlach, 2017). An important milestone for climate change litigation was reached in 2015, when the *Urgenda* case in the Netherlands was successful and brought international attention to climate change litigation. In the case petitioners, for the first time, successfully compelled the national government of the Netherlands to live up to their obligations under the UNFCCC framework to reduce GHG emissions by 25 to 40 % by 2020 (Setzer & Byrnes, 2019; *Urgenda Foundation v. The State of the Netherlands*, 2015). Although the decision by the Hague District Court was a novelty, it did not recognize any human rights violations of the petitioners. This acknowledgement was given a few months later in Pakistan, when the Lahore High Court found that the governments failure to implement the national climate policy framework violated the citizens' fundamental rights (*Leghari v. Federation of Pakistan*, 2015). According to Peel and Osofsky (2018), this historic decision is what marks a 'human rights turn' in climate change litigation and a turn away from earlier modes of litigation. Other successful human rights based cases have followed (Peel & Osofsky, 2018).[5] An inquiry into the arguments of climate change litigation will therefore be a part of my analysis.

Since the *Urgenda* case and the Paris Agreement in 2015, climate change litigation has not only increased in numbers but in geographic scope as well. While climate change related lawsuits remain concentrated in high-income countries, there has been a growing number of lawsuits in low- and middle-income countries. Key jurisdictions for high-income countries are the U.S., Australia, the United Kingdom, New Zealand, Canada, and Spain. However, in the last decade climate cases have also been brought all over the world; for example, in Pakistan, India, the Philippines, Argentina, Colombia, Chile, South Africa, Uganda, and Nigeria; thereby expanding from countries of the

[4] For instance, the non-profit public interest law firm 'Our Children's Trust' works to support youth clients and attorneys in climate change litigation around the globe. They are involved in, for example, the *Urgenda* case (*Urgenda Foundation v. The State of the Netherlands*, 2015), as well as the *Juliana* case in the U.S. (*Juliana v. United States*, 2020) and *Ali v. Federation of Pakistan* (2016) or *Pandey v. India* (2017).

[5] For example, in 2019 a group of Filipino citizens and NGOs have successfully asked for an investigation into the general issue of human rights violations caused by climate change and ocean acidification and whether the 50 Carbon Majors (e.g., Chevron, Exxon Mobil, BP) have breached their responsibility to respect the rights of the Filipino people by contributing GHGs. In their decision, the Filipino Commission on Human Rights announced that major fossil fuel companies could be held liable for climate change impacts but concluded that legal responsibility for climate damages is currently not covered by international human rights law (Peel & Osofsky, 2018).

common law family to civil law and mixed law systems (Setzer & Byrnes, 2019). My analysis will generate insights into the geography and the legal origin of climate cases and explore differences in the outcome of climate change litigation between legal families as well as the 'Global North' and the 'Global South'.[6]

Furthermore, the post-Paris global climate regime creates new spaces of opportunity in climate change litigation. The courts will have an important role in holding their governments accountable to their commitments under the Paris Agreement. The nationally determined contributions (NDCs) can be tested by litigation in the domestic courts of each member state (Bouwer, 2018; Burger & Gundlach, 2017). Due to the potential of climate change litigation and the improvements in climate science, "the increase in climate change litigation is likely to continue" (Setzer & Byrnes, 2019, p.10; McCormick et al., 2017). As "litigation is often a lengthy, costly, and risky process" and can at times result in unwanted outcomes, it is important for future litigation that climate protection advocates

> "[…] carefully consider which new cases to bring, how to bring them, and assess the potential impacts of litigation within the wider context of efforts to enhance climate change mitigation and adaptation action globally" (Setzer & Byrnes, 2019, p.10).

My analysis on the outcome of international climate change litigation attempts to formulate recommendations for future litigative action for climate protection.

1.1. Research Objective

To date, the field of climate change litigation has been studied extensively; in particular 'high-profile' cases have received high media and scholarly attention. Much of the focus has been on the analysis of isolated significant cases predominantly in the context of common law systems (Boom et al., 2017; Ganguly, et al., 2018; Osofsky, 2005; Osofsky, 2013a; Osofsky, 2013b; Peel & Osofsky, 2013; Peel & Osofsky, 2015); on geographical mapping of climate change litigation (Burger & Gundlach, 2017; Setzer & Byrnes, 2019); on creating typologies for case law (Markell & Ruhl, 2012; Ghaleigh, 2010; Grossmann, 2003); or on the role of climate change science for litigation (Marjanac et al., 2017; Marjanac & Patton, 2018; McCormick et al., 2017; McCormick et al., 2018). Though the subject of climate change litigation has received increased attention by other disciplines than the law, a systematic research review on climate change litigation from 2019 claims that there is an "important interdisciplinary potential

[6] Recognizing the debate about the definition of economically disadvantaged countries in the world, the term 'Global South' is the counterpart to 'Global North' and is not based on a geographical categorization but on economic inequalities. Both 'Global North' and 'Global South' countries vary in their development stages and legal capacity. However, the term is favored by scholars today (Setzer & Benjamin, 2020).

in terms of the types of questions begin asked“ and a “pressing need for research examining the outcomes and impact of climate change litigation“ (Setzer & Vanhala, 2019, p.2).

The outcome of climate change litigation within the U.S. has been recently analyzed by McCormick et al. (2018). The authors aim to delineate the outcome of climate cases depending on the relevant U.S. environmental statutes, the climate issues of the respective cases, and the type of petitioner. Further, they investigate the impact of climate change science on the outcome of cases (McCormick et al., 2018). They find that pro-regulatory litigants were more successful at winning their cases when they base their arguments on the Clean Air Act, Endangered Species Act, and California Environmental Quality Act. However, pro-regulatory petitioners in the U.S. have generally focused on coal-fired power plants (CFPP) and air cases until 2009, "even though biodiversity, renewable energy and energy efficiency cases have higher win rates“ (McCormick et al., 2018, p.832). On the other hand, the success of anti-regulatory litigants was highest when raising issues under the common law doctrines, such as the public trust doctrine.[7] McCormick et al. (2018) claim that anti-regulatory are overtly "more effective in their alignment of goals and strategies“ which the authors base on higher success rates as well as the focus of anti-regulatory litigants on air and CFPP cases.

On a global scale outside of the U.S. context, such an in-depth analysis on the outcome and evidence for success factors is still missing. Considering that

> “[w]ithout a complete picture of what has and has not been within the sweep of climate change litigation, it is difficult to offer a robust evaluation of the past, present, and future of climate change jurisprudence“ (Markell & Ruhl, 2012, p.1).

This thesis sets out to generate empirical insights into the outcome of climate change litigation by including climate cases about mitigation, adaptation, loss and damage as well as from the Global North and South.

The overall objective of this thesis is to identify factors that determine the outcome of climate change litigation cases. To do so, it will systematically evaluate selected climate cases since the first climate case in 1994 from all over the world, focusing on international climate change litigation and excluding the context of the U.S. which has already been investigated in the academic literature (cf. McCormick et al., 2018). Based on the assumption that every available climate case potentially contributes to painting a 'complete' picture of international climate change litigation (Markell & Ruhl, 2012), the combination of two extensive databases on litigation cases will form the

[7] The public trust doctrine is a “common law duty on the sovereign of a given jurisdiction to act as trustee for present and future generations by maintaining […] the public trust resources“ (Burger & Gundlach, 2017, p.23) and is rooted in property law (Lin, 2011).

basis for the analysis: the database provided by the Sabin Center for Climate Change Law at Columbia Law School as well as the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science (Sabin Center for Climate Change Law, n.d.; Grantham Research Institute, n.d.). Their databases are used to develop a new data set serving to accomplish the research objective of this thesis.

In order to pursue an inquiry into the outcomes of climate litigation cases worldwide, I will conduct a qualitative content analysis of case summaries and documents. Following a mixed deductive-inductive approach, the categories for this analysis will be partly developed inductively using Grounded Theory (Corbin & Strauss, 2018) as well as derived from an extensive literature review on climate change litigation. To begin with, I will outline the purpose, opportunities, and characteristics of climate change litigation in order to gain a clear view of which factors could be relevant for the analysis of the outcome of climate change litigation. In the next step, climate cases are collected and preprocessed using the previously developed attributes of climate change litigation. Then, I will analyze the outcome according to the following interposed research questions:

(1) What is the outcome of climate change litigation outside of the U.S.?
(2) What are the goals of climate change litigation and which strategies are used to achieve them?
(3) Where and when does climate change litigation occur?
(4) Who is involved in (driving and answering to) climate change litigation?
(5) Which sector of climate change is addressed and which legal basis is argued to substantiate the claims?

I will statistically analyze the distribution of the previously developed attributes of climate change litigation which will serve as the basis for answering these interposed research questions. In order to achieve the overall research objective, which is to identify factors that determine the outcome of climate change litigation, I will execute a logistic regression analysis to provide information about statistically significant predictors on the outcome. In doing so, I will test a number of hypotheses and either accept or reject them. The hypotheses follow the same pattern and are constructed in a way that the influence of certain characteristics on the outcome is investigated. For the logistic regression, I will define the outcome of climate change litigation by its impact on climate change mitigation and adaptation: whether the outcome of the climate case has a positive or negative impact meaning the outcome favored a pro-regulatory or anti-regulatory position to climate change mitigation and adaptation measures (cf. McCormick et al., 2018).

Due to the analysis of climate change litigation in the U.S. by McCormick et al. (2018), the U.S. is excluded from the statistical analysis as an area of interest. To facilitate a comparison of the outcomes from within and outside of the U.S., I will make similar methodological choices to McCormick et al. (2018) if the international scope of this analysis allows conformity to the U.S. design. The research design of this study is further limited to the available data on climate cases provided by the Sabin Center for Climate Change Law and the Grantham Research Institute on Climate Change and the Environment and also only includes climates cases that are explicitly tied to climate change and have been decided by the time of data collection (see Chapter 4.1.2 for the selection criteria). Against this background, the international empirical analysis naturally does not claim to paint an exact replica of climate change litigation and how it occurs in the world. It is an attempt to provide a more holistic picture than former case studies on climate change litigation. The goal is to investigate possible significant factors of climate change litigation and facilitate recommendations for future litigation and research designs on the subject.

1.2. Thesis Structure

While the introduction offered a problem statement and outlined a brief chronology of climate change litigation and its major events as well as outcomes, it also procured a first overview of the role climate change litigation can play in addressing the global problem of climate change. The opportunities, challenges, and mechanisms of climate change litigation are further examined in the next two chapters which are based on the review of pertinent literature.

In order to understand the dynamics of climate change and litigation as a response to it, theories on the economics of climate change are illuminated in Chapter 2. The chapter elaborates on the economic features of climate change and relates climate change litigation to the theoretical environment of institutions, rules, climate governance and liability. Essential theories and frameworks are drawn from the institutional economists Elinor Ostrom (2005; 2010; 2012); Daniel H. Cole (2014; 2017); Oliver E. Williamson (2000); John R. Commons (Hodgson, 2004); from Jacqueline Peel and Hari M. Osofsky (2015); Kim Bouwer (2018); and Marilyn Averill (2007) for their work on environmental and climate law as well as from economists Peter Zweifel and Jean-Robert Tyran (1994); Thomas H. Tietenberg (1994) and their theories on liability.

The following Chapter 3 examines climate change litigation in more detail and gives answer to the questions of what climate change litigation is about, which legal sources are available for litigative measures, and how litigation can be used as a regulatory tool

in climate governance. However, climate change litigation also faces various challenges and risks which are outlined in the ensuing sections. Alongside issues in the legal sphere, the legitimacy of climate change science plays an important role in climate change litigation. Demonstrated essential works, additionally to those mentioned above, are from Joana Setzer and Rebecca Byrnes (2019) of the Grantham Research Institute on Climate Change and the Environment, Hari M. Osofsky (2005), the environmental lawyers Sophie Marjanac and Lindene Patton (2017; 2018) as well as Sabrina McCormick (McCormick et al., 2017) on climate science in litigation and the status report on climate change litigation by the UNEP in cooperation with the Sabin Center for Climate Change Law (Burger & Gundlach, 2017).

Subsequently, the methodology section of Chapter 4 defines the data collection process and elaborates on the data sources as well as the specific selection criteria of the climate cases for the newly developed data set of climate cases of the world (outside of the U.S.). Using qualitative content analysis (Corbin & Strauss, 2018; Schreier, 2014), I will develop categories and coded variables. The result is a final data set which is used for the following statistical analysis of the climate cases. The methodological chapter of statistical analysis presents the exact methods applied on the data ranging from: the determination of absolute and proportional frequencies; the execution of a test of independence; and application of logistic regressions in the IBM SPSS statistics with the support of Aldrich & Cunningham (2016) navigating through the software.

The results are shown in Chapter 5. There are two main outputs produced in this thesis: the development of categories and coded variables based on a qualitative content analysis and the statistical analysis of the collected data. Going from high-level to basic-level concepts (Corbin & Strauss, 2008), the first section begins with depicting the categories that have been developed to differentiate the climate cases from each other and to incorporate the characteristics they have in common. For each category, I will explain why they have been chosen for the analysis and which coded variables they entail. There, I will explain the classification criteria of the variables as well.
Using tables and graphical illustrations, the results from the statistical analysis based on the developed categories and variables are shown in the second section of the results chapter. Firstly, descriptive statistics allow for a presentation of absolute and proportional frequencies of the characteristics of climate change litigation and thereby already show the outlines of international climate change litigation. Finally, the second part covers the results of the inferential statistics including the test of independence and the logistic regression models that were run on various data samples including different sets of independent variables.

In the next Chapter 6, I will discuss the findings of the qualitative content and statistical analysis. The chapter starts off with an interpretation of the results from the statistical analysis incorporating both the literature review and the empirical work. I will argue that climate change litigation is not only becoming more visible but also more important in the overall polycentric climate governance system as well as being an effective tool for climate activism. However, I will also argue that climate change litigation incorporates high risks for both types of litigants. Throughout the discussion, I will compare the findings from international climate change litigation to the observations of McCormick et al. (2018) in the U.S. Further, I will not only show the statistical observations but also attempt to explain why these observations could have happened and whether they substantiate the claims of other scholars (cf. Peel & Osofsky, 2018; Ganguly et al., 2018). The chapter concludes with a review of the applied methods, points out the limitations of this thesis and gives recommendations for future research designs.

The conclusion highlights the most important findings of the thesis and places them in the broader context of climate change litigation. Finally, I will give an outlook for future litigation on the basis of trends that can already be observed today.

2. Theoretical Background on the Economics of Climate Change

Climate change exhibits some distinct economic features that make it a unique problem. In order to understand how to adequately address climate change, and how climate change litigation relates to the economics of climate change and fits into effective climate governance, this section introduces economic conceptualizations of climate change from the disciplines of environmental and resource economics as well as institutional economics. One the whole, this chapter explores the different layers to climate change litigation rooted in economic theories.

First, the economical characteristics of climate change and its implications are specified (Cole, 2014; Hasson, 2010; Ostrom, 2012; Snyder et al., 2017). The section is followed by concepts that deal with those specific problems in order to facilitate climate change mitigation and adaptation. The concepts are illustrated with reference to climate change litigation and cover institutions and institutional change (Hodgson, 2004; North, 1991; Ostrom, 2005; Williamson, 2000), the relation between formal legal rules and 'working rules' (Cole, 2017; Ostrom, 2005; Ostrom & Basurto, 2011), polycentric climate governance (Graichen et al., 2017; Ostrom, 2012; Peel & Osofsky, 2015) and liability (Faure & Nollkaemper, 2007; Faure & Peeters, 2011; Posner, 1986; Tietenberg, 1989; Zweifel & Tyran, 1994).

2.1. Type of Goods and Externalities

In economic scholarship, climate change mitigation is widely viewed as a global public good. As such, it is non-excludable and non-rival, meaning everyone would benefit from climate change mitigation without reducing the availability of its benefits to others. In different words, "each country (and individual) faces private costs to reduce greenhouse gas emissions, while the benefits of such efforts are shared by all regardless of their own contributions" (Hasson et al., 2010, p.331; Ostrom, 2012). This situation is also referred to as a global collective-action problem. In conventional theory of collective action, the problem can only be solved by some form of external regulation imposed on a global level, since individuals are believed to be seeking to maximize their short-term benefits, thereby decreasing long-term beneficial outcomes for all (Ostrom, 2010; Brennan, 2009). Thus, a global solution was perceived as the only strategy for effective GHG emissions reduction (Ostrom, 2012). Cole (2014) observes that the climate system is better described as a common pool resource or an open access good:

> “If the global climate were completely non-rivalrous in consumption, like pure 'public goods’, the carbon budget would be infinite“ (Cole, 2014, p.5).

However, the atmosphere can only absorb a certain amount of GHGs before the climate system enters into a new and uncertain equilibrium that is dangerous to human existence (Rockström et al., 2009). Nonetheless, climate change is a result of millions of actors at multiple scales who would all benefit from its mitigation, whether bearing any of the abatement costs or not (Ostrom, 2012). This is a classic collective-action dilemma and probably “the largest dilemma the world has ever knowingly faced“ (Ostrom, 2012, p.354).

The interdependencies between the utilities and/or costs of actors, that are not reflected in market transactions, are called externalities. In these cases, market prices do not accurately reflect actual social costs of the production or consumption of the good because they do not account for the damage or benefit done to third parties. In relation to climate change, the production or consumption of certain goods also produces GHG emissions that negatively affect everyone but are not reflected in their market price. Hence, emitters have an incentive to obscure their emissions and produce too much without taking into account the damage. This situation, where the market allocation of emissions is not Pareto efficient nor socially optimal, is a typical market failure (Snyder et al., 2017; Zweifel & Tyran, 1994).[8]
The problem of externalities is also reflected in the fact that actors unequally benefit from the provision of a stable climate system, but do not bear any of the costs for providing it - a phenomenon known as the free-rider problem. Actors, while seeking to maximize their own (short-term) benefits, have an incentive to under-provide the public good (Ostrom, 2005). For this reason, actors still increase their GHG emissions while benefiting from other actors’ policies and efforts to reduce emissions despite the urgency of climate change mitigation. Within the international climate regime, the free-rider problem is also a debate about who caused climate change in the first place and who should consequently pay the most for its abatement (Ostrom, 2012).

When addressing climate change, not only the mitigation of climate emissions is an essential strategy, but also adaption to climate change impacts. While climate change mitigation is considered as a public or open access good, climate change adaption is primarily a private good benefiting the individual (or the country) that invests in it (Hasson, 2010). Thus, there is a potential trade-off between investing in mitigation or adaptation strategies. The best combination for each country depends on the particular socio-economic circumstances, vulnerability, and ecosystems. However, Hasson

[8] A socially optimal output is achieved at the intersection of marginal social benefits and marginal social costs (cf. Snyder et al., 2017, p.683ff).

(2010) claims that if countries actually perceive climate change as a threat, they are more inclined to invest in adaptation than in mitigation.

2.2. Institutions and Rules

Because of the specific characteristics of climate change, the traditional *laissez-faire* approach of welfare economics does not lead to Pareto efficiency (Hagedorn, 2002).[9] In order to reduce negative externalities (GHGs) by internalizing them (reflect externalities in the market price),[10] a broad range of institutions in the form of (governmental) regulation, taxes and subsidies, collective choice agreements, voluntary agreements (such as markets), as well as legal instruments (cf. Pigou, 1920; Baumol, 1972; Kaufmann, 2007; Ostrom, 2005; Snyder et al., 2017) are required.[11] In institutional economics, institutions are "humanly devised constraints that structure political, economic and social interaction" (North, 1991, p.97) or "socially embedded systems of rules" (Hodgson, 2006, p.8). Current institutions governing climate change, such as the UNFCCC structure, national policies, (inter)national emissions trading schemes and other certifications, are reportedly not sufficient to meet the emissions reduction targets and keep global warming under two degrees Celsius above pre-industrial levels (Graichen et al., 2017; UNEP, 2016). In order to achieve these targets, it is necessary to change the institutional environment (Klitgaard & Krall, 2011) and change 'the play of the game', i.e., the governance structures (Williamson, 2000).

As to how and why institutional change takes place, and how it can be initiated, there are different theories (cf. Kingston & Caballero, 2009). According to Williamson (2000), the change of existing institutions or the establishment of new institutions happens at different levels and within different time frames. On the one hand, informal institutions, norms, customs, and traditions only change spontaneously every thousand years. On the other hand, the institutional environment described as 'the formal rules of the game' (e.g., polity, judiciary, and bureaucracy) changes every decade to century.

---

[9] Snyder et al. (2017) define a Pareto efficient allocation as "[a]n allocation of the available goods in an exchange economy […] if it is not possible to devise an alternative allocation in which at least one person is better off and no one is worse off" (Snyder et al., 2017, p.469).

[10] In contrast, positive externalities constitute, e.g., the bee pollination of trees (Snyder et al., 2017).

[11] The use of Pigovian taxes, whether in form of carbon taxes or trading, to internalize externalities has received major attention by economists and politicians. Today, the main instrument used is emissions trading (e.g. European Emissions Trading System (EU ETS), but there are doubts to its effectiveness due to the lack of ambition on the side of the legislature (e.g. overallocation of emissions rights) leading to insufficient incentives for emissions reductions (Faure & Peeters, 2011).

For the purpose of the present thesis on the effects of litigation, John R. Commons' theory of institutional economics is briefly outlined since he focuses on the role of the judiciary in creating new rules.[12] For Commons,

> "[…] institutions as the structured organization of individual wills [are] acting in an evolving legal apparatus" and "formal laws are often expression of pre-existing, informal and undesigned social arrangement or customs" (Hodgson, 2004, p.303ff).

Commons argues that if the existing rules become limiting and unsuitable, individuals or groups are incentivized to change these rules "through the courts or by legislation" (Kingston & Caballero, 2009, p.6). Therefore, the courts can significantly determine the direction of institutional change (Kingston & Caballero, 2009; Hodgson, 2004; Kaufmann, 2007). According to Hodgson (2004), by highlighting the role of the judiciary, Commons fails to consider other spontaneous orders and systems of rules that work without the support from the law. But in society, many rules that structure society are unwritten, whereas written (legal) rules aren't necessarily followed nor accepted (Ostrom & Basurto, 2011). Rules can be defined as:

> "[…] as shared understandings by actors about enforced prescriptions concerning what actions (or outcomes) are required, prohibited, or permitted" (Ostrom & Basurto, 2011, p.319).

Following this definition, we can distinguish between formally institutionalized legal rules and 'working rules' (Cole, 2017).[13] The relationship between formal legal rules and 'working rules' (as well as informal social norms) is complex. Cole (2017) establishes a simplified three-part typology of relations (Cole, 2017, p.839):

(1) the formal legal rule is the same as the 'working rule'
(2) the formal legal rule influences the 'working rule' (or vice versa)
(3) the formal legal rule has no obvious relation to the 'working rule'

Thus, when litigative measures try to enforce or change the formal legal rules, the higher goal would be to influence the 'working rules' as well. The processes by which formal legal rules are transformed into 'working rules' are themselves (action) situations "in which legal rules are evaluated and/or interpreted" (Cole, 2017, p.843).[14] Hence, depending on how the community understands and operationalizes formal legal rules, they are transformed into 'working rules' (Cole, 2017). In her Institutional Analysis and

---

[12] Kingston (2008) assigns John R. Commons theory on institutional economics to collective action theories on institutional change. Other important collective action theories on institutional change include *inter alia* Ostrom (2005) and Libecap (1989).

[13] Cole (2017) prefers to use the term 'working rules' instead of 'rules-in-use', a term which is commonly used for rules contrary to formal legal rules, as it sometimes implies irrelevance of 'rules-on-paper'.

[14] The term 'action situation' is used in the IAD framework developed by Elinor Ostrom and describes "the social space where participants with diverse preferences interact, ex- change goods and services, solve problems, dominate one another, or fight" (Ostrom, 2005, p.14).

Development (IAD) framework, Ostrom (2005) illustrates the relationships between formal and informal collective-choice arenas (Figure 2.1).

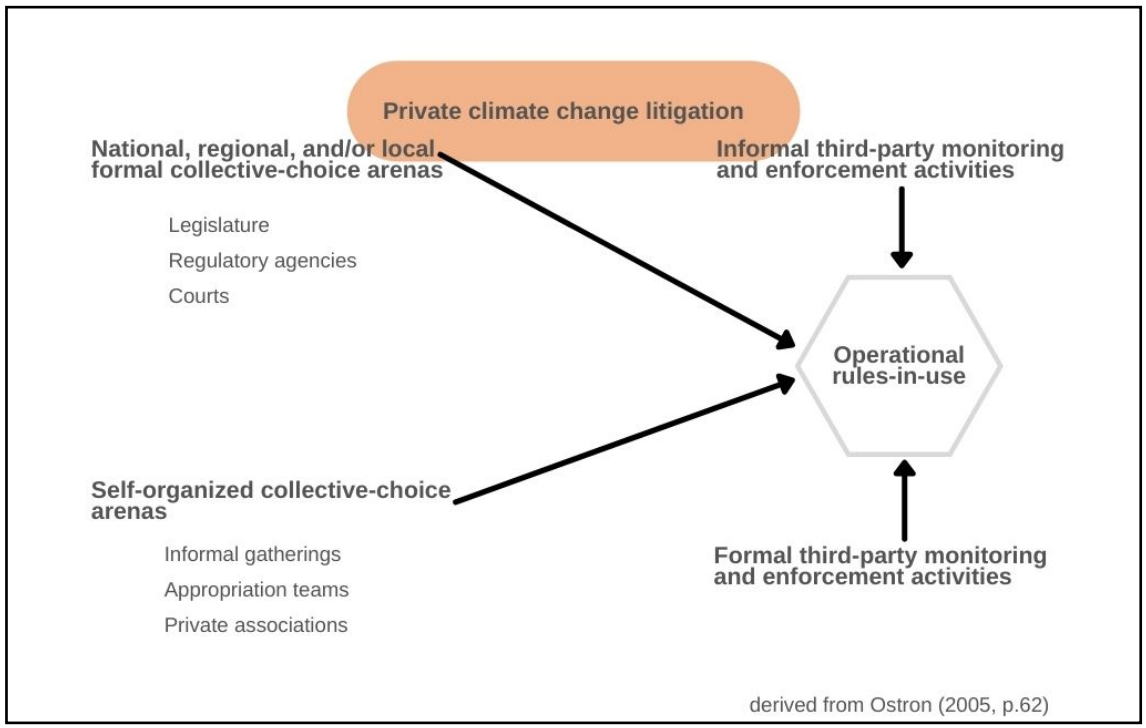


Figure 2.1: Relationships of Formal and Informal Collective-Choice Arenas

In relation to climate change litigation, petitioners would be assigned to the group of informal third-party monitoring and enforcement activities using formal collective-choice arenas, the courts, to enforce or change collective-choice rules in order to influence operational rules that cumulatively mitigate climate change.

Further, Ostrom (2005) emphasizes that when addressing institutional change, different levels of rules need to be recognized. If rules at one level are to be changed, these changes “occur within the currently ‘fixed‘ set of rules at a deeper level“ (Ostrom, 2005, p.58). She defines three levels for analysis, each level contained by the biophysical world, that cumulatively affect actions and outcomes in any situation. The rules that directly affect day-to-day decisions are operational rules-in-use. On a deeper level, there are collective-choice rules (policy-choice) that directly affect operational activities. On the deepest level are constitutional-choice rules, that directly affect activities on the higher level of collective-choice by determining the set of collective-choice rules, which in turn affect the set of operational rules and who is participating in that process (Ostrom, 2005). The difficulties of changing the rules on deeper levels is also an issue that often arises in climate change litigation. In many cases, the courts question their authority over (the lack of) legislative provisions for ordering climate change

regulation.[15] In those cases, a change of constitutional-choice rules is needed in order to enable changes in collective-choice rules.

2.3. Polycentric Climate Governance

As established, institutions and rules work at different levels (Ostrom, 2005). Current global and (inter)national institutions are insufficient to abate climate change effectively and in time (Graichen et al., 2017; Ostrom, 2012). The importance of polycentric approaches in climate governance in addition to international institutions for GHG emissions regulation has been the subject of scholarly discussions during the past decade (Bouwer, 2018; Cole, 2011; Cole, 2015; Graichen et al., 2017; Ostrom, 2010; Ostrom, 2012; Peel & Osofsky, 2015). Since many actors at different scales affect the collective benefits and costs of climate change, effective climate governance also needs to operate at multiple levels and scales, using a mix of tools (Bouwer, 2018; Ostrom, 2012). Peel & Osofsky (2015) argue why climate change litigation matters within the overall system of climate governance:

> "(1) international regulatory efforts are failing, increasing reliance on domestic regulatory solutions to which litigation can contribute;
> (2) climate governance operates across multiple scales and involves many actors, and litigation can be a useful means of connecting these different elements; and
> (3) mitigation and adaptive outcomes rely on the cumulative effect of numerous smaller-scale decisions, many of which come before courts and through which litigation can play an effective shaping role"
> (Peel & Osofsky, 2015, p.10).

Further, climate advocates pursuing legal measures to address market and policy failure exercise a form of climate activism. The increasing number of environmental NGOs and citizen advocacy groups involved in climate change litigation and strategic cases against corporations and governments indicates that different stakeholders join forces and resources to abate climate change (Setzer & Byrnes, 2019). These transnational alliances can be understood as bottom-up climate initiatives that contribute to polycentric climate governance (Peel & Osofsky, 2015; Jordan et al., 2015). Climate change litigation has an impact well beyond the court room by raising

[15] A case in which the judges questioned their authority is, for example, the highly publicized case *Juliana v. United States* which was filed in 2015 by young petitioners with the help of 'Our Children's Trust' claiming the U.S. federal government violated their constitutional rights by causing dangerous GHGs concentrations in the atmosphere. In January 2020, the petition was denied by the United States Court of Appeals for the Ninth Circuit. The majority of the judges *inter alia* expressed that "it was beyond the power of an Article III court to order, design, supervise, or implement the plaintiffs' requested remedial plan where any effective plan would necessarily require a host of complex policy decisions entrusted to the wisdom and discretion of the executive and legislative branches. The panel reluctantly concluded that the plaintiffs' case must be made to the political branches or to the electorate at large" (*Juliana v. United States*, 2020, p.5).

awareness, educating the public and building networks of activists in all areas of climate change (see Chapter 3.3.3.), which are typical functions of climate initiatives (Averill, 2007; Graichen et al., 2017). Climate initiatives engaging in litigation play a unique role. They do not only engage in public education, but also try to force action, e.g., the implementation of activities to reduce GHG emissions, by making use of the existing institutions of the UNFCCC structure and national policies (Peel & Osofsky, 2015). In that process, they might also initiate institutional change (Kaufmann, 2007).

> "In a way climate change litigation is much more radical than traditional activism because you're trying to challenge the establishment through the processes of the establishment" (Peel & Osofsky, 2015, 31).

While polycentric climate governance has received attention from economists in relation to its transformative potential, empirical findings about the performance of climate initiatives are scarce due to a lack of effective evaluation and monitoring methods (Jordan et al., 2015). However, in an attempt to quantify the emissions reduction potential of climate initiatives, Graichen et al. (2017) suggest that they do have the potential to further increase mitigation efforts and reduce emissions (Graichen et al., 2017).

While a polycentric system of climate governance in which multiple actors, policies, and institutions on different levels attempt to reduce GHG emissions might be effective, it is also a chaotic system and characterized by a number of problems. Ostrom (2012) identifies the key problems as "leakage, inconsistent policies, free-riding, and inadequate certification" (Ostrom, 2012, p.364). The problems stem from a lack of effective international policies as well as some ineffective and costly projects that particularly reward those actors, whose efforts are only pretend and an opportunistic way to obtain funds by meeting minimum requirements.[16] Ostrom further states that the "recognition of problems is essential to start serious efforts to find methods to reduce them" (Ostrom, 2012, p.364). Climate change litigation might be such a method because it can be used by informal third-party monitoring actors as a tool to directly target (invalid) beneficiaries of the current climate governance system. For example, there are climate cases where corporations were accused of false certification,[17] and

[16] Leakage occurs when policies to reduce emissions are adopted at a less than global scale. For example, when the location of GHG production is simply moved to another country or when changes in the price structure give incentives for more climate-damaging production or consumption (Ostrom, 2012).

[17] In *Australian Competition and Consumer Commission v. Prime Carbon Pty. Ltd*. (2010), the respondent, a business that sells carbon credits, claimed it was certified by the National Stock Exchange of Australia. Further, Prime Carbon Pty. Ltd. claimed that the National Environment Registry, a company through which it supplied some of its credits, was regulated by the Australian Government. The petitioner successfully argued that the respondent misrepresented its services and affiliations because the certifications were false (ACCC, 2010).

misusing funds,[18] or where governments were accused of activities leading to leakage.[19] These examples show that the opportunities of climate change litigation in addressing institution and market failure at all levels, from local to international, are numerous.

2.4. Liability

A valuable tool of the court system in controlling emissions is the application of liability law which combines areas of the law with economic principles. In certain situations courts can establish responsibility for damage done to third parties, order compensation directly to the involved victims, and create incentives for polluters to implement precautionary measures to avoid legal actions. Liability law provides an alternative instrument for the internalization of externalities, and complements legislative as well as administrative measures, such as emissions taxes and trading schemes (Tietenberg, 1989). In order to enable any internalization, property rights need to be assigned to the external effect. These rights determine who is eligible to use a resource and who has a right to claim for any loss of value (Zweifel & Tyran, 1994):

> "If the law assigns property rights to the producer of the externality, the victim is mandated to tolerate the loss. The polluter is not liable for damages in this case. If, however, the law assigns property rights to the victim, the polluter is not allowed to cause externalities and is thus liable for damages" (Zweifel & Tran, 1994, p.44).

The resulting resource allocation of court decisions is not predetermined to be efficient, but depends on the available information at the time, the financial ability of the polluter to pay damages, and the legal doctrine as a basis for the courts' decision (Tietenberg, 1989). Under the negligence doctrine, the potential injurer would be found liable, if he failed to take a minimum amount of prevention, such as a court imposed standard of care or if the costs paid for precautionary measures are smaller than the probability

[18] In *Australian Competition and Consumer Commission v. Global Green Plan Ltd.* (2010), petitioners successfully challenged the corporation for misusing funds that were originally appropriated for renewable energy investment.

[19] In *PUSH Sweden, Nature and Youth Sweden and Others v. Government of Sweden* (2016), the Swedish government was accused of illegally selling partly state-owned coal-fired power plants and mining assets to a German subsidiary of a Czech holding company. Petitioners argued that the sale would enable the expanded exploitation of the coal assets, resulting in emissions in excess of limits that correspond to climate stability and by that breach constitutional provisions and obligations under international agreements.

and the magnitude of the loss of the victim (Posner, 1986; Tietenberg, 1989).[20] Tietenberg (1989) finds that the efficiency of the expected damages depends directly on the dictated standard of care by the court. If the standard of care were too high, expected damages would be inefficiently low. Vice versa, if the standard were too harsh, expected damages would be excessive. Under strict liability, the proof of causation shifts from a violation of standard of care to establishing the causation of injuries. Strict liability means that a potential injurer is liable for the victim's damage even if the injury could not have been avoided by any precautionary measures (Posner, 1986; Tietenberg, 1989).[21] Product liability is part of strict liability and concerns damage caused by producing, distributing, or selling products.[22] Both the negligence rule and strict liability presume that the victim exercised due care.[23] This is not presumed under absolute liability, where the potential injurer is held liable regardless of the level of prevention undertaken on both sides (Zweifel & Tyran, 1994).

Environmental Impairment Liability (EIL) refers to specific situations in which the environment has been harmed or polluted by the actions of third-party individuals or entities as in the case of pollution through GHG emissions. The assessment of financial damages can be high if a court finds an entity liable for environmental impairment. For example, the multinational oil and gas company BP plc settled for a record sum of $20 Billion U.S. dollars for the oil spill caused by the explosion of Deepwater Horizon in the Gulf of Mexico (Mclean & Chapple, 2015). The amount of damages creates an incentive for polluters to prevent such impairments from happening in the future. In EIL, claims arise from victims being harmed by unauthorized environmental pollution (Zweifel & Tyran, 1994). Zweifel & Tyran (1994) state that changes in the liability rules do affect the level of environmental impairment, since the transaction costs (costs of negotiating, monitoring, or enforcement) of direct contracts between the involved

---

[20] For instance, in the case *Wohl v. City of New York* petitioners sought damages for their property which was damaged due to severe rainfall during Hurricane Irene in 2011 claiming that the damage occurred because the City of New York neglected their maintenance and inspection duties. However, the Supreme Court of New York in Staten Island found no evidence for negligence stating that the sole proximate cause for the flooding was the volume of the rainfall (Wohl v. City of New York, 2014).
The standard of care is the degree of care, e.g., caution and prudence, a reasonable person would exercise under the specific circumstances and should be laid down by the courts (cf. Baltimore & Ohio R. Co. v. Goodman, 1927).

[21] The phrase 'potential injurer' is adapted from Zweifel and Tyran (1994) though not technically a word in the English language. It is an expression for a potential liable party or offender and used in the context of liability in this thesis.

[22] Claims for product liability have *inter alia* been made in the case *Pacific Coast Federation of Fishermen's Associations, Inc. v. Chevron Corp*. in 2018. The case has not been decided yet, but the petitioners, who are a commercial fishing industry trade group, seek to hold the fossil fuel company liable for adverse climate change impacts to the oceans resulting in prolonged closures of crab fisheries. The petitioners seek damages and relief for the actions of the fossil fuel company based on strict liability for the failure to warn and strict liability for design defects of the fossil fuel products.

[23] Due care should be exercised by any reasonable person in looking out for the safety of others in a particular situation.

parties are usually excessively high in environmental impairment cases.[24] The Coase theorem, according to which Pareto-improving bargaining leads to the social optimum independently of the property rights structure, does not apply (Snyder et al., 2017; Zweifel & Tyran, 1994). EIL further exhibits special features that differentiate it from traditional liability:

(1) victims usually do not affect the probability of the accident
(2) potential injurers are mostly firms instead of private individuals
(3) the distribution of information between injurers and victims is imbalanced leading to a common problem of asymmetric information with less information available to the victims
(4) litigation costs are usually higher which diminishes the likelihood of potential injurers to be sued which in turn results in less prevention undertaken by the potential injurer (Zweifel & Tyran, 1994)

In an optimal institutional environment, the costs arising from damages, prevention, and transactions should be minimized. Transaction costs for EIL mainly concern the collection of information needed to investigate potential injurers and present causality and the extent of the damage done to the victims, legal costs including hiring experts, as well as the time and effort dedicated to the case (Grossman, 2003; Zweifel & Tyran, 1994). The level of transaction costs and their distribution among the involved actors is determined by the legal institutions.

> "The rule of liability determines under *which circumstances* an injurer is held liable, the proof of causality determines *how* the causal relationship between an event and a damage is established, and the burden of proof determines *who* has to provide evidence" (Zweifel & Tyran, 1994, p.47).

A shift in the rule of liability (as well as the burden of proof), e.g., from negligence to strict liability (or burden of proof resting on the defendant), changes the distribution of the transaction costs amongst involved parties substantially (Zweifel & Tyran, 1994). Transaction costs also increase with rising amounts of damages paid to the victims. For instance, in the U.S., courts follow the so-called 'deep-pocket policy' and adjust damages to the estimated ability of the injurer to pay. If damages ordered by the court are higher than the injurer's assets, injurers would need to declare bankruptcy and victims would not be compensated at all.[25] Further, high transaction costs lower the probability of awarded compensation to the victim resulting in a suboptimal amount of

[24] Direct negotiations between the involved parties and the internalization through contracts are assumed in the Coase theorem.

[25] Zweifel and Tyran (1994) argue that the gap between damages and financial means can be closed by EIL insurance resulting in efficiency gains. For further reading on insurance in the context of global climate change see Ross et al. (2007).

prevention taken by the potential injurer. Therefore, Zweifel & Tyran (1994) argue that damages must be adjusted upwards by the courts.

Faure & Nollkaemper (2007) find that the most difficult issue in a liability claim is the proof of causality because it is associated with high uncertainty. The authors name four ways of dealing with uncertainty issues related to the proof of causation *inter alia* the threshold liability and the proportional liability. Threshold liability guarantees full compensation for the victims if the probability of causation hits a certain threshold. If the probability does not meet this threshold, no compensation is awarded. In the case of proportional liability, compensation would be awarded according to the percentage of the probability of causation.[26] For Faure & Nollkaemper (2007) proportional liability provides optimal incentives for accident reduction, since the potential injurer "is exposed to precisely the liability for the risk which was caused by his activity" (Faure & Nollkaemper, 2007, p.164; Makdisi, 1988). Further, the fact that many actors are involved in climate change raises the question of Joint and Several Liability, which makes each successfully sued injurer potentially liable for the amount up to the entire damage that was caused, whether damages match the injurers actual contribution or not (Tietenberg, 1989).[27] So, if it cannot be established who caused the injuries to a specific extent, all injurers will be held jointly and severally liable (Faure & Nollkaemper, 2007).

In climate change related litigation, liability law claims have already been made. Most of them usually do not ask for compensation but rather ask for injunctive relief in order to stop the emissions of GHG (Faure & Peeters, 2011). Also, governmental adaptation measures stimulated victims to seek injunctive relief or compensation for injuries to their property rights, e.g., on coastal areas through sea level rise (Burger & Gundlach, 2017; Peel & Osofsky, 2015). Faure and Peeters (2011) have examined the potential of liability in the context of climate change under various legal systems using a broader understanding of liability that includes public law (Faure & Peeters, 2011). In public law, the precautionary principle can be used as a claim for liability in case of insufficient precaution. The precautionary principle is an anticipatory principle dealing with both legal and scientific uncertainty that is high for many environmental problems and especially for climate change. In particular, the message of the precautionary principle

---

[26] Currently pending in appellate court, in the case *Lliuya v. RWE AG* (2015) a Peruvian farmer seeks a declaratory judgment and compensation for damages arising from GHG emissions of RWE AG that caused the glacier melting near his town in Huaraz. The case is further special due to the different locations of the litigants (Peru and Germany). The petitioner asked the court to order RWE to reimburse him for 0,47 percent of the costs he had born to install flood protection - the same proportion of RWEs annual contribution to GHG emissions. While the lower court rejected the complaint, the appellate court allowed the case to proceed (*Lliuya v. RWE AG*, 2018).

[27] Tietenberg (1989) analyzed the economic dynamics of Joint and Several Liability in a Nash equilibrium.

is that a lack of scientific certainty is not a reason to delay measures to prevent environmental degradation (Gollier et al., 2000).[28] It can also be applied "in claims against emitters of GHG claimed to be directly responsible for climate change" and establish negligence claims (Haritz, 2011, p.23). For domestic tort law, claims largely differ between legal systems. In common law systems, tort-based climate cases raise claims under public nuisance and product liability, as Grossman (2003) examined for the U.S. Faure & Nollkaemper (2007) identify harmonization efforts of the European Union (EU) in products and environmental liability to the U.S. system. They refer to the Directive 2004/35/CE (European Liability Directive) on environmental liability "as an example of one approach to the prevention and remedying of environmental damage" and state that climate change damage may fall within the scope of the Directive (Faure & Nollkaemper, 2007, p.147). Further, GHG emissions should trigger strict liability under the Principles of European Tort Law that were presented in 2005.

In international law, climate case claims can be based on the commissions of a prohibited act, which is either the violation of an obligation under a treaty, such as the Kyoto Protocol, or a rule of customary international law meaning an "obligation of states not to cause damage to the environment of other states" (Faure & Nollkaemper, 2007, p.144).[29] Now, with the Paris Agreement in place, there might be new litigative potential. Boom et al. (2016) refer to Article 8 of the Paris Agreement as an exclusive element concerned with loss and damage that result from adverse effects of climate change. In Article 8 of the Paris Agreement, member states pledge to support each other for any loss and damage ranging from irreversible or permanent loss and damage, slow onset events, non-economic losses, to resilience of communities, livelihoods, and ecosystems. Paragraph 51 of the Decision 1/CP.21 states, however, that Article 8 cannot be used as basis for any liability or compensation. Boom et al. (2016) suspect that this reference is made to state liability, not private liability. Still, as long as the paragraph is in place, no reference to Article 8 can be made in court proceedings (Boom et al., 2016). However, Bouwer (2018) emphasizes on the new space of litigation in domestic courts as a result of the Paris Agreement. Member states now have clear and differentiated mitigation commitments, the NDCs, which are legally binding and to be increased over time. The elements of each national policy can

[28] For example, in the case *Alanvale Pty. Ltd. v. Southern Rural Water Authority* (2010) an anti-regulatory petitioner appealed the denial of a license for groundwater extraction in 2010 in Australia, which was denied on the basis of climate variability. The tribunal used the precautionary principle, fully denied the appeal, and held that there was a risk in over-allocating groundwater supply regarding the possibility of scarce rainfall as a result of climate change.

[29] In 2018, the International Court of Justice ordered Nicaragua to compensate Costa Rica for $120.000 U.S. dollar because Nicaragua cleared vegetation and forest in the territory of Costa Rica resulting in a loss of environmental goods and services, such as carbon sequestration and gas regulation by Costa Rica. The decision was based on the 1858 Treaty of Limits between Nicaragua and Costa Rica (*Costa Rica v. Nicaragua*, 2018). Thus, there are various treaties in place outside of the UNFCCC structure to argue climate cases.

consequently be tested in domestic courts with respect to their international commitments (Bouwer, 2018).

3. Climate Change Litigation

After examining some of the underlying economic aspects of climate change in relation to climate change litigation, this chapter covers climate change litigation in more detail, starting with definitions of climate change litigation and climate cases (Bouwer, 2018; Peel & Osofsky, 2015). Building on that basis, the section explores the areas of law from which legal obligations in climate change litigation are established (Boom et al., 2016; Burger & Gundlach, 2017; Peel & Osofsky, 2015) and demonstrates how litigation can serve as a regulatory tool impacting policy outcomes, society, and the corporate world (Averill, 2007; Burger & Gundlach, 2017; Peel & Osofsky, 2015; Setzer & Byrnes, 2019). Since litigation is not guaranteed to be successful, the chapter will further illustrate unintended possible outcomes and legal issues that petitioners have to deal with, such as justiciability issues and establishing standing and cause-effect links (Averill, 2007; Burger & Gundlach, 2017; Osofsky, 2005).
As climate change litigation is closely linked to climate change science, one section examines the role and potential of climate change science in the court room (Marjanac et al., 2017; Marjanac & Patton, 2018; McCormick et al., 2017). The chapter concludes with further barriers to progress in climate change litigation, mostly due to anti-regulatory goals of some petitioners and risks associated with high litigation costs for pro-regulatory climate advocates (Averill, 2007; Kaswan, 2007; Peel & Osofsky, 2015).

3.1. Definition

The possible responses to a problem as complex as climate change are multifaceted. Climate change spans multiple levels of governance, sectors of the economy and social life as well as areas of the law. It is therefore difficult to determine where a response to climate change begins and ends. The boundaries of climate change mitigation and adaptation become nondistinctive. Thus, by taking a broad approach to climate change litigation, Peel & Osofsky (2015) argue that almost any litigation could be conceived as such. As a result, the worldwide collection of climate cases is broad and shows no common characteristics which would allow for a definition of ’climate change litigation’ (Bouwer, 2018).
In order to deal with this ambiguity, “existing scholarship tends to limit the scope of examination to actions that explicitly or overtly relate to climate change“ (Bouwer, 2018, p.487). Some studies only analyze cases in which climate change is explicitly mentioned in court documents. Bouwer (2018) is critical of this approach because it tends to limit the pool of cases that can be considered as climate change litigation. For example, if cases are motivated by climate action but argued on other grounds, they

would be excluded (Peel & Osofsky, 2015). Further, cases within the realm of private law and cases that were settled outside of the courtroom still have an impact on climate change but might not be classified as climate cases and as a result are overlooked (Bouwer, 2018). Therefore, Bouwer (2018) suggests to

> "think about litigation 'in the context of' climate change, as well as litigation 'about' climate change, in order to render the invisible visible" (Bouwer, 2018, p.484).

The definitions of climate change litigation by Peel and Osofsky (2015) try to set boundaries in which climate change litigation takes place (Figure 3.1). At the core are (1) cases in which climate change is a central issue, followed by (2) cases in which climate change arguments are raised, but only mentioned marginally. These cases would be 'about' climate change and can be easily identified and classified.

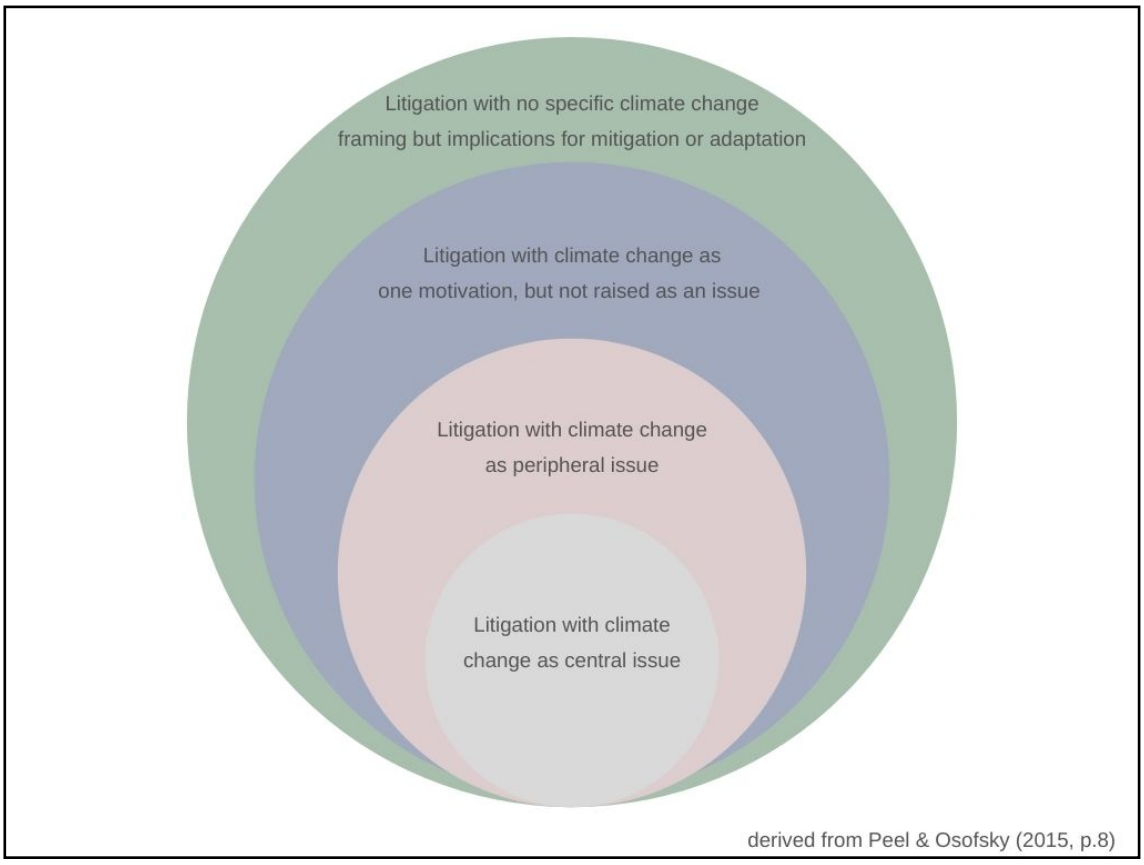


Figure 3.1: Conceptualizing Climate Change Litigation

Then there are (3) cases which are motivated by climate action but argued on other grounds, and (4) cases that are not tied to any specific climate change arguments but have implications for climate change mitigation or adaptation. Those kind of cases are more difficult to detect. Therefore the working definition of 'climate case' used in this thesis only includes cases in which climate change is a central issue or in which it is at least mentioned as a distinct feature of the case. A more detailed description how and why cases were selected is given in the Chapter 4.2.1.

In order to deal with the different notions of climate change litigation, cases can be classified as strategic or routine cases. Strategic cases tend to be 'high-profile' cases, as they exhibit a visionary approach and seek to stimulate public and policy debates about climate change. Routine cases are less visible and cases of smaller scale (Bouwer, 2018; Setzer & Byrnes, 2019). In the literature, there is a common differentiation between the litigants' motivation for legal action. Litigants either seek to promote climate change regulation (pro-regulatory) or seek to challenge existing or proposed regulatory measures (anti-regulatory) (Peel & Osofsky, 2015).[30]

3.2. Legal Obligations

The sources of climate change obligations are manifold and naturally differ between countries. The legal basis for claims in climate change litigation can be based upon international law, constitutional, statutory, and local provisions, or common law.[31] In many cases, petitioners use a combination of them. If climate change related matters are explicit content of regulation, "the task of applying the law to the facts alleged is straightforward" (Burger & Gundlach, 2017, p.5). Greater challenges occur if courts are asked to apply legal authority to regulation that is missing climate change related issues since they can be perceived as penetrating areas of the legislative (Burger & Gundlach, 2017).

On an international level, obligations stem from the UNFCCC structure, in particular provisions from the Kyoto Protocol, and more recently the Paris Agreement. Further, petitioners base their claims on international human rights law and world heritage law (Boom et al., 2016). In human rights cases, claims are established to demonstrate

[30] A different and more detailed typology of climate change litigation is offered by Ghaleigh (2010). In addition to the typologies of promotive and defensive (as pro- and anti-regulatory), he introduces the types of boundary testing (that challenge existing limits of regulatory regimes) and perfecting (that seek to improve existing regulatory regimes).

[31] As key jurisdictions for climate change litigation are the U.S., Australia, and the United Kingdom because by far most climate cases have been processed in these countries, a majority of the literature analyzes climate change litigation in a common law system. However, with an increasing number and geographical expansion of climate cases, climate change litigation also occurs in countries with civil law and mixed legal systems (Setzer & Byrnes, 2019). The common law (or Anglo-American legal family) is one of the largest legal families including all countries that were once or are still governed by England. Since the U.S. was the first colony achieving independence, its common law legal order differs most from English law (Hertel, 2009). In contrast to civil law systems (or the Romano-Germanic legal family), common law is referred to as the body of law derived from judicial decisions (case law), rather than from statutes or constitutions (statutory law) in civil law systems (Garner, 2009). Historically, a written legal code precedes judgments in civil law systems and the judge's duty is to determine the law from the words that have been used in the code. The common law is unclear until expressed in a judgement. The judge therefor decides "in accordance with morality and custom" and subsequent judgements follow the principle of the precedent (Devlin, 1979, p.177). However, today most provisions in common law countries are also codified in a statutory form, such as environmental statutes in the U.S. (Hertel, 2009).

human rights violations or to support other claims under the public trust doctrine or in tort cases (Peel & Osofsky, 2018). For EU member countries, obligations arise from several EU Directives, for instance, the directives regulating the European emissions trading system (EU ETS).
On national levels, constitutional and statutory provisions provide legal basis for climate cases. Often, petitioners have relied on their constitutional rights to life or a healthy environment and have used the precautionary principle. Also, claims are made based on national policies involving environmental protection, renewable energy, NDCs, and other policies regarding climate change. Petitioners have used common law obligations such as the public nuisance doctrine and negligence claims in tort law as well as the public trust doctrine (Burger & Gundlach, 2017; Grossman, 2013; Haritz, 2011; Lin, 2011; Peel & Osofsky, 2015). In addition, there are numerous local regulations in place which particularly govern (environmental) planning processes and thereby provide a legal basis for climate cases (Bouwer, 2018).

3.3. Litigation as Regulatory Tool

Based on a broad understanding of ’regulation’ that includes formal legal rules and informal rules (see Chapter 2.2), climate change litigation can serve as a regulatory tool as a part of climate governance (Peel & Osofsky, 2015). It can also influence the behavior of stakeholders indirectly, e.g., through public education and pressure. The following sections will lay out the different types of impacts of climate change litigation on policy, corporate actors, and society (Averill, 2007; Burger & Gundlach, 2017; Peel & Osofsky, 2015; Setzer & Byrnes, 2019). In addition to these effects of litigation, I will shortly outline possible unintended outcomes (Averill, 2007).

3.3.1. Policy Impacts

Many current climate-related cases, in particular ’high-profile’ cases, aim to incentivize governmental authorities at various levels to take action with respect to climate change mitigation and adaptation. Climate advocates compel the government to fulfill their obligations under national and international climate and environmental policies or even try to force the government to increase mitigation ambition (Averill, 2007; Burger & Gundlach, 2017; Setzer & Byrnes, 2019).[32]

[32] In the case *Leghari v. Federation of Pakistan* (2015), a farmer challenged the Pakistani government to fulfill its obligations under the national climate change policy as well as the framework for its implementation claiming the failure to implement the policy violates fundamental human rights. The court ruled in favor of the petitioner and ordered the government to undertake a variety of measurements.
A prominent example of a case to increase national climate change mitigation ambition is the already mentioned case *Urgenda Foundation v. The State of the Netherlands* (2015).

At times, climate cases address issues concerning the authority of a governmental agency and seek to clarify existing law. Issues are raised whether that federal or state agency has the authority to enforce climate policies and whether there are laws in place to allow or prevent those agencies from taking action (Peel & Osofsky, 2015). This is particularly important in countries where climate change related policies are not explicit but a result of other environmental policies, or where legislation left gaps in regulation (Averill, 2007; Burger & Gundlach, 2017). For example, many cases challenging a project or policy seek to identify relations between resource extraction as well as combustion and climate change impacts, and make these relations legally significant (Burger & Gundlach, 2017). Other cases focus on procedural requirements and seek to ensure that climate change impacts and GHG emissions are routinely taken into account in environmental assessment processes and other similar decision makings (Peel & Osofsky, 2015).

In some regions, climate change impacts have resulted in migration within and across national borders and will continue to do so. When environmental stresses are so severe, individuals or communities living in certain areas can no longer sustain their livelihood and start migrating. Already, cases resolving issues from migration due to climate change have been brought before the courts (Burger & Gundlach, 2017).[33]

3.3.2. Corporate Impacts

There are both direct and indirect effects on corporate behavior resulting from climate change litigation. Corporations can be directly affected by court orders to hold and prevent specific actions, change their operations, incorporate climate risk into their decision-making, or give financial compensation for injuries caused by climate damaging actions that can be attributed to themselves (Averill, 2007; McCormick et al.,

[33] In New Zealand, climate change refugee Teitiota has challenged the denial of his refugee status. The petitioner fled the Kirabati islands due to rising sea levels and environmental degradation resulting from climate change impacts (*Teitiota v. The Chief Executive of the Ministry of Business, Innovation and Employment*, 2015). After losing before the Supreme Court, this case went before the UN Human Rights committee. The committee upheld the denial in this specific case but states in its ruling that “the effects of climate change in receiving states may expose individuals to a violation of their rights … thereby triggering the non-refoulement obligations of sending states“ which opens doors for future obligations under international law (Lyons, 2020; UN Human Rights Committee Views Adopted on Teitiota Communication, 2019).

2018; Setzer & Byrnes, 2019).[34] Legal actions seeking damages or injunctive relief involve claims that include (product) liability, negligence, and public nuisance (Grossman, 2003; Setzer & Byrnes, 2019). To this effect, many cases pursue to "establish liability for entities that generate emissions with full knowledge of those emissions' effects on the global climate" (Burger & Gundlach, 2017, p.5).

Averill (2007) states that corporations take risks from legal action seriously. Even prior to a decision by the court, corporate litigants often take voluntary action or engage in settlement negotiations in order to mitigate negative publicity and unforeseeable damages ordered by the court. In any case, litigation action involves immediate legal costs. Further, if a case against a corporation was successful, other corporations operating similarly are at higher risk of litigation. On that account, corporations try to influence public opinion through publicity campaigns and lobby for changing laws (Averill, 2007). Private climate change litigation therefore increases costs and risks for corporations and might invite corporations to integrate litigation risk into corporate climate risk management (Peel & Osofsky, 2015).

3.3.3. Societal Impacts

Whether or not climate change cases are successful (from a pro-regulatory standpoint), they can still have a positive impact by making climate change and climate change science more visible in the public eye. In each case, both sides present their best story using (scientific) experts and arguing facts and claims particular to the case. Depending on the media coverage of those cases, this information will reach the public through a variety of sources. Climate change litigation cannot only affect the public perception of the credibility of climate change science but also raise important questions about responsibility, fairness, balancing risks and uncertainty, and future climate action and protection (Averill, 2007; McCormick et al., 2018):

> "How is climate affecting individuals and communities? What is the division between human and natural causes of climate change? Has harm already started to occur? Who is responsible, the corporation that emits CO2 by burning fossil fuels to produce energy, or the consumer who uses the energy? What costs are associated with reducing greenhouse gas emissions or with failing to reduce them? What governmental policies are best for the public? Who deserves to be compensated for injuries, both domestically and internationally? Who should pay for injuries to people or property? What allocation of

[34] For example, in 2005 a civil advocate successfully challenged oil and gas corporations in *Gbemre v. Shell Petroleum Development Company of Nigeria Ltd. and Others* (2005) to hold the practice of gas flaring in the Niger Delta arguing human rights violations. However, the court's order was never enforced (Faturoti et al., 2019). The case is described in detail by Osofsky (2005).
Alongside the case *Lliuya v. RWE AG* (2015) in which a Peruvian farmer seeks proportional compensation for damage from RWE AG, a bundle of cases were brought in Brazil by the Public Prosecutor of Sao Paulo seeking compensation from various airline companies that use the regional airport. The petitioner sought reforestation by the respondents to offset their GHG emissions and other pollutants. The case *Sao Paulo Public Prosecutor's Office v. United Airlines and Others* was dismissed in 2014 on the grounds that the court lacked jurisdiction.

> responsibility among governments, corporations, and individuals is fair? Do we know enough about climate change and its effects to be able to answer such questions? How should decisions be made in the face of scientific uncertainty?“ (Averill, 2007, p.468)

Thus, litigation can assume the role of public education. A better understanding of the causes and effects of climate change can consequently lead to a change in consumer behavior and other beneficial social responses (Moser & Dilling, 2004). Social change initiated by litigation may be slow. However, the material produced by climate change litigation can be used by other climate advocates to communicate the urgency of climate action and legitimacy of climate change science (Averill, 2007).

3.3.4. Possible Unintended Outcomes

Litigation is not only a lengthy and costly process but also entails high risks. For example, there is a risk that the original goal of petitioners, whether they are trying to enforce or block climate action, is defeated (Setzer & Byrnes, 2019). A lost lawsuit can have direct social or environmental impacts. Plaintiffs seeking stricter regulation on climate change mitigation and adaptation “may risk more than just losing a lawsuit“ (Averill, 2007, p.470). For instance, a ruling by the court claiming climate change science is still too uncertain may justify climate inaction by the government. Further, ineffective or flawed expert testimonies may undermine the legitimacy of climate change science as a whole. In litigation cases against corporations, lost cases may serve as precedent against similar litigants while won cases may encourage businesses to lobby for legislation protecting against such lawsuits and decreasing regulation on climate change issues in the future. Also, anti-regulatory petitioners face additional risks if losing the lawsuit, such as encouraging governmental bodies to introduce stricter regulation (Averill, 2007).

3.4. Legal Issues

While climate change litigation can have impacts on policy outcomes as well as social and corporate behavior, there are some legal issues that are specific to climate-related litigation. Foremost, climate change litigation, such as any environmental litigation in general, often raises higher-level institutional questions about the separation and balance of powers and challenges judicial competence (Burger & Gundlach, 2917; Grossman, 2003; Peel & Osofsky, 2015). As described by Sax (1998), environmental litigation is “a means of access for the ordinary citizen to the process of governmental decision-making“ (Sax, 1998, p.301). Others dispute this aspect, claiming litigation would interfere with “democratic values by removing environmental decisions from elected officials“ (Averill, 2007, p.463).

> "Courts generally focus on the particular plaintiffs and defendants in front of them; however, in this instance [global warming], the major issues of causation, multiple defendants and plaintiffs, the variety of remedies, and present and future harms all suggest a more comprehensive approach to climate change that might be better taken by a legislature or agency" (Grossman, 2003, p.6).

On court level, this issue translates into the issue of justiciability. The term generally refers to the ability of a person to seek remedy before a court of law in case of specific harms. A case is only justiciable in a particular court if that court is capable of deciding the matter and finds it appropriate to do so. Whether the court has the power to adjudicate the case and authorize remedy usually depends on constitutional provisions but is eventually decided by the courts before hearing the case (Burger & Gundlach, 2017).[35]

Another element regarding the justiciability of a case is the establishment of the petitioner's standing to bring the case before a court. The petitioner is obliged to satisfy particular criteria in order to be a party to the legal proceeding. Fundamentally, these criteria typically aim to ensure that all parties have sufficient stake in the outcome and that the claims can be resolved by the court. Often, petitioners must show that they have suffered, or will suffer, as a result of the respondents' alleged unlawful actions. Depending on the case, the issue of standing can be a serious challenge in climate change litigation, especially when a group or individual petitioner must establish a specific injury (Burger & Gundlach, 2017; Peel & Osofsky, 2015). For this reason, many NGOs that seek to mitigate climate change collaborate with local residents that can prove their (future) injuries. Still, most tort-based claims against major emitters of GHGs have been dismissed due to justiciability issues (Marjanac & Patton, 2018). The issue of justiciability is also relevant for class action suits, in which a group of people is suing together. The definition of the group as well as the reasons why only this particular group is affected has to be justified before the court. This condition makes class action suits in climate change litigation rare since everyone is arguably affected.[36] When individual petitioners are allowed by the jurisdiction to sue based on injuries that are general to the public, the bar to establish standing becomes lower. In the Global South, the issue of standing has received less attention so far (Burger & Gundlach, 2017). Setzer & Benjamin (2020) observe that some countries of the Global South, e.g., India and the Philippines, have interpreted standing requirements more broadly because of the success of using "public interest litigation to address environmental

[35] Courts decide differently on such matters in different jurisdictions and levels of instances. Some examples are depicted by Burger & Gundlach (2017) in the corresponding chapter about the separation or balance of powers.

[36] There has been one attempt for a class action suit in Canada that was decided in 2019. While the judge recognized the justiciability of climate change impacts, he denied the authorization of the proposed class of all Québec citizens aged 35 and under, claiming the age limit was arbitrary (*ENvironment JEUnesse v. Canada*, 2019).

concerns“ which is partly supported by the judiciary in order to drive sustainable development (Setzer & Benjamin, 2020, p.95).

Hence, the petitioner’s choice of where to sue is important. Osofsky (2005) analyzes the geography of climate change litigation. He states that

> “[…] the choice of parties, fora, and substantive law each connect the case or petition to particular localities. Such decisions are rarely neutral, but rather reflect comparative assessments of litigative potential that are tied to place. For example, whether comparisons occur at a subnational, national, or supranational level, some places are perceived as having stronger regulations, more will to enforce their regulations, or a more progressive judiciary than others“ (Osofsky, 2005, p.1802).

However, the choice of jurisdictions that show stronger regulations and a more progressive judiciary does not guarantee a positive outcome for the petitioner. Even if international standards for judicial independence and the rule of law are met, the judges deciding the cases are still human beings that are “inescapably intertwined in their place in the world“ (Osofsky, 2005, p.1808). Adjudicators are not neutral beings disconnected from the world but have values that are based on “their socioeconomic, political, and educational experience“ of their locality (Osofsky, 2005, p.1807).
In terms of climate change litigation, the political and social setting also determines the degree to which the courts accept that (1) climate change is caused or reinforced by human (or the respondent’s) actions, (2) climate change has injured or will injure the petitioners, and (3) climate change science is exact and reliable. The acknowledgement of all three elements is crucial so that petitioners can successfully establish cause-effect links (Burger & Gundlach, 2017). For instance, the proof of causality is the most difficult issue in liability claims (Faure & Nollkaemper, 2007), heavily complicated due to cross-boundary pollution (Averill, 2007). Burger & Gundlach (2017) find that while many courts have accepted the scientific consensus on the causal relationship between humanly caused GHG emissions and climate change (impacts),

> “[…] no court has yet found that particular GHG emissions relate causally to particular adverse climate change impacts for the purpose of establishing liability“ (Burger & Gundlach, 2017, p.18).

Thus climate change science is and will be a core aspect of any climate change related case that is not primarily decided on procedural or administrative grounds (McCormick et al., 2017).

3.5. Climate Change Science

Science in climate change litigation is *inter alia* used for weather event attribution that seeks to establish climate change as the cause for a specific event, projecting climate change impacts such as sea level rise, and quantifying GHG contributions of particular emitters or economic sectors. There is a growing literature on quantifying GHG emissions from various sources in energy or in agricultural production (cf. Whitaker et al., 2012; Olander et al., 2014), but also for projecting sea level rise (cf. Slangen et al., 2017).

In order to establish a cause-effect link in climate change litigation, petitioners further need to provide evidence that the amount of GHG emissions caused the (weather) event that injured them, for example, a flooding or drought event. For this reason, the improvement of weather event attribution science can influence the outcome of climate change litigation. Probabilistic event attribution seeks to establish a causal relationship between anthropogenic GHG emissions and the "probability or intensity of a particular weather event or class of weather events, with an assignment of statistical confidence" (Marjanac et al., 2017, p.616). This is achieved by comparing changes in observed records with climate model simulations and by differentiating between natural and human-caused processes leading to (climate-related long-term) heat waves, droughts, and heavy (short-term) precipitation events. Although weather attribution science always expresses its findings in probabilistic terms, it can form the basis for establishing sufficient cause-effect links before a court, provided it is admissible to serve as evidence in the respective jurisdiction. The challenge here is to balance scientific integrity and a clear expression of the scientific results that is understandable for non-scientists (Marjanac et al., 2017). As any other scientific evidence used in court, expert testimony on weather attribution science is tested by various rules of evidence to determine credibility and reliability (Marjanac & Patton, 2018).

The establishment of a causal link between a particular emitter of GHGs and climate-related harm experienced by the victims has been largely unsuccessful, although drawing causal links between climate change and its impacts such as sea level rise have been well established and accepted.[37] McCormick et al. (2017) analyze the role of climate change science in U.S. courts and find that the extent to which science is considered is rather context-specific. However, the authors observe that it has been attached more and more importance in recent court cases. For instance, climate

[37] In Australia, a number of cases have been brought before the courts that challenged developments in coastal areas due to flood risks resulting from climate change impacts. In most cases, the courts based their decision on scientific results regarding sea level rise. For instance, in the appeal *Northcape Properties v. District Council of Yorke Peninsula* (2008) the Supreme Court of South Australia upheld the local council's decision that climate change induced hazardous sea level rise over the next 100 years constitutes a sufficient basis to support the refusal of the coastal development application.

change science has been used to determine the required GHG reductions of a government to fulfill obligations under UNFCCC in the *Urgenda* case, and to establish the standing of the petitioners and allowance to proceed on the merits. According to the authors, science is more heavily used in pro-regulatory than in anti-regulatory cases (McCormick et al., 2017).

The science of (extreme) weather attribution in the context of climate change improved significantly since the first event attribution study was published in 2004 (Marjanac & Patton, 2018; Stott et al., 2004). Today, the attribution of extreme weather and climate events is a subfield of climate science in its own (Otto, 2017) and scientists continuously improve their approaches (cf. Bellprat et al., 2019; Paciorek et al., 2018; Stott et al., 2015; Vautard et al., 2016). The work of weather attribution science can further help to improve forecasting future events (Ornes, 2018; Harrington & Otto, 2018). As weather attribution science improves, the foreseeability of events increases as well, affecting various areas of law in particular areas in which legal duties rise from the power to manage and mitigate (foreseeable) risks:

> "Improvements in attribution science may […] increase the likelihood that courts will be willing to issue both traditional and novel and far-reaching injunctive relief restraining action; or, in the future, rulings that require defendants to pay damages to plaintiff parties adversely affected by the impacts of climate change" (Marjanac & Patton, 2018, p.297).

Due to the concept of fungibility which states that GHG emissions are mutually interchangeable in their impact and effect on the atmosphere because atmospheric warming is determined by the overall global GHG emissions, all emissions from different sources contribute to the problem equally over time. Translated to the area of law, the concept of fungibility is the basis for assigning responsibility to different actors and their total quantities of emitted carbon dioxide equivalent emissions (Marjanac & Patton, 2018). Combined with the advances in probability weather attribution science, the chances to establish a cause-effect link for tort and liability cases in climate change litigation increases. Further, foreseeability of events and their damage is an important requirement for cases based on duty of care claims, in particular in adaptation cases, as decision-makers have a duty to manage foreseeable damages and incorporate those risks into their planning for the future (Marjanac et al., 2017; Marjanac & Patton, 2018; McCormick et al., 2017).

3.6. Barriers to Progress

While climate change litigation offers the possibility for various actors on multiple scales to engage in climate governance, and to influence climate change mitigation and adaptation, there are limits to climate change litigation as a regulatory tool (Peel &

Osofsky, 2015). Some barriers have already been mentioned, ranging from the separation of powers and the struggle of the judiciary to impose stricter regulation, the hurdles of establishing a cause-effect link and the standing of petitioners, possible unintended outcomes, as well as anti-regulatory litigation in general (Peel & Osofsky, 2015). Anti-regulatory petitioners have used environmental provisions to block climate protection by challenging existing rules and environmental regulation affecting private property rights as well as blocking federal ambitions for climate action (Averill, 2007).
In addition, there are access barriers for petitioners due to litigation costs and the associated risks (Peel & Osofsky, 2015). High litigation costs may prevent poor victims with insufficient resources from taking litigative measures (Zweifel & Tyran, 1994). Further, Kaswan (2007) speaks of “free rider problem“ in climate change litigation when each victim hopes that someone else affected will bring suit and bear the costs and risks. However, Peel & Osofsky (2015) conclude that

> “despite these barriers, our overall assessment of the constructive regulatory impact of this litigation remains positive“ (Peel & Osofsky, 2015, p.309).

In the following chapters, this claim will be tested empirically.

4. Methods

In order to empirically investigate the outcomes of climate change litigation on a global level and to make out the factors which determine the success or failure of a case, cases from all over the world have to be selected and evaluated. To do so, a mixed methods approach including elements from qualitative and quantitative content analysis was chosen. Qualitative methods in this thesis consist of developing categories and coded variables for structurally unpacking the material in light of my research interest. The qualitative data is composed of the case descriptions, provided by the Sabin Center and Grantham Research Institute, and attached case documents available in English. Subsequently, quantitative methods such as descriptive and inferential statistics are applied on the data set to explore factors determining climate change litigation. Consequently, the unit of analysis is global climate change litigation, whereas the units of observation are the distinct climate change litigation cases (climate cases). Excluded from the analysis are the jurisdictions located in the U.S.

The foundation of the empirical work in this thesis is a data set for climate change litigation outside of the U.S. which is developed with the support of two databases that are publicly available online. Cases were selected by specific criteria and then processed using a structured form of qualitative content analysis and Grounded Theory approach (Corbin & Strauss, 2018; Mayring, 2010; Schreier, 2014). The following chapter attends to the data collection process, detailing the characteristics of the utilized data sources, the definitions of relevant terms, and the selection criteria. The methods for data analysis are split into qualitative and quantitative tools. First, methods used to develop a category and coding system for the data set of climate change litigation outside of the U.S. are described, followed by the presentation of applied descriptive and inferential statistics, the corresponding formulas and interpretations of the output.

4.1. Data Collection

4.1.1. Data Sources

Major sources for the development of the data set are two databases made available online by the Sabin Center for Climate Change Law at Columbia Law School and the Grantham Research Institute on Climate Change and the Environment at London School of Economics and Political Science (Sabin Center for Climate Change Law, n.d.; Grantham Research Institute, n.d.). The institutes cooperate with each other to collect climate change litigation cases within and outside of the jurisdiction of the U.S.

and update their databases monthly. The database from the Sabin Center focuses on U.S. climate change litigation, while the Grantham Research Institute focuses on worldwide climate change litigation and policies. Still, as climate cases are listed in a unique style in both databases and therefore provide slightly different information on each case, both databases are utilized to construct the data set used in this thesis. While the institutes strive to keep their databases as comprehensive and accurate as possible, they do not claim completeness of the information and encourage open participation (Grantham Research Institute, n.d.). This feature and the fact that both institutes reside in anglophone countries might result in an overrepresentation of climate cases available in English, as documents on cases are mostly released in the official language of the respective country or region. This becomes especially apparent concerning cases not having received high media attention and is part of the later discussion about the limitations of the data (see Chapter 6.2). For retracing purposes, no additional data from other databases was used.

For cases outside of the U.S., the databases cover all UN and UNFCCC parties on national level as well as jurisdictions of supranational organizations, such as the EU, the UN, and the Organization of the American States (OAS). The two research institutes understand the definitions of the terms ’climate change’ and ’laws’ as inclusive and flexible to enable addressing different sectors, approaches, and cultures amongst the countries. Also, the U.S. Climate Change Litigation database states that the term ’case’ refers to more than judicial actions and proceedings such as rule-making petitions, requests for reconsideration of regulations, notices of intent to sue, and subpoenas.
With regard to further research, the Grantham Research Institute advises researchers to evaluate the usefulness of the data for their own research purposes themselves (Grantham Research Institute, n.d.). Hence, I will elaborate on the more distinctive selection criteria for the purpose of this thesis in the following.

4.1.2. Selection Criteria

As stated, the Sabin Center and Grantham Research Institute use the term ’climate case’ in a broader sense which encompasses climate change litigation processes in their entirety. For the purpose of this thesis, a more narrow interpretation of the term is used. In order to analyze the outcome of climate change litigation through the judicial system, only cases that feature a distinct plaintiff or petitioner and defendant or respondent are considered for the data set.[38] In order to be able to evaluate the cases with respect to their outcome, cases must have concluded in a comprehensible

[38] The terms ’petitioner‘ and ’respondent‘ will be used throughout the thesis. Cases lacking a distinctive petitioner or respondent do not fit in the data set and would lead to numerous issues of classification.

decision by the court (at least once). These criteria eliminate settlements, notices of intent to sue, pending cases (with the exception of appeals, where a lower court has previously come to a decision on the matter), and incomprehensible cases (where information was lacking). Furthermore, to count as a climate case climate change needs to be mentioned explicitly either in the petition or the judgement by the court. Case descriptions and documents, if available, have been further scanned for climate change related key words ’greenhouse gas’, ’global warming’, and ’carbon dioxide’ and then assessed if climate change is a distinct issue in the case. The main reasons for choosing this working definition of 'climate case' are the data sources and their pre-selection of climate cases as well as to keep the variety of the data limited for the statistical analysis. The subject of climate change litigation already incorporates numerous aspects that need to be considered for the analysis. Hence, I chose a clear definition of climate case for practical reasons. Still, as a comprehensive analysis of the outcome of climate change litigation on an international level has never been done before, this analysis provides new insights and contributes to the existing literature. Cases’ decisions were last altered on the 8th of March 2020. Subsequent new rulings were not included resulting in a period of analysis from 1994 to 2019.

4.2. Data Analysis

4.2.1. Qualitative Content Analysis

According to Schreier (2014), qualitative content analysis is a method to excerpt relevant meanings of textual data as categories and assign text passages to this set of categories. The analysis aims at reliability and validity, so the set of categories reflect the essential aspects of the material. There are different kinds of qualitative content analysis, e.g., structured or formal, all of which approach the material from a different perspective. The different kinds share the development of categories which are applied to the material in a systematic and rule-oriented manner. Categories and variables are developed with respect to the research questions (Schreier, 2014). In the end, all categories were developed deductively with one exception: the main topic or issue of climate change that the case is about was developed inductively. For the purpose of this thesis, a structured content analysis was most suitable to gain an overview of the material (Mayring, 2010; Schreier, 2014). There are different ways to conduct a structured content analysis. This thesis follows the toolbox approach outlined by Schreier (2014).

During the collection process of the data, a brief summary of each case was written. These case summaries served as the basis for any future data processing,

construction of categories and sub-categories, re-assignment and re-classification of cases, and iterative changing, improving, and adjusting of the data for the statistical analysis. The brief case summaries are based on the case descriptions provided by the Sabin Center and complemented - if those were lacking or insufficient - on the attached case documents that usually consist of the petitions or judgements. A mixed approach of deduction and induction is used for the development of categories and corresponding variables. Most categories and coded variables are deducted from the literature and utilized databases, while others - the category *Climate Issue* - are developed inductively based on the material at hand. This approach is also consistent with the conception and analytical tools used by Grounded Theory (Corbin & Strauss, 2018). Grounded Theory emphasizes on the dynamic aspect of qualitative data analysis. During data processing categories and variables are continuously revised and adapted until it “feels right“ (Corbin & Strauss, 2018, p.163). Developing certain codes inductively makes it possible to reflect the heterogeneity of cases from all over the world. Most categories are thematic, use thematic codes, and are measured on a nominal scale (Boyatzis, 1998; Schreier, 2014). In the following, the coded variables of those categories are termed ’categorical‘ in line with the terms used in statistical analysis. The results section describes how each category and corresponding coded variables were developed. Moreover, it elaborates on the assignment of codes to the cases based on specific classification criteria that were determined by reviewing the case summaries as well as additional case documents. It is further noted at which scales the coded variables are measured.

In this section, an example is highlighted to grasp the methodological process of the development of categories and variables. In order to develop the categories and variables inductively, relevant facts concerning the specific category were summarized case by case. In the beginning of the data collection process, this was particularly done to describe the motivation of the petitioner, the respective goal or issue of the climate case, and the claims made at court. For example, in the case *In re Court on its own motion v. State of Himachal Pradesh and others* (2013) in India the motivation was to protect glaciers and forests; the goal was to implement already existing policies as well as to halt and reverse the receding of glaciers near Rohtang pass by restricting transport and implementing a deforestation program; and the claims were made based on rights to a healthy environment and a right to life before the National Green Tribunal. Also, the relation to climate change was documented, whether it was weak or strong, as well as the environmental impact of successful pro-regulatory cases. For the Indian case the environmental impacts were, e.g., an abatement of GHG emissions by reforestation and a reduction of traffic in the Rohtang pass. However, during the ongoing data collection process, some of the original categories were removed or adapted due to a lack of information, problems of interpretation, and redundancy. The

motivation, for example, could not be determined on the basis of the data for most cases and moreover, left too much room for speculation. The impact on the environment could only be determined for pro-regulatory cases which were won and where a certain period of time had passed in order to evaluate recordings of the actual impact it had and was therefore eliminated.

Another method for qualitative content analysis which is deemed particularly useful when conducting a large-scale study is the construction of a typology (Kuckartz, 2014; Schreier, 2012). In this case, a typology for the outcome of climate change litigation is constructed with respect to the impact the case had on climate protection thereby inheriting an evaluative character. The typology is illustrated in Chapter 5.1.2. of this thesis.

4.2.2. Statistical Analysis

The focus in this study does not lie on the individual climate case but on the distribution of the coded variables of all climate cases of the data set. Therefore, descriptive and inferential statistical methods are applied. The results are illustrated in quantitative presentation styles, using graphs, diagrams, and tables, either in text or in the appendix.

4.2.2.1. Descriptive Statistics

The descriptive statistical part of the analysis offers an overview of the outcome and relevant aspects of climate change litigation. To identify the absolute frequency distribution of selected codes and illustrate them in an adequate way the software Microsoft Excel is utilized.[39] If appropriate, percentages of the distribution are given as well. For the extraction of the relevant data from the data set, the function 'PivotTable' which constructs contingency tables is applied.

4.2.2.2. Test of Independence

A test of independence allows to determine whether the distribution of the variables shows some kind of relation to the outcome of climate change litigation. If the differences between the groups (outcome and category X) are so large that they are unlikely to have occurred by chance or sampling error, these group differences are termed significant (Schreier, 2014). One test of independence designed for categorical variables that are expressed as frequencies is the chi-square test (Aldrich & Cunningham, 2016). It uses the chi-square distribution (χ^2) to see whether there is a significant difference between the observed frequencies and expected frequencies in one or more categories. The chi-square test expresses whether the two categories are

[39] The version utilized in this thesis is Microsoft Office 365.

stochastically related or independent by rejecting or not rejecting the null hypothesis, respectively. It does not express the intensity of a potential relationship (Aldrich & Cunningham, 2016).

Generally, the chi-square test in this thesis is applied to identify if particular categories have a correlation with the outcome of climate change litigation. To express the outcome, the mentioned evaluative typology is used (the outcome is either positive or negative). Hence, the hypothesis is that the variables of category X and the outcome Y are stochastically dependent while the null hypothesis states the opposite of no dependency (Aldrich & Cunningham, 2016):

> H_1: The variables of X and Y (evaluative outcome of climate change litigation) show statistical dependency.
>
> H_0: The variables of X and Y (evaluative outcome of climate change litigation) show statistical independency.

The Pearson chi-square test was run in Microsoft Excel. At first, contingency tables were developed - with a selected category X and the evaluative typology of the outcome Y of climate change litigation. The contingency table includes the observed or actual frequencies A_{ij} as the frequency of a combination of the variables Y_i and X_j, the row and column totals r_i and c_j, and the grand total. The expected frequencies are calculated as the ratio of the product of row and column totals to the grand total. For good results of the chi-square test, it is recommended that every expected frequency should be above five. In order to achieve that condition, some categories were re-classified into broader classes (CHISQ.TEST function, n.d.).

Then, by applying the CHIQU.TEST function of Microsoft Excel,[40] a chi-square test was performed on the actual and expected frequencies, giving a probability that the differences between the two data sets are likely to be explained by chance or sampling error. The formula for the chi-square (χ^2) test is (CHISQ.TEST function, n.d.):

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(A_{ij} - E_{ij})^2}{E_{ij}}$$

where,

A_{ij} = actual frequency in the i'th row and j'th column

E_{ij} = expected frequency in the i'th row and j'th column

r = number of rows

c = number of columns

[40] In the 365 Microsoft Version of Excel the function is called CHIQU.TEST.

CHIQU.TEST uses the χ^2 distribution with an appropriate number of degrees of freedom (df). If the rows and columns are higher than one, then df is the product of (r - 1)(c - 1) which is the case for all chi-square tests executed in this thesis. Generally, a probability of α = 0.05 or less is considered to be significant.[41] So if χ^2 is lower than α, the chi-square indicates that there is a significant difference between the observed and expected frequencies unlikely due to error or chance (CHISQ.TEST function, n.d.).

4.2.2.3. Logistic Regression Analysis

There are various statistical tests to identify the strength and direction of a correlation between variables. When dealing with categorical dependent variables that are measured at a nominal scale, a logistic regression is the appropriate choice (Aldrich & Cunningham, 2016). In this study, the dependent variable has two dichotomous values as a result of the evaluative typology of the outcome: 0 for a negative and 1 for a positive outcome (see Table 5.1) and by that violates the assumption of linearity in linear regressions. A logistic regression is therefore the appropriate choice of method to determine significant factors contributing to the outcome of climate change litigation.
In mathematical terms, the logistic regression model predicts the natural logarithm (logit or ln) of the odds of the outcome of interest Y from the independent variable X. Odds are ratios of the probabilities of the outcome of interest happening (π) to the probabilities of the outcome of interest not happening (1-π). So in a simple way, the logistic regression can be expressed as (Peng et al., 2002):

$$\text{logit (Y) = natural log (odds) = ln}\left(\frac{\pi}{1-\pi}\right) = \alpha + B_1X_1 + B_2X_2 + \ldots$$

where,

Y	=	outcome of interest
π	=	probability of Y happening
α	=	intercept of Y (constant)
B	=	regression coefficient (logit)
X_k	=	independent variables

Aldrich & Cunningham (2016) state that for a logistic regression the data does not need to be normally distributed or have equal variances. However, there are some issues

[41] The probability α (alpha) is the type I error in hypothesis testing consisting of a rejection of a null hypothesis that is true (false positive) and is sometimes referred to as level of significance. A probability of α = 0.05 means that there is a 5 % probability that the null hypothesis is rejected but true.

that need to be considered: (1) sample size and number of independent variables, (2) extreme values, and (3) multicollinearity between the independent variables. The authors recommend decreasing the number of independent variables or increasing the sample size if the number of independent variables is too high. An indicator for too many independent variables would be empty cells in the omnibus chi-square test. Further, extreme values should be eliminated. The authors also suggest a weak correlation between independent variables and a moderate to strong correlation between independent and dependent variables (Aldrich & Cunningham, 2016). In order to check for multicollinearity of the independent variables, a test for Spearman's Correlation Coefficients for Multicollinearity was run.[42] Any correlation coefficient between independent variables higher than 0.35 is considered as too high if the correlation is also deemed to be significant (Aldrich & Cunningham, 2016).

The logistic regression models were run in IBM SPSS statistics 26.0. The technical term in SPSS for the type of regression conducted in this thesis is binary logistic regression (Aldrich & Cunningham, 2016). Default settings for model criteria were used for all models.[43] The SPSS program presents the output of the logistic regression in two blocks conducting a 'Wald' statistic. The first block is *Block 0* and "attempts to predict the outcome […] without using any of the independent variables" (Aldrich & Cunningham, 2016, p.277). As a model that only uses a constant and no predictors (independent variables), it is used as a baseline for the evaluation of the model with predictors (Peng et al., 2002). Ideally, the correct prediction of variables should increase when introducing the independent variables (predictors) in *Block 1*. Within the second block *Block 1*, three types of output are created. First, the performance of the model is indicated by the classification table of correctly predicted cases. Secondly, the fit of the model is tested by the omnibus test of model coefficients and the Hosmer-Lemeshow test which are both 'goodnis-of-fit' tests. By default, SPSS statistics develops values of the 'Cox & Snell R Square' and the 'Nagelkerke R Square' and refers to them as Pseudo R square values. In connection with multiple regression analysis, these values are disputed in the literature as real R square values (Aldrich & Cunningham, 2016; Peng et al., 2002). For this reason, both R square values are not considered in this thesis for interpretation and the Hosmer-Lemeshow test is added to the output instead. The third type of output describes the correlation between the individual independent variables (predictors) and the dependent variable. The direction, strength, and significance level of the 'Wald' statistic is produced for each value of the independent variables. For hypothesis testing, the upper and lower confidence intervals

[42] The test for Spearman's Correlation Coefficients for Multicollinearity is executed in IBM SPSS statistics 26.0 using the 'Bivariate' analysis window checking 'Spearman' as correlation coefficients.

[43] Default setting are the following: the probability for a stepwise entry is at 0.05 and the removal at 0.1. A maximum of 20 iterations are executed. The classification cutoff occurs at 0.5.

are produced. The interpretation of all outputs is explained in the following Tables 4.1 and 4.2.

Table 4.1: Interpretation of Model Performance Results

	Interpretation
Omnibus Test	Indicates whether the model fits the data better than the model in *Block 0* with no predictors. High significance values $p < 0.05$ indicate a good fit of the model. Results show a chi-square statistic, the degrees of freedom, and the significance level.
Hosmer-Lemeshow	Indicates whether the model is not fitting the data. Low significance values $p > 0.05$ indicate a good fit of the model. Results show another chi-square statistic, the degrees of freedom, and the significance level.
Classification Table	Originally illustrates the observed and predicted frequencies of the outcome (positive and negative). It shows the correctly predicted outcome, false positives and negatives. Here, the total correctly predicted outcome is presented in percentages as well as the difference between the correctly predicted outcomes of *Block 0* and *Block 1* as percentage points increase.

Table 4.2: Interpretation of Logistic Regression Model Results of the Individual Predictors

	Variables in the Equation				
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)
Step 1[a]					Lower Upper
Name	Standardized regression coefficient		Significance level of the 'Wald' statistic	Exponent of B	Confidence intervals for Exp(B)
Formula	H_0: B = 0		If $p < 0.05$, then significant	H_0: Exp(B) = 1	If Lower C.I. < 1 > Upper C.I., then H_0 is accepted
Interpretation	Positive/negative values indicate that an increase/ decrease in the predictor variable increases the likelihood of membership to the outcome of interest. At value 0 the null hypothesis is accepted		Contribution of the indepen-dent variable is statistically significant	If Exp(B) is > 1, the relationship between predictor and outcome of interest is positive. If Exp (B) is < 1, it is negative.	The null hypothesis is accepted if 1 falls between the upper and lower boundaries.

a. Variable(s) entered on step 1: independent variables X

The variables in the equation (Table 4.2) represent the regression coefficients and are interpreted as the predicted change in log odds (logarithm of the odds ratio) for every unit increase on the predictor. Generally, it "shows how each of the independent variable contributes to the equation" (Aldrich & Cunningham, 2016, p.281). For every model, the standardized regression coefficient, the degrees of freedom (df), the significance level of the 'Wald' statistic, the exponent of the standardized regression

coefficient as well as the confidence intervals of that exponent are presented.[44] The SPSS program also produces values for the ’Wald’ statistic. For a clear arrangement and simplified interpretation of the predictors only the significance level of the ’Wald’ statistic is displayed.

Hence, the standardized regression coefficient B indicates the direction and strength of the relationship between the predictor and the outcome of interest. The outcome of interest has the value one which, in this study, refers to a positive outcome of climate change litigation. As B is standardized, the value of the coefficient is unit-less. Whether the relationship is statistically significant can be derived from the significance level of the ’Wald’ statistic. However, the null hypothesis is only rejected when the confidence intervals for the exponent of B do not enclose the value one. The hypotheses for the logistic regressions are: [45]

> H_1: The predictors of X_k and Y (outcome of interest) show a statistical significant relationship.
>
> H_0: The predictors of X_k and Y (outcome of interest) show no statistical relationship.

Predictors in this sense refer to the coded variables assigned to the categories depicted in Chapter 5.1. As recommended by Peng et al. (2002), the output of the performance of the model as well as the results for the predictors are illustrated for each model. Therefore, the results from the logistic regression models indicate whether there are statistically significant factors that determine the outcome of climate change litigation.

[44] When “using standardized regression coefficients, then each coefficient b_k indicates the expected change in Y [dependent variable], in standard deviation units, given a corresponding 1 standard deviation change in X_k [independent variables], when all the other predictors in the model in X […] are fixed or controlled for“ (Nimon & Oswald, 2013, p.651).

[45] A full list of possible independent variables X_k can be found in the Supplementary Table 18.

5. Results

The data collection process and application of the selection criteria resulted in a total of 263 climate cases since 1994 outside of the U.S. The next chapter presents the results of the qualitative and quantitative analysis of these cases. The first section describes the categories and coded variables developed to analyze the outcome of climate change litigation and thereby setting the frame for the application of subsequent quantitative methods. Henceforth, the data are statistically analyzed in order to identify trends of climate change litigation and factors that determine their outcome. The quantitative results are presented in the second section of this chapter, complemented by tables in the appendix.

5.1. Qualitative Content Analysis

In this passage, the development of categories and coded variables for the 263 climate cases is elaborated. An overview of all developed categories and coded variables is shown in the Supplementary Table 1. The categories were developed to describe the properties of each litigation case with regards to the overall research question concerning the factors that determine the outcome of climate change litigation. In order to facilitate some level of comparison to the U.S. analysis on the outcome of climate change litigation by McCormick et al. (2018), various categories and variables were inspired by their coding system.

To clarify the reasons for the selection of categories, this chapter specifies whether they are based on the literature or developed inductively and explains why the specific categories have been chosen and what they entail. The section further gives an explanation for every coded variable as well as for the criteria of their classification. Apart from the two-level hierarchy of categories and coded variables, categories and variables might be summarized by upper-level groups and variables might contain sub-codes providing a higher level of detail. There are four upper-level groups of interest: basic information, stakeholder, case specifications, and outcome. For each upper-level group, several categories have been developed (see Figure 5.1).

The data of which some categories consist, such as the *Name*, *Year*, *Country* (or region), and *Jurisdiction* are not coded. The Rule of Law Index and CCPI scores are adopted from the corresponding sources (Burck et al., 2020a; WJP, 2020). All variables of the remaining categories are coded categorically and measured at a nominal scale. In general, each case is assigned to one definite code for each category unless mentioned otherwise.

Figure 5.1: Categories of Climate Cases by Upper-Level Groups

5.1.1. Basic Information

To begin with, basic information that helps defining and differentiating the cases was collected. Cases are characterized by the *Name* of the case, the *Year* of filing (or, if not available, the year of ruling), the *Jurisdiction* of the court, and the *Country* in which the jurisdiction is located.

Additionally, a category marking whether the case occurred before or after 2015, the year in which the Paris Agreement was accomplished, the *Urgenda* case decided, and climate change litigation supposedly experienced a second wave, was produced (Ganguly et al., 2018; Setzer & Byrnes, 2019; *Urgenda Foundation v. The State of the Netherlands*, 2015). This category is called *Marker 2015*. The variables of this category are dichotomous and divided into cases that have been filed (or decided) before 2015 or in 2015 and afterwards. The codes are *Ante 2015* and *Post 2015*, the latter including cases from the year 2015.

Further along the analysis, country specifications were added to the data. These include the type of *Legal System* derived from JuriGlobe[46] (2020a), the *Rule of Law* Index 2020 provided by the World Justice Project (2020), and the Climate Change

[46] Juriglobe is a research group of the University of Ottawa.

Performance Index (*CCPI*) 2020 developed by Germanwatch e.V. (Burck et al., 2020). The category *Legal System* allows to identify the influence of different legal families that the jurisdictions of the climate cases are located in. The Rule of Law Index further supplies more detail on each jurisdiction and whether principles such as accountability of and accessibility to the judiciary impact the outcome of climate cases. Moreover, the CCPI might offer insight into a possible correlation of a country's climate protection efforts and the outcome of climate change litigation.

The classification of the legal systems is based on five categories selected by JuriGlobe: (1) *Civil Law;* (2) *Common Law;* (3) C*ustomary Law;* (4) *Muslim Law;* and (5) *Mixed Law* system, which refers to a combination of legal systems. The researchers admit this classification is imperfect (JuriGlobe, 2020b). Hertel (2009) expresses the classification of legal families in the following way:

> "Classification into legal families permits legal orders in different countries that share distinctive common features to be described in summarised form. The standard summary facilitates legal comparison […] It is unavoidable with a simplified summary that various details of the individual legal orders do not fit into the generalised scheme of things. […] There is no 'correct' or even generally recognised classification into legal families" (Hertel, 2009, p.128).

Thus, it should be noted that by using only five concepts of legal families some important differences between the different legal systems of the countries are overlooked. For climate cases on international level, such as the European Union or United Nations, the code (6) *International Law* is introduced.

The Rule of Law Index was developed by the World Justice Project (WJP) in order to quantitatively measure the rule of law in practice. Focusing on policy outcomes rather than written legal codes, the data draw upon a general population poll and respondents' questionnaires to examine the experienced and perceived rule of law in 128 countries (WJP, 2020). The rule of law is a complex concept, best described by the set of outcomes it provides when effectively implemented:

> "Effective rule of law reduces corruption, combats poverty and disease, and protects people from injustices large and small. It is the foundation for communities of justice, opportunity, and peace - underpinning development, accountable government, and respect for fundamental rights" (World Justice Project, 2020, p.9).

On this note, there are four universal principles of the rule of law: accountability, just laws, open government, and accessible and impartial dispute resolution. The overall score ranges between zero and one, where zero reflects a weak rule of law and one a strong rule of law (WJP, 2020). As scores are only available for 128 countries worldwide, some countries cannot be assigned a Rule of Law Index score. This concerns Switzerland, Luxembourg, and Ireland as well as supranational jurisdictions in this thesis.

Since 2016, Germanwatch e.V. in collaboration with the New Climate Institute and Climate Action Network-International have been developing the Climate Change Performance Index (CCPI), a tool to monitor countries' climate protection efforts. It aims at transparency in national and international climate policy and allows the performance of different countries of the world to be compared. So far, 58 countries have been evaluated by 350 climate experts from all over the world (Burck et al., 2020b). There are no data available for Colombia, Costa Rica, Kenya, Nigeria, Pakistan, Philippines, or supranational jurisdictions. The countries' climate protection efforts are assessed within four categories: GHG emissions, renewable energy, energy use, and climate policy. The index incorporates past trends and current levels of emissions, renewable energy use and primary energy supply as well as respective 2030 targets and national and international policies (Burck et al., 2020b). The overall score ranges between zero and one hundred points, from a low to high performance, respectively (Burck et al., 2020a).

Using cross-country international data to analyze the outcome of climate change litigation, these country specifications might offer valuable insight when cautiously interpreted. Cross-country legal data faces substantial difficulties because each unit, in this case the country, is highly heterogeneous; the sample size is small as each country only exists once; and the data is sparse since it is often unavailable for many countries and variables (Spamann, 2015). Spamann (2015) calls the testing of causal theories using cross-country legal data 'empirical comparative law' and places it

> "at the crossroad of empirical legal studies, comparative law, and sister empirical disciplines such as comparative politics" (Spamann, 2015, p.132).

Empirical comparative law is regarded as a method; the largest body of literature is found in the field of 'law and finance' (Spamann, 2015; cf. La Porta et al., 1998). Retrospectively, Spamann (2015) emphasizes the fact that different outcomes cannot entirely be explained by differences between legal systems, e.g., common law and civil law systems. Therefore causal links between the outcome and legal origin should be drawn carefully, if at all. Empirical comparative law can however narrow down the number of plausible effects by, for example, testing possible causalities of legal origin against domestic evidence. He further recommends using the Rule of Law Index and other indicators when conducting empirical comparative research (Spamann, 2015). Hence, the category *Legal System* and two indices were introduced: the Rule of Law Index and the CCPI.

For both indices, the latest version is used for all cases independently from the year of filing or ruling. During the data collection the latest version was of 2020. Though the data cover a time span of more than 20 years during which climate change laws and policies have probably changed, the scores used in this thesis are derived from the latest versions of the indices for practical reasons. The Rule of Law Index and Climate

Change Performance Index were first published in 2007 and 2016, respectively, thereby producing a lack of data for all climate cases between 1994 and 2007 or 2016. The countries' performance over time is thereby only reflected in their latest scores.

5.1.2. Stakeholder

There are different parties involved in a litigation process, such as the individuals of the judiciary, lawyers, judges, and, in jury trials, the members of a jury. However, for the purpose of this thesis, only the *Type of Petitioners* and *Type of Respondents* of the particular cases are considered. The categories provide information about who drives climate change litigation and who is at the responding end. In combination with other categories, information on the *Type of Petitioners* and *Type of Respondents* helps to generate valuable empirical insights about who wins and/or loses cases, how the litigants achieve their goals, and what their goals in the litigative process are.

The same coding structure is used for both stakeholder categories and is inspired by the codes used by McCormick et al. (2018). It consists of (1) *Individual or Citizen Advocacy Group;* (2) *ENGO* for environmental non-governmental organizations; (3) *Corporation* for any type of businesses; (4) *Industry Advocacy Organization;* (5) *City;* (6) *Local Government;* (7) *State Government;* (8) *Federal Government;* and (9) *Supranational Government*. The codes referring to governmental agencies include all types of governmental bodies on the particular level. Further, the code *Federal Government* refers to all agents with authority on a national level regardless of the existence of a federal system in the respective country. While there are some climate cases in which combinations of those groups were involved, one definite group was assigned to each case. The classification is based on the relevance of the particular group to the climate issue of the case or, for example, which type was ranked higher on the petition and judgment documents. During the classification process these case documents were reviewed and interpreted.

5.1.3. Case Specifications

The following categories embody the essence of each case and the focus of this study: what the case is about; what it is based on; what the initial goal of the petitioner is; and which kind of type the case represents.
In order to classify climate cases with respect to their impact on climate change, the category *Goal of Petitioner* is introduced. It describes the petitioner’s attitude towards climate protection, whether the petitioner favors a higher or lower level of regulation on climate change. The category *Case Mode* concerns the approach that has been taken by the petitioners to achieve their desired goal (Setzer & Byrnes, 2019). Going into detail, the category *Climate Issue* provides information about the climate sector in

which the litigation takes place, e.g., if the climate case challenges fossil fuel extraction in the energy sector or if the case aims at enhancing transparency by demanding access to specific climate related information. Furthermore, it would be helpful for future litigation to understand which laws were used to support the claims raised in arguments or the decisions by the court, and if they were successfully used. Therefore, the category *Legal Obligations* is developed.

The category *Goal of Petitioner* describes the general motivation of the petitioner. If the petitioner seeks a higher level of climate mitigation or adaptation measures, the implementation of strengthened regulation, thus an overall result of an increase in climate change action, the case was coded as (1) *Pro-Regulatory*. In contrast, if the petitioner supports climate policy deregulation and challenges existing climate change protection measures, it was coded as (2) *Anti-Regulatory* (Peel & Osofsky, 2015; Setzer & Byrnes, 2019; McCormick et al., 2018). Anti- or pro-regulatory cases are mutually exclusive. The decision of the assignment was made solely in relation to climate change, even if other environmental aspects were involved.

For classification of climate cases with respect to their intent and/or nature, the *Case Mode*, Setzer & Byrnes (2019) define two groups of climate change litigation cases as followed:

> "Strategic cases, with a visionary approach, that aim to influence public and private climate accountability. These cases tend to be high-profile, as parties seek to leverage the litigation to instigate broader policy debates and change […]
> Routine cases, less visible cases, dealing with, for example, planning applications or allocation of emissions allowances […] These cases expose courts to climate change arguments where, until recently, the argument would not have been framed in those terms" (Setzer & Byrnes, 2019, p.2).

Therefore, this category is about the approach undertaken by the petitioners to achieve their litigative goal. In some cases, the assignment of whether a case is (1) *Strategic* or (2) *Routine* is less obvious and depends highly on the notion of the researcher. The category allows for a more in-depth analysis of the outcome of different types of climate cases.

The codes for the category *Climate Issue* describe the topic in the broad area of climate change that each case primarily addresses. The process of code development in this category was purely inductive based on case-specific descriptions. After becoming familiar with the data, some of the originally developed codes, that were derived from the descriptions, were later changed into the codes and sub-codes shown in Figure 5.2. The colored codes (Figure 5.2) are used in the data analysis. Sub-codes can be merged into higher-level codes if necessary, e.g., public and private construction can be merged into construction. Five upper-level topics were identified (grey) in which climate change litigation takes place. Climate cases address

institutions, the energy sector, and the use of land. Also, climate cases concern the assignment of responsibility for climate emissions and impacts or the issue of transparency of climate related actions.

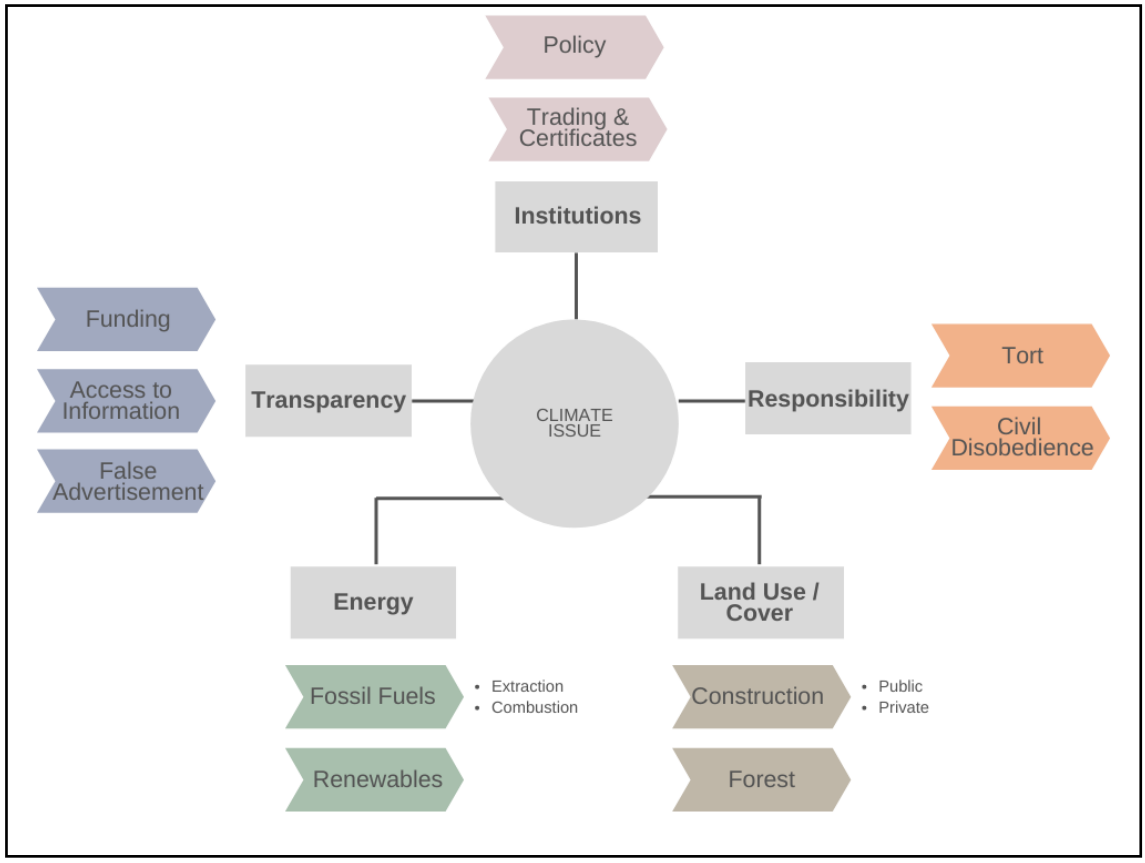


Figure 5.2: Codes (Colored) for Climate Issue by Upper-Level Topics

In the group of climate cases targeting institutions, cases are classified as either dealing with existing climate and other environmental (1) *Policy* or (2) *Trading & Certificates.* The code *Policy* includes all cases in which governments or other entities are compelled to fulfill their mitigation and adaptation obligations or to increase their mitigation and adaption efforts due to existing policies (see Chapter 3.3.1) as well as cases in which indigenous people assert their human rights.[47] The code *Trading & Certificates* adheres to any emissions trading schemes and other certificates, e.g., Renewable Energy Certificates in Australia regulating GHG emissions. Climate cases seeking to assign responsibility are divided into (3) *Tort* cases and (4) *Civil Disobedience* in which climate activists have mostly disrupted climate-damaging operations. *Tort* cases seek to receive some form of compensation or damages for injuries or lost goods. In the topic of land use and land cover, climate cases essentially target the regulation of (5) *Construction* and (6) *Forest* cover which refers to deforestation and afforestation. The code *Construction* is further divided into the sub-

[47] Originally, the code *Right to Livelihood* was supposed to include cases commenced by indigenous groups. However, only two cases could be assigned to the code which was therefore merged into the code *Policy*.

codes of (5.1) *Public* and (5.2) *Private* construction to identify differences in the outcome when it comes to decisions concerning public infrastructure or private development. Public construction reflects all cases challenging the construction of public infrastructure such as roads, airports, and ports, whereas private construction mainly consists of cases dealing with the construction of private buildings. In the energy sector, climate cases mostly challenge the (7.1) *Extraction* or (7.2) *Combustion* of (7) *Fossil Fuels* or the development of (8) *Renewables,* mostly wind and solar farms. Finally, some climate cases seek to increase transparency in order to improve climate action. Either these cases deal with the (9) *Funding* of climate-damaging or climate-friendly projects or with (10) *Access to Information* that is related to climate change, e.g., GHG emissions from certain projects and (11) *False Advertisement* of products. Cases that could not be assigned to any of these codes were coded as (12) *Other*.

For the category providing information about *Legal Obligations* that have been used in arguing the claims of the case or in the decisions of the court, the codes are classified by level of law and then further divided into specific obligations within that level. Firstly, since cases are argued based on several legal obligations at the same time, the codes are not mutually exclusive. Secondly, some important variables that are used in combination frequently constitute another single variable, such as *Human Rights* and *UNFCCC* in international law. Moreover, the different levels of law actually function as separate categories in the statistical analysis. Within each level of law, only one code can be assigned to each case. The most relevant obligation at each level that was used in the case to argue climate change related issues was crucial for the assignment of the code. The coded variables have been developed inductively, using the material of the data set as well as conclusions from the literature (see Chapter 3.2).

On an (1) *International* level, legal obligations are classified by (1.1) *EU* law*;* (1.2) *EU* law in combination with *Human Rights;* (1.3) *EU* law and obligations stemming from the *UNFCCC* structure, such as the Kyoto Protocol and the Paris Agreement; (1.4) *Human Rights;* (1.5) *Human Rights* and *UNFCCC* obligations; (1.6) *UNFCCC;* and (1.7) *Other* international laws.
On a national level, legal obligations are divided into (2) *Constitutional* and (3) *Statutory Provisions*.[48] The constitution of countries provides legal obligations for climate change based on (2.1) the *Right to Life* and (2.2) the *Precautionary Principle*. The code *Right to Life* also includes the right to a healthy environment and other constitutional rights. A combination of (2.3) the *Precautionary Principle* and the *Right to Life* exists as well. Cases using other provisions on the constitutional level are marked as (2.4) *Other*. If cases are based on (3) *Statutory Provisions*, they are classified to (3.1) *Climate*

[48] In the tables showing the results of the statistical analysis, the code *Constitutional Provisions* is sometimes referred to as *Constitution* and the code *Statutory Provisions* as *Statutes.*

Change related policies or (3.2) *Other*. The latter code includes a wide range of statutory provisions that are not related to climate change specifically.

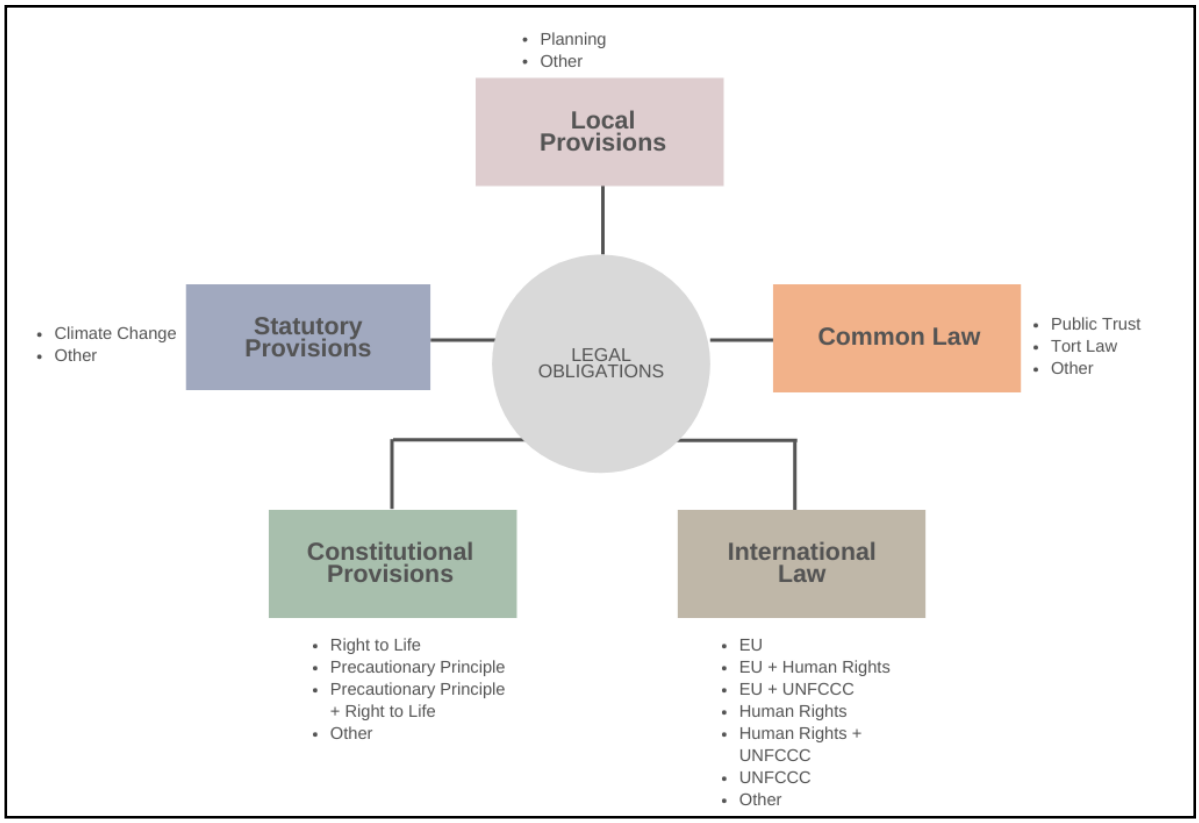


Figure 5.3: Codes (Listed) for Legal Obligations by Level of Law

Since all local provisions in the data set deal with the approval or denial of planning permits, the only code on a local level is (4) *Planning*. In jurisdictions of common law systems some unique (5) *Common Law* concepts can be applied such as the (5.1) *Public Trust* doctrine or (5.2) *Tort Law.* Other common law principles are summarized under (5.3) *Other*.[49]

5.1.4. Outcome

The core of the analysis draws on the outcome of the climate cases expressed as a court ruling. Generally, cases are decided at different levels of the judiciary system. If appealed, a lower court's ruling can be overturned or confirmed by a higher instance. On the one hand, outcomes are therefore classified into *First Instance*, *Appellate Court*, and *Supreme Court*.[50] Concurrently, appeals of a listed case are not counted as a new lawsuit but reflected in the outcome at different levels. However, for further statistical

[49] The coded variables *Common Law* and *Tort Law* within the category *Legal Obligations* should not be confused with the similar codes *Common Law* which refers to the *Legal System* and *Tort* as a description for the *Climate Issue*.

[50] It should be noted that rulings within the European Court of Justice work on a two-level system: the General Court and the High Court of Justice. Here, the General Court is classified as *First Instance* and the High Court of Justice as *Supreme Court*.

analysis the *Overall Outcome* is specified as well, leaving each case with one definitive and most recent outcome. On the other hand, a typology of the outcome is developed that allows for a combination of the categories *Overall Outcome* and *Goal of Petitioner* in order to analyze the impact of the outcome of each case on climate change mitigation and adaptation. The typology produces two types of variables (Figure 5.1).

There are different ways to express the outcome of a climate case. The simplest form is to determine whether a case has been (1) *Won*, (2) *Lost* or is still (3) *Pending*. For the outcome at different instances (first, appellate, and supreme court), this form has been chosen to provide a detailed level of information. Thereby, winning cases are defined as those granted or partly granted, losing cases are dismissed or denied (McCormick et al., 2018). For the *Overall Outcome,* the ruling of the highest court was decisive, so all cases are either marked as (1) *Won* or (2) *Lost*. Hence, if a case was lost, then appealed and was still pending at the time of coding, it was coded as lost.

This classification is used as a basis for the development of a typology of the outcome that includes the goal of the petitioner. Since both pro-regulatory and anti-regulatory climate cases are considered for the analysis, the impact the climate case has on climate change mitigation and adaptation is not defined by the success of the individual case, but depending on whether the petitioner's goal is anti- or pro-regulatory in the first place. Thus, a two-dimensional typology is constructed using a combination of the codes of the categories *Overall Outcome* and *Goal of Petitioner* (see Table 5.1).

Table 5.1: Typology of the Outcome of Climate Cases

		Overall Outcome	
		Won	**Lost**
Goal of Petitioner	**Pro-Regulatory**	Pro-Won (+)	Pro-Lost (−)
	Anti-Regulatory	Anti-Won (−)	Anti-Lost (+)

The typology provides four codes: (1) *Pro-Won* includes cases with a pro-regulatory goal that were won; (2) *Pro-Lost* means lost cases with a pro-regulatory goal; (3) *Anti-Won* consists of won anti-regulatory cases; and (4) *Anti-Lost* refers to lost cases with an anti-regulatory goal.

However, for the statistical analysis, particularly the logistic regression, the number of codes is further reduced by applying an evaluative point of view on the outcome. Cases can have a (1) *Positive* or a (2) *Negative* impact on climate change protection and adaptation measures, tagged as (+) and (-) in Table 5.1, resulting in an outcome that either favored a pro- or anti-regulatory approach, respectively. This type of outcome is

also analyzed by McCormick et al. (2018) in their study on climate change litigation in the U.S. coded as an anti- and pro-regulatory approach. In order to avoid confusion with the *Goal of Petitioner* the outcome in this study uses the terms *Positive* and *Negative*.

5.2. Statistical Analysis

The previous chapter defined all the categories and coded variables that were used in the quantitative analysis of the outcome of international climate change litigation outside of the U.S. In this chapter, I will present the results of this statistical analysis of the 263 climate cases, gradually going into more detail as the results unfold. The section begins with the illustration of absolute and proportional frequencies of the coded variables.

At first, I present the overall outcome of climate change litigation as well as the goal and approach of the climate cases. Then, the geography of climate change litigation is depicted, by country as well as by legal family, followed by the stakeholders driving and receiving litigation. The descriptive statistic part concludes with the topics and legal obligations of climate change litigation. Thereafter, the test of independence provides conclusions about the statistical dependency between the categories and the outcome of climate change litigation. Further, a test for multicollinearity assesses the extent of any correlations between variables. To identify any factors that determine the outcome of climate change litigation, a number of logistic regression models are run. The first two models include the metric variables *Rule of Law* and *CCPI*. For categorical variables, three different models are established, each containing a different set of variables and data sample. Also, separate models analyzing the outcome climate change litigation in civil and common law countries are assessed. To compare the results against domestic evidence, regression models based on data sub-sets of Australia and the UK are established as well. The chapter concludes with a summary of the results of the logistic regression models.

5.2.1. Descriptive Statistics

An absolute and proportional frequency distribution of the variables which were determined to describe climate cases on an international level offers a first glance into the development and focal points of climate change litigation since 1994. Moreover, selected categories are combined to allow for a detailed analysis of the outcome. For example, the examination of the distribution absolute frequencies solely on one category, such as the *Type of Petitioner* only provides important information when combined with, e.g., the *Climate Issue* of the case as well as the outcome and/or the

Case Mode. At times, this variety produces complex tables which are, due to their size, presented in the appendix.

5.2.1.1. Overall Outcome

A total of 263 different climate cases have been analyzed. Out of these 263 cases, 140 cases seek a pro-regulatory and 123 an anti-regulatory goal with a ratio of 1.14 to 1.

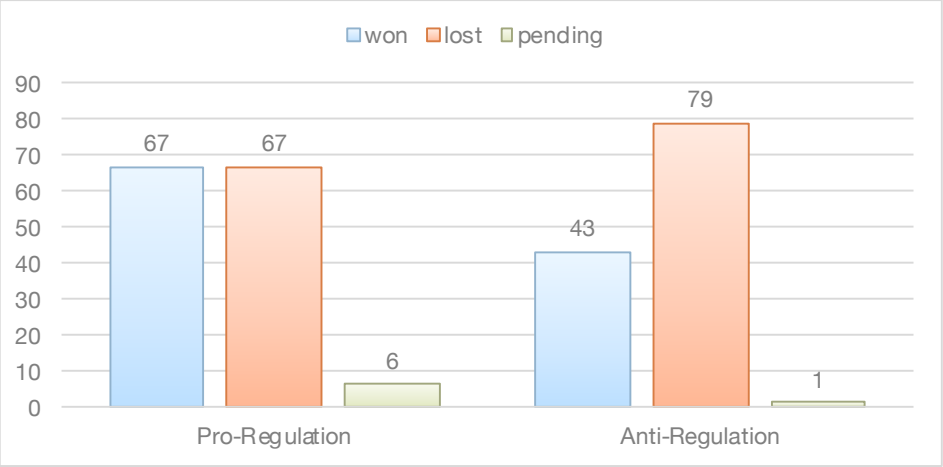


Figure 5.4: Overall Outcome per Goal of Plaintiff

The Figure 5.4 shows that 67 pro-regulatory cases were each won and lost in the judicial process while 6 cases are still pending at higher instances. Within the anti-regulatory group 43 cases were won, 79 cases were lost, and one is still pending. If the pending cases are assigned to a definite outcome, then 42.2% of all climate cases have achieved their initial goal whether it was anti- or pro-regulatory. Out of all pro-regulatory cases 48.6% have been successful in achieving a positive outcome, while 35% of all anti-regulatory cases have been won and resulted in a negative outcome for climate change mitigation and adaptation. Applying the evaluative typology, a total of 148 cases (56.3%) have resulted in a positive outcome, whereas 115 (43.7%) have had a negative impact on climate change protection and adaptation measures concluding in a ratio of 1.3 to 1.

In more detail, the Figure 5.5 demonstrates that most cases, 198 in total, have been decided at first instance. In 108 decisions, the outcome has been positive (won pro-regulatory and lost anti-regulatory) and 90 cases resulted in a negative outcome (lost pro-regulatory and won anti-regulatory cases). At the higher instance of appellate courts, less than 40 cases have been decided. The decisions by the appellate courts resulted in 15 negative as well as 18 positive outcomes. Decisions by the first instance have been appealed in up to 50 cases, 12 directly to the supreme court. Overall, the supreme courts have made 70 rulings in total. At that level, decisions have resulted in a higher number of positive than negative outcomes while 3 cases are still pending. In 6 cases, the supreme courts overturned the decisions of the lower courts. Since a case

can be decided at more than one level, the total number of decisions is 306 and higher than the total number of cases.

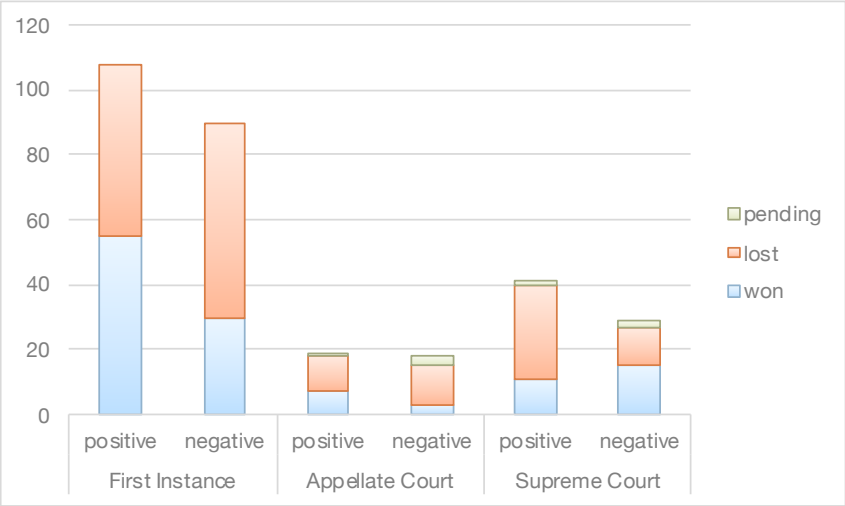
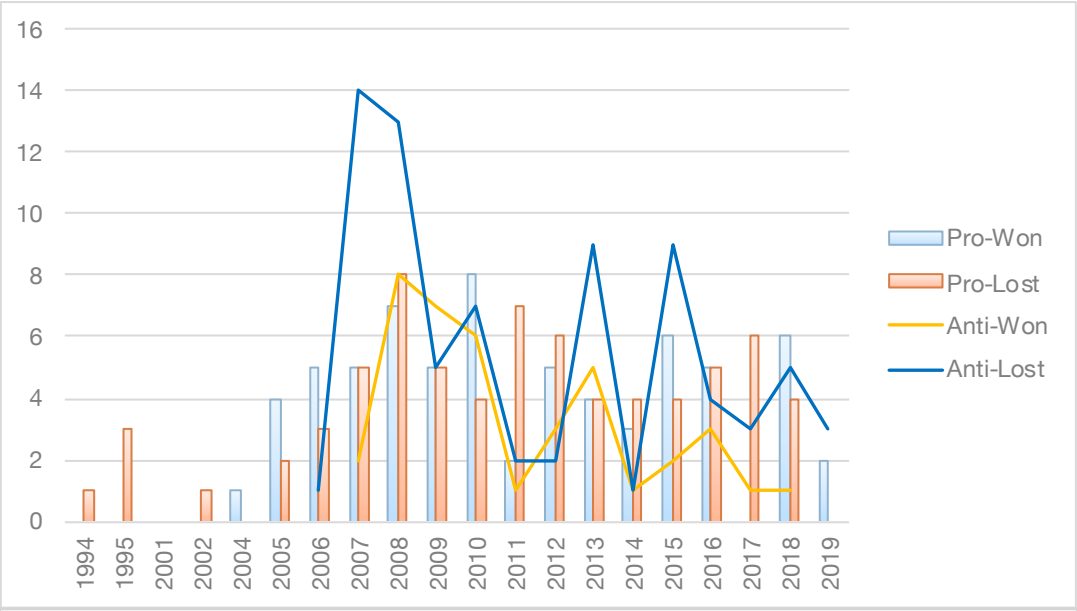


Figure 5.5: Overall Outcome at Different Instances

On a timescale (Figure 5.6), the data indicate that the early climate cases were overly seeking a pro-regulatory goal (bars) but were not able to be successful until 2004. Climate cases with positive outcomes (blue) start to increase in 2005 and reach a peak in 2008, the same year in which negative outcomes (orange) climax. Anti-regulatory climate cases (lines) have begun in 2006, decrease after 2008, then fluctuate. However, the overall tendency of anti-regulatory cases is declining since 2008.



Legend: blue = positive outcome ; orange = negative outcome ; bars = pro-regulatory goal ; lines = anti-regulatory goal

Figure 5.6: Timeline of the Outcome

In the year 2014, there is a general drop in the number of climate cases. Since 2015, the number of climate cases which have already been decided is decreasing. However, in 2019, all climate cases have resulted in a positive outcome.

The literature suggests that the year 2015 has been a marker in climate change litigation due to the Paris Agreement, the *Urgenda* case and a second wave of litigative measures (Ganguly et al., 2018, Setzer & Byrnes, 2019; *Urgenda Foundation v. The State of the Netherlands*, 2015).

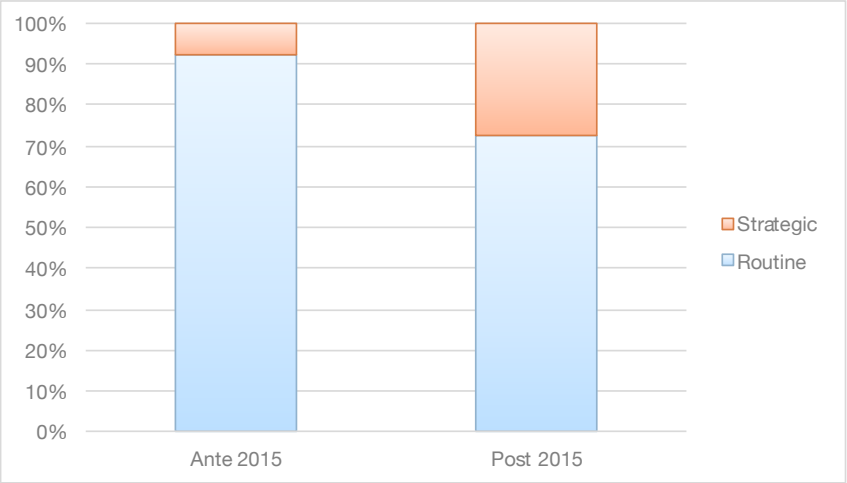


Figure 5.7: Percentages of Strategic and Routine Cases Ante / Post 2015

The data indicate that after 2015 there is a trend towards strategic cases as a means to climate protection, showing an increase of 20% (Figure 5.7). Generally, all 34 strategic cases were initiated with a pro-regulatory intent. In total, 197 cases were decided between 1994 and 2015 while 66 climate cases have already reached a decision by the courts after 2015. These 66 cases already constitute of a quarter of all considered cases. The majority of cases (87%) are routine cases. In relation to the outcome, strategic cases only result in positive outcomes in 41% of the time while 59% of all routine cases achieve a positive outcome. There is no further evidence of strategic cases becoming more successful after 2015.

When analyzing the outcome of strategic and routine cases at different levels of the judiciary system, strategic cases appear to have better chances for success at appellate and supreme courts than at first instances. From 28 strategic climate cases decided at first instance, only ten were successful in achieving their goal. At appellate and supreme court level, four cases were each decided positively with a total of 13 and 11 handled cases, respectively. Routine cases have predominantly lost at all court levels.

5.2.1.2. Geography of Climate Cases

Since 2015, Setzer and Byrnes (2019) attest a geographic expansion of climate change litigation. This geographic expansion and an increase in total numbers of climate cases on each continent is supported by the data as well (Figure 5.8 and Figure 5.9).

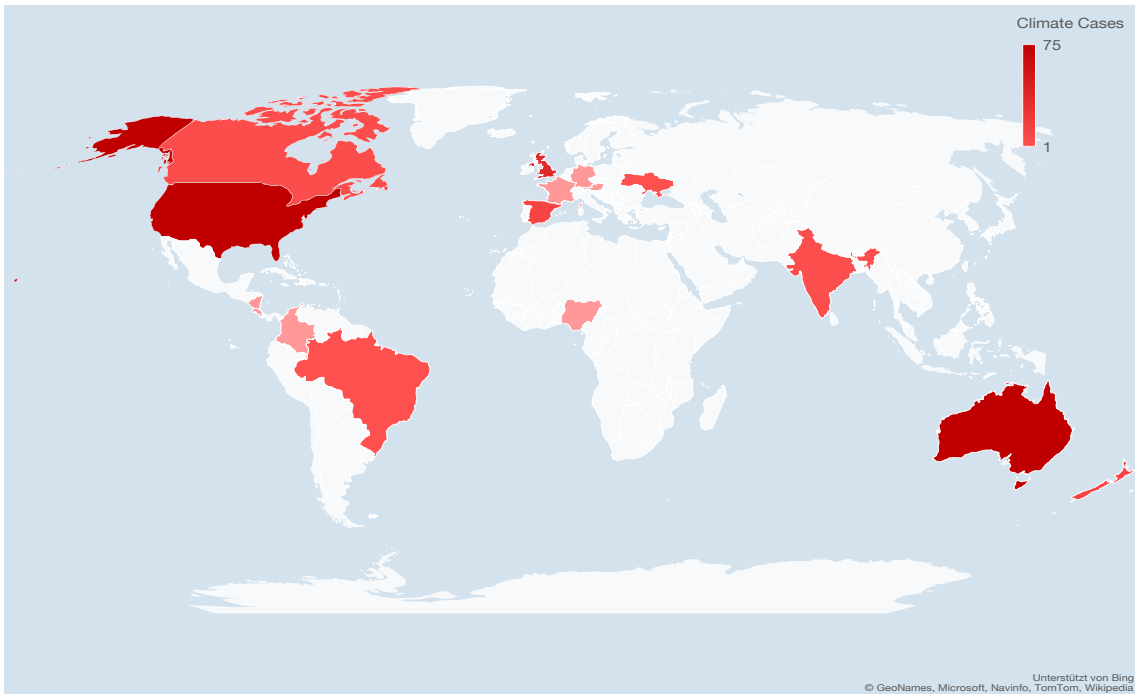


Figure 5.8: World Map of Climate Cases Before 2015

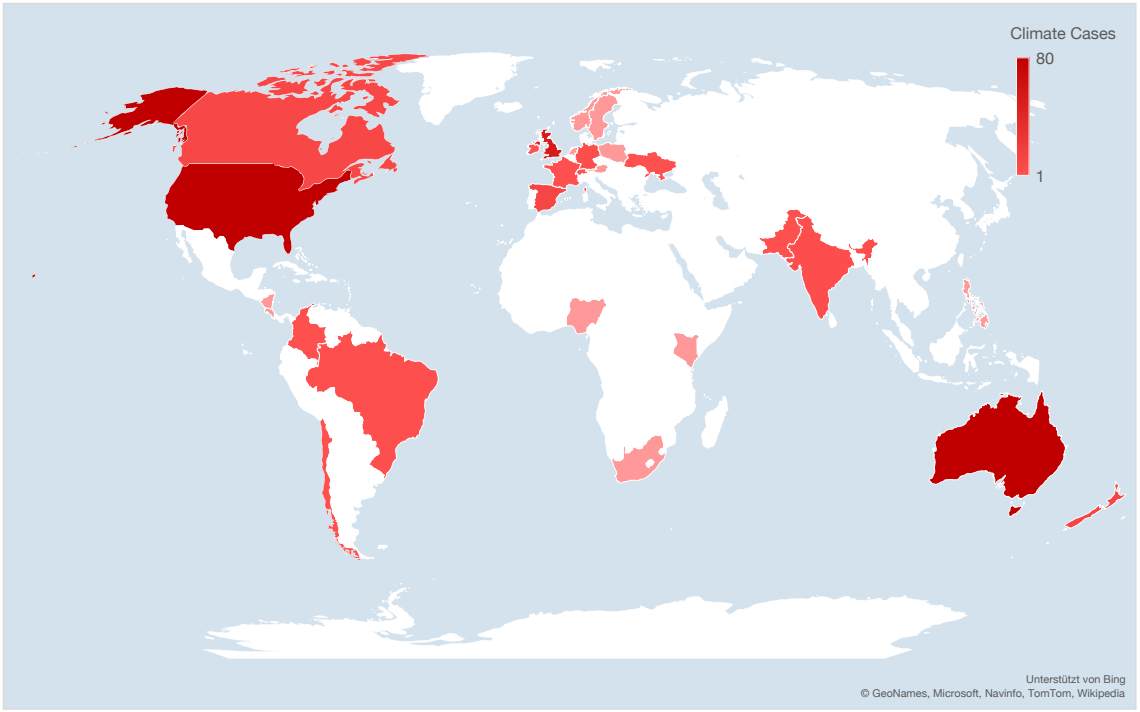


Figure 5.9: World Map of Climate Cases After 2015

Especially in Europe and Asia, climate change litigation has fortified and spread. By far, the most climate cases have been brought in the U.S.[51] While exempted from the data used for analysis, they are illustrated in the maps in Figure 5.8. and 5.9. Outside of the U.S., the highest number of climate cases until 2019 took place in Australia (80 cases); followed by the United Kingdom (54); New Zealand (14); Spain (13); and Canada (11). In the other countries, climate change litigation has not surpassed the single digits.[52] Not illustrated in the maps are cases of supranational jurisdiction.

Some important jurisdictions stand out, such as the Civil and Administrative Tribunal in Victoria, Australia (33 cases); the European Court of Justice (31); the Land and Environment Court in New South Wales, Australia (21); the General Court of the European Union (15); the Supreme Court of Spain (13); and the Federal Court of Australia (13).[53] This abundance in particular jurisdictions can be partially explained by the following: cases processed within the EU jurisdictions are mainly concerned with the topic of the EU ETS in which much litigation took place. In Australia, climate cases have been largely revolving around fossil energies, specifically coal mining and the combustion of coal. New South Wales holds, beside Queensland, one of the largest black and brown coal fields in Australia (Britt et al., 2013). On the other hand, Victoria is characterized by a vast coastal area leading to a high number of cases dealing with adaptation measures in private and public construction due to (the concern of) sea level rise.

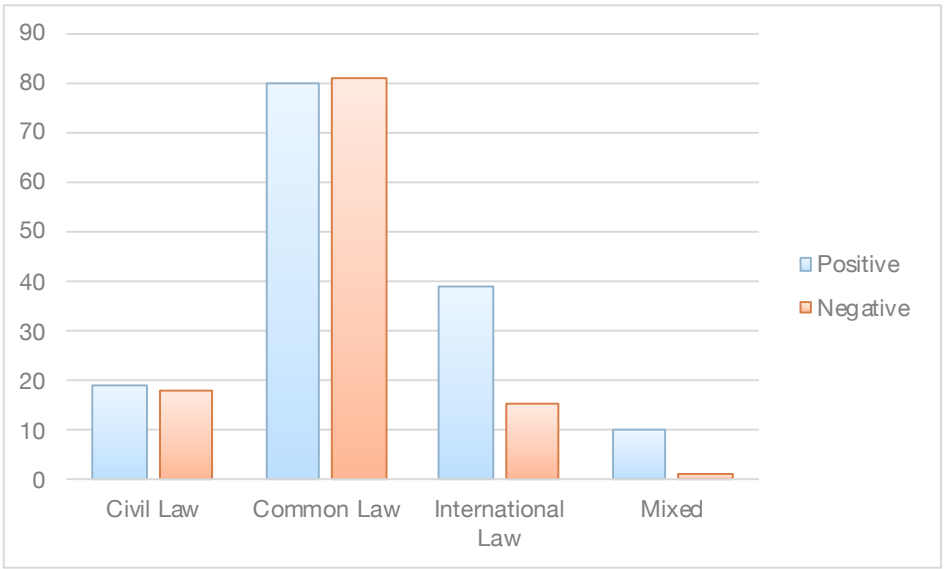


Figure 5.10: Outcome by Legal Family

[51] Before 2015, there were 873 climate cases in the U.S. (Setzer & Byrnes, 2019). Since 2015 those have mounted up to 1282 cases increasing weekly (Sabin Center for Climate Change Law, n.d.). It should be noted that the database applies different selection criteria including all cases whether a decision has been reached or not.

[52] The change of color from light pink to red is defined at n = 2 climate cases. All countries colored in light pink therefore only feature one climate case.

[53] Jurisdictions with a higher number than 10 climate cases are mentioned.

Thus, unsurprisingly most climate cases have been brought in countries of the Common law family, followed by international law, civil law and lastly mixed law systems (Figure 5.10). In common law and civil law systems, positive and negative outcomes are counterbalanced while in international law and mixed law systems positive outcomes predominate.

5.2.1.3. Stakeholder

The cross tabulation of Table 5.2 offers some insight into the drivers and recipients of climate change litigation. The rows represent the different types of petitioners and the columns depict the types of respondents. The values reflect the total number of cases and further detail whether those cases have been strategic or routine and positive or negative.

Table 5.2: Climate Cases by Respondent, Petitioner, Case Mode, and Outcome

Type of Petitioner	Individual / Citizen Group	ENGO	Corpora-tion	City	Local GOV	State GOV	Federal GOV	Supra-national GOV	Total
Individual / Citizen Group			5 (2:3| 2:3)	7 (0:7| 4:3)	27 (0:27| 14:13)	18 (1:17| 10:8)	24 (13:11| 13:11)	1 (1:0| 0:1)	82 (17:65| 43:39)
ENGO			9 (1:8| 3:6)	2 (0:2| 2:0)	2 (0:2|1:1)	7 (0:7|3:4)	19 (10:9| 8:11)		39 (11:28| 17:22)
Corpora-tion	2 (0:2| 1:1)	2 (0:2| 0:2)	2 (0:2| 1:1)	5 (0:5| 1:4)	24 (1:23| 11:13)	15 (0:15| 7:8)	36 (0:36| 20:16)	16 (0:16| 16:0)	102 (1:101| 57:45)
Industry Advocacy Org.					1 (0:1|1:0)		2 (0:2| 2:0)		3 (0:3|3:0)
City							2 (1:1| 1:1)		2 (1:1|1:1)
Local GOV			1 (1:0| 1:0)		2 (0:2|2:0)	1 (0:1|1:0)	1 (1:0| 1:0)		5 (2:3|5:0)
State GOV	3 (0:3| 2:1)	3 (0:3| 3:0)	2 (1:1| 1:1)				2 (0:2| 2:0)		10 (1:9|8:2)
Federal GOV		1 (0:1| 1:0)	8 (0:8| 6:2)			1 (1:0|1:0)	2 (0:2| 2:0)	5 (0:5| 2:3)	17 (1:16| 12:5)
Supra-national GOV							3 (0:3| 2:1)		3 (0:3|2:1)
Total	5 (0:5| 3:2)	6 (0:6| 4:2)	27 (5:22| 14:13)	14 (0:14| 7:7)	56 (1:55| 29:27)	42 (2:40| 22:20)	91 (25:66| 51:40)	22 (1:21| 18:4)	263 (34:229| 148:115)

The left columns represent the types of petitioner, the rows the types of respondent. The abbreviation GOV stands for government and Org. for Organization. Results are portrayed as Total (Strategic : Routine \| Positive : Negative). A blank cell mark 0 total climate cases for this combination of variables.

Altogether, governmental bodies have been the highest recipient of climate change litigation. Federal (or national) governments have been sued 91 times, 25 of those in a strategic fashion, followed by local governmental bodies which were targeted 56 times, the state governments 42, supranational governments 22, and cities 14 times. The majority of climate cases against governmental agencies have been initiated by corporations, followed by Individuals or citizen groups and ENGOs. For example, there have been cases in which supranational governmental organizations were sued by federal governments. A number of 37 cases were initiated by governmental bodies but

only two of those by cities. Out of all cases against governmental agencies, 136 cases have shown a positive and 98 a negative outcome.

Subsequent to governmental organizations, corporations have been the second largest target of climate change litigation. Thereby, corporations were sued five times in a strategic way, both by local and state governments as well as individuals or citizen groups and ENGOs. Yet, the difference between positive and negative outcomes of litigation against corporations is negligible. While corporations are a target of climate change litigation, they are also driving it, particularly through initiating routine cases. A total of 102 climate cases have been submitted by corporations and 57 of those, against 45, have resulted in a positive outcome. Other drivers of climate change litigation are individuals or citizen groups and ENGOs. These two groups are the main petitioners who initiate strategic cases against corporations and governmental bodies. ENGOs seem to be less successful than individuals or citizen groups in doing so.

5.2.1.4. Topics of Climate Change Litigation

Table 5.3 provides information about the climate issues that have dominated climate change litigation.[54] Individuals or citizen groups have been involved in cases of nearly all climate issues. However, they are most active in cases concerning private construction and renewables. The first refers to cases in which petitioners, for example, were dealing with the approval or denial of planning permits on private property. Within the topic of renewables, individuals or citizen groups mostly objected to the construction of new renewable projects, such as wind parks. The data indicate that the majority of cases against renewables were not successful as the outcome is predominantly positive. Further, individuals or citizen groups have been objecting to construction of public infrastructure, such as new roads or airways. The outcome of those cases tends towards a negative impact on climate change mitigation. In contrast, the topic of private construction more often results in positive outcomes. Cases concerning the extraction of fossil fuels have also been commenced by individuals or citizen groups and have largely resulted in a positive outcome. When launching cases seeking to increase mitigation ambitions by governments or to fulfill governmental obligations under statutory provisions or the UNFCCC structure, four cases have been successful while 6 cases were lost.

However, cases introduced by ENGOs who have also brought cases in most climate issues have resulted in more negative than positive outcomes. Only in cases seeking access to information and in cases involved in reducing the combustion of fossil fuels have ENGOs been more likely to achieve a positive outcome. They are most active in the areas of fossil fuel extraction and policy. Similar to climate cases petitioned by

[54] The Supplementary Table 13 uses the typology of the outcome (Table 5.1) and offers more detailed information on the goal of the petitioner and is referenced in this section.

individuals, ENGOs invariably seek a pro-regulatory goal except within the topic of renewables.

Table 5.3: Climate Cases by Climate Issue, Petitioner, and Outcome

Climate Issue	Individual / Citizen Group	ENGO	Corporation	Industry	City	Local GOV	State GOV	Federal GOV	Supra-national GOV	Total
Policy	10 (4:6)	9 (2:7)	2 (1:1)	1 (1:0)				2 (2:0)		24 (10:14)
Trading & Certificates		2 (1:1)	58 (39:19)	2 (2:0)			2 (2:0)	7 (2:5)	3 (2:1)	74 (48:26)
Tort	1 (0:1)							1 (1:0)		2 (1:1)
Civil Disobedience			1 (0:1)				6 (5:1)	1 (1:0)		8 (6:2)
Construction (Public)	10 (3:7)	3 (1:2)			1 (1:0)	1 (1:0)				15 (6:9)
Construction (Private)	25 (12:13)		14 (8:6)			3 (3:0)				42 (23:19)
Forest	4 (4:0)						1 (0:1)			5 (4:1)
Fossil Fuels (Extraction)	9 (6:3)	9 (2:7)	3 (1:2)							21 (9:12)
Fossil Fuels (Combustion)	3 (0:3)	6 (4:2)	1 (0:1)				1 (1:0)			11 (5:6)
Renewables	14 (11:3)	3 (2:1)	18 (6:12)			1 (1:0)				36 (20:16)
Funding		2 (1:1)	1 (1:0)							3 (2:1)
Access to Information	3 (2:1)	5 (4:1)	1 (0:1)		1 (0:1)					10 (6:4)
False Advertisement								6 (6:0)		6 (6:0)
Other	3 (1:2)		3 (1:2)							6 (2:4)
Total	82 (43:39)	39 (17:22)	102 (57:45)	3 (3:0)	2 (1:1)	5 (5:0)	10 (8:2)	17 (12:5)	3 (2:1)	263 (148:115)

The results are shown as Total (Positive : Negative). Blank cells stand for 0 total cases. The abbreviation GOV stands for government, the variable Industry Advocacy Organization is shortened to Industry.

By total numbers, corporations are the main driver of climate change litigation. The numbers are primarily pushed by 58 cases dealing with trading and certificates of GHGs. Thereby, corporations have produced 39 positive against 19 negative outcomes in relation to climate change mitigation and adaptation. Yet, only five cases had a pro-regulatory goal to begin with while 36 cases had an anti-regulatory goal but were eventually lost. In cases dealing with the construction of private property corporations have been seeking anti-regulatory outcomes as well. Solely for renewables, corporations have pursued pro-regulatory measures as they were trying to receive planning permits for their renewable projects. Similar to corporations, industry advocacy organizations were trying to achieve anti-regulatory goals but lost resulting in a positive outcome for climate change mitigation.

As Table 5.2 indicates, governmental bodies have been targeted by litigative measures far more than actively instigating the process. In their active part, governmental agencies both seek pro- as well as anti-regulatory goals. For example, federal governmental agencies have successfully sought to halt false advertisement by corporations. On the other hand, state governmental bodies have been trying to convict citizens, generally climate activists, for civil disobedience.

Regarding the climate issues of climate change litigation over time (Figure 5.11) some trends can be observed.[55] In general, the three most prominent topics of climate change litigation are trading and certificates, followed by private construction and renewables.

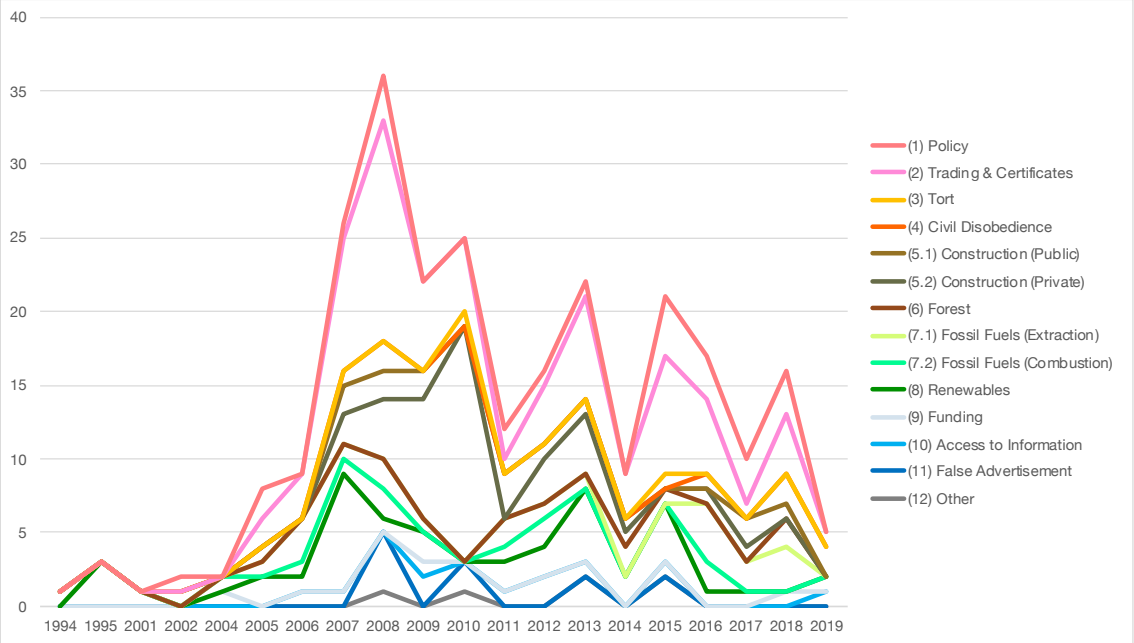


Figure 5.11: Climate Issue Over Time (Stacked Lines)

Cases dealing with emissions trading schemes and other certificates began in 2005 and have dominated the share of climate change litigation ever since. The first case about private construction was filed in 2002 and cases have been brought regularly until 2017. The first climate case in 1994 was about the combustion of fossil fuels. Since 2005, cases challenging the extraction of fossil fuels were a regular topic of climate change litigation, peaking in 2006. Since 2016, numbers have increased again. Cases engaging in renewable projects commenced in 1995, and have since then held a fair share of climate change litigation. Some civil disobedience cases concerning climate change related issues have already been brought in 2007 but have become more common since 2018. Further, the data indicate that cases seeking to compel governments or corporations to fulfill their climate change mitigation obligations or increase climate action have become more important in climate change litigation, particularly after 2015. If strategic climate cases are excerpted from the data and analyzed over time, this trend is confirmed (Supplementary Table 16). Strategic cases mostly deal with policy issues, public construction, and deforestation. Routine cases

[55] The lines in Figure 5.11 are stacked so that the number of cases is displayed as the difference between the lines. Because the lines are stacked on each other in the event of zero cases the lines of variables with a higher numeration conceal the variables with a lower one. This is the case, e.g., for the variable *Fossil Fuels (Extraction)* in green which is covered by the brown *Forest* line and for the variable *Tort* in light orange concealing *Civil Disobedience* and *Construction (Public)*.
For this reason, Supplementary Table 15 gives further information about the development of climate issues in climate change litigation over time and is used as a reference in this section.

can be predominantly found in issues concerning trading and certificates, private construction, and renewables and are higher in total numbers. The outcome of strategic cases is, however, more often negative than positive.

5.2.1.5. Legal Obligations

When analyzing the data with regard to the legal obligations of climate cases that are either used in arguments by the petitioners or mentioned in the court decisions, the total number of legal obligations for this data set increases to 306 since more than one code can be assigned to one case (see Table 5.4). Most cases base their arguments on statutory provisions which are not explicitly related to climate change. A total of 56 cases are built on EU law and show 41 positive over 15 negative outcomes. However, 51 of those cases relate to the EU ETS or other certificates (see Supplementary Table 17). Overall, 21 cases have based their arguments on climate change statutes, followed by 16 cases using the UNFCCC structure. In 16 cases, local provisions about planning have been argued against governmental bodies in the topics of construction and renewables. Further, 14 cases have used the precautionary principle in their arguments and 11 the right to life or right to a healthy environment, slightly resulting in more positive than negative outcomes.

Considering strategic cases by legal obligation, it becomes evident that most strategic cases build their arguments on human rights issues or legal obligations that directly concern national or UNFCCC climate change policies.[56] Cases based on human rights already make up for 21 of the 58 strategic cases and cases using climate change policies count up to 31 strategic cases. Supplementary Table 17 in the appendix shows that cases argued by climate change policies mainly concern the area of policy, construction (private and public combined), and fossil fuels (extraction and combustion combined). Policy-related cases are also frequently argued by human rights issues. Constitutional rights further play an important role in cases associated with fossil fuel extraction and combustion. Common law principles are used in 7 climate cases, the public trust doctrine has been used only twice against federal governments. Tort law has been applied three times, once in the only (true) liability case (*Lliuya v. RWE*, 2015) and twice in cases about civil disobedience. The application of common law principles does not indicate a better outcome of the climate cases.

[56] The human rights issues which are referred to include the coded variables *EU + HR, HR, HR + UNFCCC, Right to Life, Precautionary Principles + Right to Life*, while climate change and UNFCCC policies include *EU + UNFCCC, HR + UNFCCC, UNFCCC,* and *Climate Change.*

Table 5.4: Cases by Legal Obligation, Respondent, Case Mode, and Outcome

Legal Obligation	Individual or Citizen Group	EN-GO	Corpo-ration	City	Local GOV	State GOV	Fed GOV	Supra-national GOV	Total
International Law			5 (2:3I3:2)		3 (1:2I2:1)	6 (1:5I3:3)	48 (16:32I28:20)	21 (1:20I17:4)	83 (21:62I53:30)
EU			2 (0:2I0:2)		2 (0:2I2:0)	5 (0:5I3:2)	27 (0:27I19:8)	20 (0:20I17:3)	56 (0:56I41:15)
EU + HR							1 (1:0I1:0)		1 (1:0I1:0)
EU + UNFCCC					1 (1:0I0:1)				1 (1:0I0:1)
HR			2 (2:0I2:0)				5 (5:0I0:5)		7 (7:0I2:5)
HR + UNFCCC							1 (1:0I1:0)		1 (1:0I1:0)
UNFCCC			1 (0:1I1:0)			1 (1:0I0:1)	13 (9:4I6:7)	1 (1:0I0:1)	16 (11:5I7:9)
Other							1 (0:1I1:0)		1 (0:1I1:0)
Constitution			4 (2:2I2:2)		5 (0:5I3:2)	5 (1:4I3:2)	16 (11:5I9:7)		30 (14:16I17:13)
Right to Life			2 (2:0I2:0)		1 (0:1I0:1)	2 (1:1I2:0)	6 (5:1I3:3)		11 (8:3I7:4)
Precau-tionary Principle			2 (0:2I0:2)		4 (0:4I3:1)	3 (0:3I1:2)	5 (2:3I4:1)		14 (2:12I8:6)
Precau-tionary Principle + Right to Life							4 (4:0I1:3)		4 (4:0I1:3)
Other							1 (0:1I1:0)		1 (0:1I1:0)
Statutory Provisions	4 (0:4I2:2)	6 (0:6I 4:2)	21 (2:19I10 :11)	13 (0:13I 7:6)	42 (0:42I24:18)	36 (2:34I18:18)	47 (13:34I24:23)	1 (0:1I1:0)	170 (17:153I90:8 0)
Climate Change					1 (0:1I0:1)	4 (1:3I1:3)	16 (11:5I10:6)		21 (12:9I11:10)
Other	4 (0:4I2:2)	6 (0:6I 4:2)	21 (2:19I0: 11)	13 (0:13I 7:6)	41 (0:41I24:17)	32 (1:13I17:15)	31 (2:29I14:17)	1 (0:1I1:0)	149 (5:144I79:70)
Local Provisions				2 (0:2I0: 2)	11 (0:11I3:8)	1 (0:1I1:0)	2 (1:1I1:1)		16 (1:15I5:11)
Planning				2 (0:2I0: 2)	11 (0:11I3:8)	1 (0:1I1:0)	2 (1:1I1:1)		16 (1:15I5:11)
Other									
Common Law	1 (0:1I1:0)	1 (0:1I 0:1)	2 (1:1I1:1)				3 (3:0I2:1)		7 (4:3I4:3)
Public Trust							2 (2:0I1:1)		2 (2:0I1:1)
Tort	1 (0:1I1:0)	1 (0:1I 0:1)	2 (1:1I1:1)						4 (1:3I2:2)
Other							0 (1:0I1:0)		0 (1:0I1:0)
Total	5 (0:5I3:2)	7 (0:7I 4:3)	32 (7:25I16 :16)	15 (0:15I 7:8)	61 (1:60I32:19)	48 (4:44I25:23)	116 (44:72I64:52)	22 (1:21I18:4)	306 (58:249I169: 137)

Results are depicted as Total (Strategic : Routine I Positive : Negative). Blank cells represent 0 total cases. Variables of the column Legal Obligation are presented by level of law giving sums for each in the darker shaded rows. The abbreviation HR stands for Human Rights.

On a timescale, climate cases that root their arguments in human rights have increased since 2015 (see Figure 5.12). Back in 2005 and 2013, four and two climate cases have raised human rights issues, respectively. Since 2015, human rights issues have become more important and regularly served climate cases in their arguments. The data set of this thesis shows no results for human rights obligations after 2018 as no decisions have been made until March 2020 in those cases. In the literature, a ’human rights’ turn in climate change litigation is suggested for 2015 by Peel & Osofsky (2018).

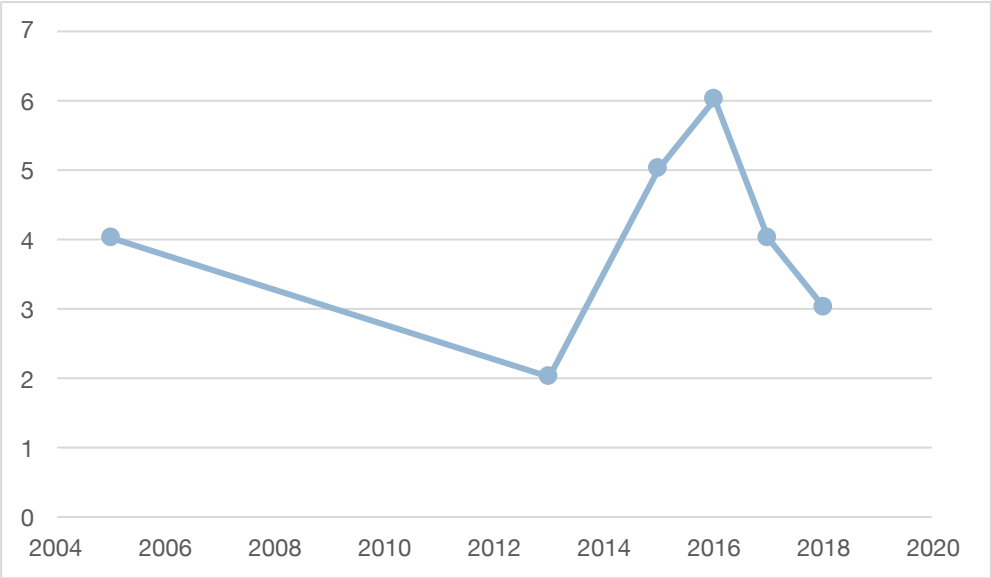


Figure 5.12: Cases Based on Human Rights Obligations Over Time

The analysis of the distribution of variable frequencies has generated a number of valuable insights. The data indicate that climate change litigation outside of the U.S. has predominantly resulted in a positive outcome for climate change mitigation and adaptation. Strategic cases are invariably seeking pro-regulatory goals but are more often unsuccessful than successful. Still, the data show that since 2015, strategic cases have become more important. So far climate change litigation has achieved more positive outcomes in countries with a mixed law system. The biggest target of litigation have been governmental bodies, particularly federal (or national) governments. The second largest target as well as the main driver have been corporations which are especially active in emissions trading schemes and other certificates. Individuals or citizen advocacy groups as well as ENGOs usually pursue pro-regulatory goals but ENGOs have been less successful in using litigation as a tool for climate action. The main topics of climate change litigation are emissions trading and GHG certificates, private construction, and renewable projects. Most cases are argued on (undefined) statutory provisions, followed by EU law, climate change policies, UNFCCC obligations, and the precautionary principle. Strategic cases are mostly based on human rights issues and climate change policies. Whether any of these variables have a statistically significant relation to the outcome of climate change litigation is determined in the following inferential statistical analysis.

5.2.2. Test of Independence

The results of the Pearson chi-square statistics indicate whether any differences between two categorial groups are likely to have happened by chance or sampling error. The test compares the observed and expected frequencies of variables of two categories. Since the test has been developed for categorical variables, the metric

variables *Rule of Law* and *CCPI* are excerpted from the analysis. An assumption for the Pearson chi-square test is that expected frequencies should not be below five for the expected frequencies of any single variable. Therefore, some categories have been re-classified to meet that criterion (see Supplementary Tables 2-12). The chi-square test was executed for all nominally scaled categories (variables X_k) in combination with the category *Evaluative Outcome* that contains the values positive and negative (impact on climate change mitigation and adaptation).

Table 5.5: Chi-Square Statistics for Categorial Variables

Variable X_k	Significance of Chi-Square χ^2	Interpretation	
Type of Petitioner	.1075	not significant	
Type of Petitioner (re-classified)	.0515	not significant	
Type of Respondent	.4000	not significant	For all, the level of significance is α = 0.05
Type of Respondent (re-classified)	.2998	not significant	
Climate Issue	.2246	not significant	If $\chi^2 < \alpha$, then the statistic indicates a significant difference between the observed and expected frequencies.
Climate Issue (re-classified)	.1949	not significant	
Legal Obligation (re-classified)	.1151	not significant	
Case Mode	.0572	not significant	
Marker 2015	.2685	not significant	
Goal of Petitioner	.0072	significant	
Legal System	.0000	significant	

The left column represents the variables X_k that were each combined with the variable Evaluative Outcome (positive / negative) to conduct the chi-square statistic. The middle columns represent the significance level and the interpretation of the chi-square statistic while the right column specifies the criteria. Contingency tables are presented in the Supplementary Tables 2-12.

The results are presented in Table 5.5 and indicate that only the groups *Legal System* and *Evaluative Outcome* as well as *Goal of Petitioner* and *Evaluative Outcome* show statistical dependency, which means that the differences between the observed and expected frequencies are not likely to have happened by chance or due to sampling error. For all other categories X_k, the null hypothesis of no relation is accepted. However, the categories *Type of Petitioner* (re-classified) and *Case Mode* almost meet the criterion of statistical significance with values of 0.0515 and 0.0572, respectively. Generally, by re-classifying categories that do not meet the mentioned criteria of expected frequencies, the significance level of the chi-square statistic increases.

5.2.3. Logistic Regression

Specifics about the relationships between the coded variables and the outcome of climate change litigation were explored by applying a logistic regression analysis. As a first step, a test for multicollinearity between the variables was conducted since a strong correlation between variables can influence the performances of the regression models. Then, the binary logistic regression models were run. For each regression model, information about the model performance as well as the significance, strength, and direction of a relationship between the individual predictors (coded variables) and the outcome of interest is presented. Supplementary Table 18 provides an overview of all independent variables (categories) and the scale at which they are measured.[57] The first model incorporates the metric variables *CCPI* and *Rule of Law*.

5.2.3.1. Test for Multicollinearity

In order to check for multicollinearity, a Spearman's correlation test was executed (see Supplementary Table 19). The independent variable *International Law* shows high significant correlation values ($C > 0.35$ and $p < 0.05$) to the variables *Legal System*, *Case Mode*, *Goal of Petitioner*, and *Type of Petitioner*. Similarly, the variable *Statutory Provisions* correlates strongly with *Marker 2015*, *Case Mode*, and the *Type of Respondent*. Further, the independent variable *Climate Issue* exhibits a high significant correlation with the *CCPI* and the *Type of Respondent*. The *CCPI* also correlates with the *Rule of Law*. However, in the first regression model all independent variables are introduced and then re-evaluated on the statistical results of their roles as predictors.

5.2.3.2. Models with Metric Variables

Both the CCPI and Rule of Law Index do not provide a score for each country appearing in the data set. Hence, a quarter of all cases would be excluded from the regression analysis resulting in a total of 196 cases. For this reason, the metric variables are analyzed separately from the categorical variables. Due to the significant dependency between the *CCPI* and the *Rule of Law* indicated by the Spearman's correlation test, the independent variables are tested individually.

A comparison of both models represents the different kinds of relationships between the independent variables and the outcome of interest as well as overall model performance quite beautifully (Table 5.6 and Table 5.7).[58] The model including the *Rule*

---

[57] According to the terms used in logistic regression the developed categories are henceforth called 'independent variables'; the coded variables are referred to as 'predictors'; the 'dependent variable' is the outcome; and the 'outcome of interest' is a positive outcome of climate change litigation.

[58] The model including the *Rule of Law* is based on 204 cases and the *CCPI* model on 201 climate cases.

of Law (Model01) shows good results for the 'goodness-of-fit' tests. The omnibus and Hosmer-Lemeshow tests both indicate statistical significance while the two tests for the model including the *CCPI* (Model02) do not. The correctly predicted outcome for the *CCPI* model even decreases when introducing the predictor. The predictor *Rule of Law* increases the first model's accuracy by 0.4% points.

Table 5.6: Model01 and Model02 Performance

	Chi-square	df	Sig.
Omnibus Test			
Rule of Law	9.957	1	.002
CCPI	.011	1	.918
Hosmer-Lemeshow			
Rule of Law	2.250	4	.690
CCPI	6.117	4	.191
Prediction			
Rule of Law	52.9% correctly predicted (0.4% points increase)		
CCPI	47.8% correctly predicted (2.4% points decrease)		

The statistical results of the predictors indicate for Model01 that there is a statistically significant negative relationship between the Rule of Law Index and a positive outcome of climate change litigation (B = -5.577) meaning the higher the score of the Rule of Law Index and the stronger the rule of law in that country, the less likely the climate case achieves a positive outcome (Table 5.7). As the lower and upper boundaries of the confidential intervals do not enclose the value one, the null hypothesis is rejected. The Model02 suggests no relationship between the predictor and the outcome. The standardized regression coefficient B is almost zero and the confidence intervals enclose the value one indicating that the null hypothesis is accepted. Further, the significance level at 0.918 shows no significant relationship between these variables meaning that the score of the CCPI does not have an influence on the outcome of climate change litigation.

Table 5.7: Predictors for Model01 and Model02

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
RuleofLaw	-5.577	1	.006	.004	.000	.198
CCPI	.001	1	.918	1.001	.985	1.017

a. Variable(s) entered each on step 1: Rule of Law.
a. Variable(s) entered each on step 1: CCPI.

5.2.3.3. Models with Categorial Variables

The first logistic regression model using nominal (categorical) variables (Model03) includes all possible independent variables that could contribute to the outcome of climate change litigation (see Supplementary Table 18). The model processes all 263 cases of the data set and includes the independent variables: *Legal System; Marker 2015; Case Mode; Goal of Petitioner; Petitioner; Respondent; Climate Issue;* and Legal Obligations (*International Law; Constitution; Statutes; Local Provisions;* and *Common Law*). The performance results of that model indicate a good fit of the data as well as an increase of 14.4% points of accuracy in comparison to the model with no predictors (Table 5.8).

Table 5.8: Model03 Performance

	Chi-square	df	Sig.
Omnibus Test	96.811	51	.000
Hosmer-Lemeshow	9.540	8	.299
Prediction	70.7% correctly predicted (14.4% points increase)		

For the individual predictors, the model indicates significant values for the two predictors *Strategic* (Sig. = 0.041) and the respondent *Corporation* (Sig. = 0.045) (see Supplementary Table 20). For both predictors, the null hypothesis is rejected. However, the directions of the relationship with the (positive) outcome of climate change litigation are negative. Hence, strategic cases are less likely to obtain a positive outcome and cases against corporations are more likely to result in a negative outcome. The predictor of no *Local Provisions* (blank cells) used as a legal obligation in the cases shows a significance level of 0.052 and B = 2.260. While the relationship is not statistically significant, the model results still indicate that cases which are based on local provisions for planning probably result in a negative outcome. For all other predictors the significance levels are too high to make assumptions about their relationship with the outcome. This especially concerns the categories *Climate Issue* and *Legal Obligations* which are at the core of the analysis. The coefficients of the predictors for these categories are inconclusive - most indicate a negative relationship with a positive outcome and at times, the values are so large that no upper confidence interval can be determined. The values remain very similar when both of the independent variables are introduced individually into a binary logistic regression model. In the end, no valid statements can be made about the influence of the predictors within the categories *Climate Issue* and *Legal Obligations* on the outcome of climate change litigation.

In order to mitigate correlations between the independent variables and exclude variables with a low probability to influence the outcome, a second model (Model04) was run. This model incorporates the independent variables: *Case Mode; Legal Systems; Marker 2015;* and *Goal of Petitioner*. In doing so, the problematic variables *International Law, Statutory Provisions*, and *Climate Issue* which show multicollinearity with other independent variables are eliminated from the model. Once more the data fits the model, but the accuracy only increases by 7.6% points indicating a poorer performance than Model03 (Table 5.9).

Table 5.9: Model04 Performance

	Chi-square	df	Sig.
Omnibus Test	27.924	6	.000
Hosmer-Lemeshow	2.225	5	.817
Prediction	63.9% correctly predicted (7.6% points increase)		

When excluding the independent variables that most likely have no influence on the outcome, the regression model shows higher significance values for the remaining predictors (see Table 5.10). Now, the predictors *Common Law* and *Mixed System* which refer to the legal systems of the corresponding jurisdiction insinuate a significant relationship with the outcome of interest. While the predictor *Common Law* shows a negative influence on the positive outcome of climate change litigation, cases processed in mixed law systems have better chances at resulting in a positive outcome. Also, the significance level of strategic cases (Sig. = 0.018) increased further in comparison to the Model03.

Table 5.10: Predictors for Model04

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
LegalSystem		3	.007			
Civil Law	-618	1	.192	.539	.213	1.363
Common Law	-849	1	.022	.428	.207	.884
Mixed System	2.308	1	.046	10.056	1.043	96.911
Ante 2015	-.362	1	.270	.696	.366	1.324
Strategic	-1.197	1	.018	.302	.112	.815
Pro-regulatory Goal	-.394	1	.178	.674	.380	1.197
Constant	1.446	1	.000	4.248		

a. Variable(s) entered on step 1: Legal System, Marker 2015, Case Mode, Goal of Petitioner.

As established, the *Rule of Law* probably has a negative influence on the positive outcome of climate change litigation. A separate model (Model05) helps to identify how the model changes when introducing the Rule of Law to the categorical variables. Firstly, the total number of cases declines to 204. Therefore, the Model05 is based on a different data sample than Model04. The accuracy of the Model05 improves by 8.8% points when introducing the predictors. In comparison with Model04 the increase of accuracy is higher, the overall accuracy, however, is lower. Altogether, the 'goodness-of-fit' tests point to a good data fit (see Supplementary Table 21).

In Model05, the only statistically significant predictors are the *Rule of Law* and cases resumed before 2015 (*Ante 2015*) (see Table 5.11). The significance level of the predictor *Rule of Law* decreases in comparison with Model01 but the data still indicates a negative relation to the outcome of interest. Cases that were filed or decided before 2015 are less likely to achieve a positive outcome according to the standard regression coefficient of -0.805. The previous significant predictors of the Model04 no longer show an influence on the outcome. At times, the significance levels actually decreases as fewer cases are included in the analysis.

Table 5.11: Predictors for Model05

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
LegalSystem		2	.275			
Civil Law	-1.134	1	.402	.322	.023	4.577
Common Law	-.470	1	.759	.625	.031	12.546
Ante 2015	-.805	1	.043	.447	.205	.974
Strategic	-.946	1	.102	.388	.125	1.207
Pro-regulatory Goal	-.283	1	.375	.754	.403	1.408
Rule of Law	-7.290	1	.033	.001	.000	.552
Constant	7.210	1	.001	1,353.118		

a. Variable(s) entered on step 1: Legal System, Marker 2015, Case Mode, Goal of Petitioner, Rule of Law.

5.2.3.4. Legal Origin

To identify differences of climate change litigation between legal systems, two additional data sub-sets are created to see if the model predictions change when the data draws upon evidence from either common law or civil law systems. Unfortunately, the data of climate cases located in mixed law systems is too scarce for a reasonable regression analysis as there are only 11 cases in total.

When selecting climate cases processed in civil law systems (Model06) as well as the independent variables *Rule of Law* and *CCPI* that further reduce the number of considered cases, 31 climate cases remain for the analysis.[59] The Model06 shows a good fit of the data and an increase of accuracy by 35.5% points (see Table 5.12).

Table 5.12: Model06 Performance

	Chi-square	df	Sig.
Omnibus Test	28.639	18	.053
Hosmer-Lemeshow	.000	6	1.000
Prediction	90.3% correctly predicted (35.5% points increase)		

However, there are no significant predictors for Model06 as the significance for all predictors varies between 0.999 and 1. Therefore, the null hypothesis cannot be rejected (see Supplementary Table 22). Better results for the predictor *Ante 2015* can be achieved (Sig. 0.065 and B = -2.174) in Model07 which only includes the independent variables *Marker 2015*, *Case Mode*, and *Goal of Petitioner* (Supplementary Table 24). The performance of the Model07 is still good (Supplementary Table 23).

The Model08 is based on the common law data sample and draws upon 159 climate cases. It includes the same independent variables as the Model06 and therefore incorporates the *CCPI* and *Rule of Law*. The Hosmer-Lemeshow test features a good performance for the model though the Omnibus test does not meet the criteria of a significance level below 0.05 (see Table 5.13).

Table 5.13: Model08 Performance

	Chi-square	df	Sig.
Omnibus Test	54.650	40	.061
Hosmer-Lemeshow	4.817	8	.777
Prediction	69.8% correctly predicted (19.5% points increase)		

No significant relationship between any predictors and the outcome of climate change litigation is indicated in Model08 (see Supplementary Table 25). The highest significance level is found for the predictor of no *Local Provisions* as a legal obligation at 0.188, followed by a *Pro-Regulatory Goal* of the petitioner at 0.376 with a negative relation to the outcome of interest. Model09 is similar to Model07 and includes only the

[59] Additional independent variables of Model06 are *Marker 2015; Case Mode; Goal of Petitioner; Petitioner; Respondent; Climate Issue;* and *International Law*.

independent variables *Marker 2015*, *Case Mode*, and *Goal of Petitioner.* The significance of a *Pro-Regulatory Goal* of the petitioner increases to 0.061 (see Supplementary Table 27). However, the performance of Model09 is worse than that of Model08 (see Supplementary Table 26).

5.2.3.5. Domestic Evidence

As Spamann (2015) suggests the causal relationships based on different legal systems should be tested against domestic evidence. Generally, the precision of regression models declines with a decreasing numbers of cases. Therefore, the sources for domestic evidence testing should come from countries (outside of the U.S.) with the highest number of climate cases, i.e., Australia and the UK. For this reason, two data sub-sets are created.

The Australian Model (Model10) contains 80 climate cases and displays good performance results (Table 5.14). Both 'goodness-of-fit' tests suggest a good fit of the data and the prediction of the outcome increases by 28.7% points in comparison to the model with no predictors reaching 82.5% accuracy. The variables included in the analysis are *Marker 2015; Goal of Petitioner; Petitioner; Respondent; Climate Issue;* and Legal Obligations (*Constitution; Statutory Provisions; Local Provisions*).[60]

Table 5.14: Model10 Performance

	Chi-square	df	Sig.
Omnibus Test	58.131	26	.000
Hosmer-Lemeshow	3.068	8	.930
Prediction	82.5% correctly predicted (28.7% points increase)		

Model10 produces no significant predictors (see Supplementary Table 28). The predictor with the best significance is a *Pro-Regulatory Goal* of the petitioner at a significance level of 0.094 with a positive relation to the outcome of interest. On second place, cases resumed before 2015 possess a significance level of 0.293 and a positive influence on the outcome.

The model based on cases from the UK (Model11) includes 54 climate cases. While the Omnibus test is not significant for the data set, the Hosmer-Lemeshow test indicates a good fit of the data. The accuracy increases by 33.3% points when introducing the predictors (see Table 5.15) which are *Marker 2015; Case Mode; Goal of Petitioner; Petitioner; Respondent; Climate Issue;* and all levels of *Legal Obligations*.

[60] The variables *Case Mode, International Law* and *Common Law* are not considered in Model10 as all cases are routine cases and no international obligations as well as Common Law principles have been used in Australian climate cases.

Table 5.15: Model11 Performance

	Chi-square	df	Sig.
Omnibus Test	40.397	28	.061
Hosmer-Lemeshow	5.737	8	.677
Prediction	83.3% correctly predicted (33.3% points increase)		

Yet again, the logistic regression Model11 does not show any significant predictors. For the UK data set, the predictor with the best significance is the respondent *State Government* at a significance level of 0.299 and a positive influence on the outcome, followed by cases concluded before 2015 (Sig. = 0.303) showing a negative contribution to a positive outcome (see Supplementary Table 29). However, these values are not significant and therefore these predictors are not explanatory for the outcome.

When emulating Model04 based on the international data set by only including the independent variables *Marker 2015, Goal of Petitioner,* and *Case Mode*, the domestic models have a poor performance. The percentage of correctly predicted outcome only increases by 1.2% points for Australia and 11.1% points for the UK. Further, the Omnibus test indicates a bad fit of the data for both models (0.757 for Australia and 0.326 for the UK). Therefore, I refrain from going into detail on the results of the individual predictors.

5.2.3.6. Summary

To summarize, most predictors in all executed models do not show a significant influence on the outcome of climate change litigation. An overview of all significant predictors is shown in Table 5.16 as well as in Supplementary Table 30 that provides further details on all executed models. Overall, no statistically significant relationships with the outcome could be found for the categories *Goal of Petitioner*, *Type of Petitioner, Climate Issue, Legal Obligations*, and for the *CCPI* in any of the models. For the *Type of Respondent* a significant negative impact was indicated by Model03 for the respondent *Corporation*. The model insinuates that cases against corporations are less likely to result in a positive outcome.

The *Rule of Law* model (Model01) suggests that the lower the score of the Rule of Law Index in a jurisdiction, the more likely the outcome of climate change litigation has a positive impact on climate change mitigation and adaptation. This finding is confirmed by Model05 that includes categorical variables as well as the Rule of Law Index. The negative relationship between the *Rule of Law* and the outcome is also corroborated by the influence of the legal families on the outcome. While Model04 indicates a negative influence of the presence of a common law system, mixed law systems have a positive impact on the outcome of climate change litigation. The score of the Rule of Law Index for these countries is particularly low and varies between 0.39 for Pakistan and 0.59 for

South Africa.[61] In contrast, most common countries of the common law family show higher scores around 0.8, for example, Australia, Canada, UK, and New Zealand.

Table 5.16: Overview of Significant Predictors on the Outcome

Model	Significant Predictors	B	Sig.	H_0	Model Performance
Model01					
	Rule of Law	-5.577	.006	rejected	good
Model03					
	Strategic	-2.582	.041	rejected	good
	Respondent Corporation	-2.291	.045	rejected	
Model04					
	Strategic	-1.197	.018	rejected	good
	Common Law (System)	-.849	.022	rejected	
	Mixed Law (System)	2.308	.046	rejected	
Model05					
	Ante 2015	-.805	.043	rejected	good
	Rule of Law	-7.290	.033	rejected	
Model07					
	Ante 2015	-2.174	.065	accepted	good
Model09					
	Pro-Regulatory Goal	-.636	.061	accepted	poor

The strategy of a climate case (*Case Mode*) might have an impact on the outcome of climate change litigation. Strategic cases are less likely to result in a positive outcome which in turn indicates that routine cases do. This relationship is insinuated by Model03 and Model04. Further, cases that have been concluded before 2015 have a negative relation to the outcome which is indicated by Model05 that includes the Rule of Law Index and categorical variables. The predictor *Ante 2015* also shows a significance of 0.065 in Model07 which is based on the civil law data set. These findings suggest that climate cases that have been decided after 2015 supposedly have had a better outcome than older cases, particularly in civil law jurisdictions.

Overall, the models based on national data (Australia and the UK) or data divided into common law and civil law families indicate no significant relationships between any predictors and the outcome of climate change litigation. Therefore, findings from the models based on the international data set (Model01 to Model05) cannot be confirmed by other evidence.

[61] Other mixed law systems are found in India (0.51), Nigeria (0.43), Kenya (0.45), and the Philippines (0.47).

6. Discussion

In the course of this chapter, the previously developed results about the trends in and the outcome of climate change litigation outside of the U.S. are interpreted and discussed in light of the research questions in Chapter 1.2 and against the backdrop of the literature reviewed in Chapter 2 and 3. For this reason, the research questions are recaptured:

(1) What is the outcome of climate change litigation outside of the U.S.?
(2) What are the goals of climate change litigation and which strategies are used to achieve them?
(3) Where and when does climate change litigation occur?
(4) Who is involved in (driving and answering to) climate change litigation?
(5) Which sector of climate change is addressed and which legal basis is argued to substantiate the claims?
(6) Which factors determine the outcome of climate change litigation?

Special attention is awarded to the analysis by McCormick et al. (2018) about the outcome of climate change litigation in the U.S. The U.S. American analysis complements this study. It also allows for the comparison of the findings of both studies. Further, a discussion about limitations and advantages of the different methods applied in both studies follows. The section includes a reflection on the coding and category development. Based on the drawn conclusions, recommendations for further research are formulated.

6.1. Interpretation and Implications

The structure of this section follows the depiction of the results from the statistical analysis and includes findings from U.S. litigation by McCormick et al. (2018). Firstly, the overall outcome of climate change litigation is discussed in terms of the initial pro- and anti-regulatory goals, trends, and judicial instances. One focal point relates to the difference between strategic and routine climate cases. Thereupon, the geography of climate change litigation is dissected concentrating on the distinction between the Global North and South, legal families, and the role of the Rule of Law Index (WJP, 2020). Going into detail, the topics and legal obligations of climate change litigation are discussed for each type of petitioner and respondent starting with corporations, then going to governmental bodies and concluding with ENGOs and other citizen advocacy groups or individuals. The discussion is substantiated by drawing on various exemplary climate cases. To offer valuable clues to the main research question, the findings of the test of independence as well as the logistic regression models are examined. Finally,

the results are interpreted with regard to the literature on the economics of climate change.

6.1.1. Outcomes, Trends and Goals

The data indicate that climate change litigation predominantly results in a positive outcome for climate change mitigation and adaptation showing a ratio of 1.3 to 1 (positive to negative outcomes) in the data set of this study. The results might therefore suggest that litigative measures are a legitimate tool for climate action and governance. Climate activists have recently recognized the opportunities of climate change litigation for climate change mitigation and adaptation to a great extent which is supported by the data (cf. Averill, 2007; Burger & Gundlach, 2017; Peel & Osofsky, 2015; Setzer & Byrnes, 2019). Strategic cases which have a visionary approach and tend to be high-profile cases have become more frequent. Following the *Urgenda* case and the Paris Agreement in 2015 the share of strategic cases has increased by 20% (see Figure 5.7; Setzer & Byrnes, 2019). However, this increase in strategic cases does not correspond to an increase in success rates. In fact, strategic cases do not only result in more negative outcomes than routine cases, the variable *Strategic* is one of the few predictors produced by the logistic regression analysis that shows a statistically significant negative relationship with a positive outcome for climate protection. Further, the category *Case Mode* that incorporates the code *Strategic* nearly meets the level of significance of 0.05 in the chi-square statistic suggesting that the distribution of the variables *Strategic* and *Routine* is not a sampling error (Table 5.5). Hence, the data strongly indicate that while efforts to use climate change litigation strategically to influence climate accountability increase, they lack the desirable outcome in the court room. Still, outside the court room, highly publicized strategic cases can also stimulate the public debate, educate the public on climate change, and produce changes in social behavior in the long run (Averill, 2007). Further, lost strategic cases can have other important implications for future litigation. For example, the administrative court in Berlin has decided in the case *Family Farmers and Greenpeace Germany v. Germany* for the first time that the German government's climate policy is subject to judicial review and that claims can be based on human rights. This decision has been considered a success by the petitioners though the petition itself has been rejected by the court and was therefore marked as a lost case in this study (Deppe-Burghardt, 2019). Thereupon, Greenpeace Germany has supported a second climate case against the German government which was filed in 2020 at the Federal Constitutional Court in Germany and has yet to be decided on (Klimapolitik vor Gericht, 2020). In contrast, lost pro-regulatory cases can also undermine climate change science, if rejected by the court, and justify climate inaction (Averill, 2007). As the data show strategic cases are more likely to result in a negative impact for climate change mitigation. Hence, choosing and channeling resources into litigative measures as a tool

for climate action should be considered carefully. ENGOs and other pro-regulatory litigants should balance the risk of losing the lawsuit against their financial resources, time, and efforts they are willing to invest. While the data show an increase of strategic cases in recent years, they do not suggest an increasing success rate. Hence, the ongoing shortcomings of strategic cases stress the importance of routine cases for climate governance through the court system. The data collection of routine cases constitutes a more difficult task due to the invisible and small-scale nature of routine cases (Bouwer, 2018; Setzer & Byrnes, 2019). Consequently, routine cases are likely to be under-represented in the data set of this thesis. Nevertheless, the data insinuate promising results for routine cases to impact climate change mitigation positively. A large proportion thereby rests upon lost climate cases with an anti-regulatory goal that did not succeed.

In the analyzed data set, the number of pro-regulatory goals in climate change litigation outweighs anti-regulatory petitions. However, the difference of 17 cases out of 263 total climate cases is minor. Anti-regulatory cases are lost more frequently than pro-regulatory cases resulting in the overall dominance of positive outcomes for climate protection and adaptation measures. Only a third of all anti-regulatory cases has been successful. Therefore, the data suggest that de-regulation through the legal system is not a very promising strategy for anti-climate action outside of the U.S. This tendency mostly concerns climate cases about emissions trading schemes and renewable energy projects (see Supplementary Table 13).

The majority of climate cases are petitioned before a first instance of the judiciary system. At the first instance, positive outcomes predominate the negatives. When climate cases are appealed and decided at appellate courts, positive and negative outcomes nearly outbalance. The supreme courts however appear to favor pro-regulatory over anti-regulatory outcomes (Figure 5.5). Further, strategic cases have better chances at winning when decided at higher instances such as appellate and supreme courts.[62] Hence, climate activists might consider filing their petitions at higher instances, if possible.

Since 2004, 10 years after the first climate case outside of U.S. jurisdiction, climate change litigation has occurred annually (Figure 5.11). In total, litigative measures peaked between 2007 and 2010, then in 2013 and 2015 numbers increased again. These fluctuations in total numbers of climate cases before 2015 cannot be explained by the data. Potentially, the second major drop of climate cases in 2014 is due to an incomplete data sample or because petitioners waited to file their lawsuits in anticipation of the Paris Agreement in 2015. Not included in the analysis are climate

[62] The ratio of negative to positive outcomes is 1.8 for first instances, 1.5 for appellate courts, and 1.25 for supreme courts. Pending cases are excluded from that ratio.

cases which have not reached a decision by the courts yet. Thus, the numbers are naturally lower for the past two to four years. However, total numbers after 2016 are comparable with and at times even higher than the years 2011 and 2012 indicating that climate change litigation has in fact expanded in recent years which supports Setzer & Byrnes (2019) observations. While in 2007 and 2008 many anti-regulatory climate cases have been brought before the courts, the overall tendency of anti-regulatory litigation is declining. There is a possibility that the numbers decrease because anti-regulatory cases have been predominantly lost in the early stages of climate change litigation. Early judgements can serve as precedent particularly in common law systems discouraging other anti-regulatory petitioners to pursue litigative measures (Averill, 2007).

6.1.2. Geography

The geographic expansion observed by Setzer & Byrnes (2019) is supported by the data (Figure 5.8 and 5.9). In this study the timeline is split in 2015 in order to check for the second wave of climate change litigation observed by Ganguly et al. (2018). Further, because undecided cases are eliminated from the data set, the geographic expansion of climate change litigation is likely to be more extensive than suggested in this thesis.[63] The majority of climate change litigation occurs in the Global North. Countries situated in the Global North are historically the largest contributors to climate change with the U.S. at first and the EU at second place (Rocha et al., 2015). Most apparent is the expansion in Europe. Before 2015, climate cases have been brought in Austria, France, Germany, Luxembourg, Spain, the UK, and Ukraine. After 2015, litigation has expanded to Ireland, the Netherlands, Norway, Poland, Sweden, and Switzerland. In North America, numbers have increased both in Canada and dramatically in the U.S. (from 873 to 1377 cases between 2015 and 2021) and numbers continue to increase weekly (Sabin Center for Climate Change Law, 2021; McCormick et al., 2018; Setzer & Byrnes, 2019).[64] In Oceania, no expansion and only a slight increase in total numbers are detected. In the Global South, climate cases are also growing (Setzer & Benjamin, 2019). In South America, climate change litigation has broadened to Chile and increased in Brazil and Colombia. In Africa, it has expanded from Nigeria to Kenya and South Africa, in Asia, from India to Pakistan and the Philippines. Many of the climate cases brought in the Global South, which are

[63] The database and map of the Grantham Research Institute which includes undecided climate cases also observes climate cases in Argentina, Ecuador, Guyana, and Peru in South America as well as Mexico in North America. On the African continent climate cases are also brought in Uganda. In Asia the expansion has also reached Nepal, Indonesia, Japan, and South Korea, and in Europe Estonia and Slovenia are included as well (Grantham Research Institute on Climate Change and the Environment and Sabin Center for Climate Change Law, n.d.).

[64] The current number of 1377 is dated at 14/02/2021. The number of 873 climate cases is derived from McCormick et al. (2018) and reflects the status of climate change litigation in the U.S. from 2015/2016.

recognized by 'western' scholarships, are of strategic nature. Due to a higher vulnerability to climate change impacts, these cases combine climate change issues with constitutional and human rights violations as well as other environmental protection disputes (cf. Peel & Lin, 2019; Setzer & Benjamin, 2020). Thereby, strategic cases in the Global South heavily rely on human rights approaches. A

> "[…] human rights framework is particularly relevant in building a compelling climate justice narrative in the Global South. This narrative […] also provides vulnerable countries and communities with the opportunity to account for their experience of climate impacts" (Setzer & Benjamin, 2020, p.90).

Still, the vertical relationship in climate change litigation between the individual petitioner and the national state in the Global South does not reflect the responsibility of the Global North for climate change impacts located in the Global South. Further, environmental activists in the Global South face higher levels of violence and even death threats as well as higher levels of procedural challenges such as capacity constraints (Setzer & Benjamin, 2020). Remarkably, climate change litigation has achieved some progressive outcomes in the Global South, such as the already mentioned gas flaring case in Nigeria or the human rights violation case against 50 Carbon Majors in the Philippines (Setzer & Benjamin, 2020; *Gbemre v. Shell Petroleum Development Company of Nigeria Ltd. and Others,* 2005; *In re Greenpeace Southeast Asia and Others,* 2015). Setzer & Benjamin (2020) identify that climate change litigation in the Global South differentiates from strategic cases in the Global North by focussing on the enforcement of existing policies for mitigation of and adaptation to climate change, the resolution of governance gaps, and the protection of native ecosystems rather than forcing governments to increase mitigation ambitions. The authors anticipate that climate change litigation in the Global South is likely to increase in the coming years (Setzer & Benjamin, 2020).

Due to the scarcity of data within national states, this study does not provide an analysis of the outcomes by country. Only five countries can show more than 10 climate cases that have been decided in their jurisdictions and four of those countries are of the common law family and situated in the Global North namely Australia, Canada, New Zealand, and the UK. Differences between the outcomes of climate change litigation by country can therefore not be explained by excluding sampling error or chance.

However, the classification into legal families indicates that climate change litigation results in better outcomes for climate change mitigation in mixed law systems than in common law systems (see Figure 5.10). The category *Legal System* is one of the two categories that were marked as significant by the chi-square statistic of the test of independence. Both predictors *Common Law* and *Mixed System* show significant contributions to the outcome in Model04 (model with categorical variables) with a negative relationship between *Common Law* and a positive outcome and a positive

influence on the outcome by *Mixed System* (see Table 5.10). Hence, the data suggest climate change litigation is less likely to result in positive outcomes within countries of the common law family but achieves more positive results in mixed law systems.

This finding might be linked to the rule of law in those countries. When examining the Rule of Law Index, it becomes evident that most countries with a common law system achieve a high score of 0.8 and higher, while countries with mixed law systems only score between 0.39 and 0.59. The rule of law is likely to influence the outcome of climate change litigation, since the data determines the rule of law as a significant predictor (see Table 5.7 and 5.11). Surprisingly, the higher the score of the Rule of Law Index in a jurisdiction, the less likely the climate case results in a positive outcome for mitigation. This suggests that high degrees of accountability of the judiciary, just laws, accessibility to the judicial process, and impartial dispute resolution, which the Rule of Law Index analyzes, do not improve the outcome of climate change litigation (WJP, 2020). On the contrary, in countries where accountability and the actual enforcement of the judgements are weak, the courts are more likely to favor pro-regulatory measures on climate change. Setzer & Benjamin (2020) explain these progressive positive outcomes in strategic environmental litigation in the Global South by placing them within “the history of environmental jurisprudence in these countries, combined with progressive procedural requirements“ helping to facilitate standing and even class action suits (Setzer & Benjamin, 2020, p.95). Another important aspect might be that climate change impacts are more severe and dangerous to the livelihood of people in the Global South thereby allowing for an approach to establish violations of human rights and improve sustainability (cf. IPCC, 2014; Peel & Osofsky, 2018; Setzer & Benjamin, 2020). However, positive outcomes of climate change litigation do not necessarily result in a positive impact on climate change mitigation and adaptation when judgements and orders are not enforced. For example, the pro-regulatory judgment by the Federal Court of Nigeria in the case *Gbemre v. Shell Petroleum Development Company of Nigeria Ltd. and Others* (2005) was never enforced and gas flaring practices in the Niger Delta continued (Faturoti et al., 2019). Setzer & Benjamin (2020) trace difficulties in the enforcement of environmental legislation back to a shortage of resources, weak and fragmented institutions, a lack of technology and monitoring facilities as well as limited political will.

While the risk of non-enforcement of judgments might be more pressing in countries with lower Rule of Law scores, countries of the Global North showing high Rule of Law scores are not secure from implementation failures. The prominent *Urgenda* case has demonstrated that. The court’s decision was a landmark for climate action through the court systems (Peel & Osofsky, 2018; Setzer & Byrnes, 2019). However, the actual implementation of the judgement that the government has to reduce GHG emissions by 25% until the end of 2020 is not likely to be achieved (Brouwer, 2020). Though lacking enforcement, court decisions that favor pro-regulatory approaches to climate change

can still inspire other climate change litigation, as the *Urgenda* case has proven, and increase public pressure on the governments' response to the threat of climate change (Averill, 2007; Brouwer, 2020).

There is another possible explanation for the significant negative impact of the existence of a common law system on the outcome of climate change litigation in comparison to, e.g., civil law and mixed law systems. Climate cases within the jurisdictions of Australia, the UK, and New Zealand mostly concluded before 2015 when anti-regulatory (negative) outcomes were more frequent due to fewer policies on climate change regulation and a generally lower acceptance of climate change and climate change science (Marjanac et al., 2017; Marjanac & Patton, 2018; McCormick et al., 2017). For example, the Victorian Civil and Administrative Tribunal in Australia expressed in 2008 that

> "the relevance of climate change to the planning decision making process is still in an evolutionary phase. Each case concerning the possible impacts of climate change will turn on its own facts and circumstances" (*Gippsland Coastal Board v. South Gippsland SC & Ors*, 2008).

Hence, if regulation through policy is lacking, then each case is determined by the available provisions, the individual expert testimonies, available precedents, and the judges' opinions about judicial competence in regulating climate change through court judgments. The issues of justiciability, balance of power, and social acceptance of climate change come to play (Averill, 2007; Grossman, 2003).

While climate change litigation has expanded all over the globe, litigative measures involving climate change issues are most commonly used in the U.S. As the federal state is exempted from the data set of this study, the analysis of McCormick et al. (2018) offers some insights into the outcome of and strategies in climate change litigation in the U.S. Similar to the typology of negative and positive outcomes, McCormick et al. (2018) analyze whether the outcome favors pro- or anti-regulatory positions to climate change. The researchers considered U.S. American climate cases that were decided between 1990 and 2016 to create a data sample.[65] So any effects of the Paris Agreement are not included in their analysis. They selected cases that enclose climate change as a distinct issue but also cases about coal-fired power plants (CFFP), arguing this sector is the largest contributor to GHG emissions in the U.S. Besides focusing on the outcome of climate change litigation, McCormick et al. (2018) analyze frequently used U.S. laws, common climate topics, and the role of climate change science. The latter focal point is based on 78 in-depth interviews with litigants and their perspective on the matter.

Whereas climate cases outside of the U.S. have predominantly resulted in positive or favoring pro-regulatory outcomes, U.S. American litigation paints a different picture.

[65] The data set used by McCormick et al. (2018) is available online (McCormick, 2017).

From the total of 873 climate cases until 2016, 309 concluded in a negative and 224 in a positive outcome with a ratio of 1.4 to 1. A third of all climate cases (305) were settled outside of the court room or were indeterminate. More than 400 new cases have been brought since 2016, so climate change litigation is now three to four times the volume of the rest of the world. However, the success rates of both pro-regulatory (ENGO and other pro-regulatory) and anti-regulatory litigants (business / industry and other anti-regulatory) are roughly 30% when settled and indeterminate cases are excluded. Thus, not only are litigants in the U.S. less likely to succeed with their litigative endeavors, the judicial system favors anti-regulatory over pro-regulatory positions. This finding is primarily substantiated by the high volume of lost pro-regulatory cases initiated by ENGOs. The example of the U.S. demonstrates that the litigative potential of climate action in the rest of the world is far from exhausted. However, it also highlights that litigation involves high risks for the litigants.

6.1.3. Stakeholder, Topics and Legal Obligations of Climate Change Litigation

In the U.S., ENGOs are the driving force behind climate change litigation. In the rest of the world, corporations initiate the majority of climate cases. However, corporations predominantly pursue anti-regulatory goals, particularly in the topic of emissions trading schemes (see Table 5.2 and Supplementary Table 13). Only in the renewables sector corporations show an interest to establish their business volumes by increasing regulation on climate change. Hence, they are not responsible for driving climate action through the court system. By targeting mostly governmental bodies, corporations have not been entirely successful with their agenda to diminish climate change related regulation on emissions trading schemes and private construction, nor to boost the development of renewable projects. Furthermore, corporations have been at the responding end of climate change litigation particularly for the extraction of fossil fuels, false advertisement, and emissions trading (see Supplementary Table 14). With a ratio of 1.25 to 1, petitioners have succeeded against corporations. Overall, the data indicate that climate change litigation incorporates a high risk for corporations whether they act as petitioners or respondents. Strategic cases against corporations have been successful by arguing human rights violations, the right to life, and tort law principles (see Table 5.4). However, the data suggest that opportunities to internalize external effects of climate change through judicial processes are not exhausted. To date, only a single lawsuit against a Carbon Major has been pursued in order to receive compensation for losses due to climate change impacts by applying proportional liability (cf. Faure & Nollkaemper, 2007). The case referred to is *Lliuya v. RWE AG* (2015). Other cases against Carbon Majors have not been seeking damages. For example, in the case *In re Greenpeace Southeast Asia and Others* (2015) petitioners

asked for an investigation into the general issue of human rights violations by the world's 50 biggest Carbon Majors causing climate change and ocean acidification. While the Filipino Commission on Human Rights found that these companies could be held liable for climate change impacts, they identified a gap in current international human rights law in order to assign legal responsibility to those Carbon Majors. In climate change litigation, it has been more common to seek injunctive relief rather than damages. In a broader sense of liability law, the precautionary principle has been predominantly used in 18 climate cases (Supple-mentary Table 17; Faure & Peeters, 2011). Hence, the data show that the application of liability law plays a significant role in climate change litigation. They also show that there is still potential to use the negligence doctrine, strict and product liability as well as threshold or proportional liability to assign responsibility for emissions and award damages for victims.
In the U.S., with a total of 95 cases, corporations and businesses are often sued for climate change related issues. Only governmental agencies are sued more often (McCormick, 2017; Supplementary Table 31). Over three quarters of those climate cases sought a pro-regulatory goal but only 10 were successful in doing so. Corporations are primarily sued over coal-fired power plants (CFPP) and other air quality related issues as well as for human health impacts of climate change. The data by McCormick (2017) therefore suggest that corporations in the U.S. with high financial and other resources are more likely to be able to persuade courts to decide in their interests. While industry advocacy organizations have not been subject to climate change litigation outside of the U.S., as far as the data set of this thesis is concerned, these organizations have been targeted in 11 climate cases in the U.S. Again, the courts have predominantly decided in their interests (McCormick, 2017; Supplementary Table 31). When initiating climate cases, industry advocacy organizations in the U.S. usually seek an anti-regulatory goal (ratio of 5.2 to 1), but are less successful than the respective petitioners to enforce their interests in the court room (McCormick, 2017).

Similar to targeting corporations, businesses, and industry advocacy organizations, petitioners that file lawsuits against governmental bodies in the U.S. have predominantly lost. Until 2016, out of 449 pro-regulatory cases, only 103 were able to win and 234 lost. The ratio increases with higher levels of government, from 1.8 lost cases to one successful case against local governments, to 2.1 to 1 against state governments, and 2.6 to 1 when addressing the federal government of the U.S. (McCormick, 2017). The success rate of anti-regulatory litigation is higher - a third of all anti-regulatory cases were successful. Again, with higher levels of governmental bodies (from local to federal), the ratio of lost to won cases increases as well. Though petitioners are less likely to succeed by suing U.S. federal agencies, the U.S. federal government has been sued the most with a total of 416 climate cases until 2016 addressing various climate topics (McCormick, 2017; Supplementary Table 31).

Outside of the U.S., the role of governmental agencies in climate change litigation is similar. In the rest of the world, governmental bodies, particularly federal governments, have been the highest respondent of climate change litigation. Around three quarters of all strategic climate cases have been filed against federal governments. In contrast to the U.S., these cases resulted in more positive than negative outcomes (see Table 5.2). The fact that federal governments are frequently sued strategically might be partially explained by the definition of strategic cases and the consequent classification of cases. As strategic cases seek to influence climate accountability and stimulate policy debates, strategically operating petitioners, in this case ENGOs and citizen advocacy groups or individuals, target the bigger players such as federal governments or exemplary corporations (Setzer & Byrnes, 2019). In general, strategic cases primarily challenge public construction, deforestation, or the enforcement of existing policies (see Supplementary Table 16). If strategic petitioners seek to enforce policies on climate change by challenging federal agencies, they have only been unsuccessful by arguing human rights and UNFCCC obligations. The issues that arise mostly concern the establishment of standing and other justiciability issues. For example, in the case *Armando Ferrão Carvalho and Others v. The European Parliament and the European Council*, also called the 'people's climate case', the European General Court dismissed the case on procedural grounds. The judges concluded the petitioners cannot demonstrate standing since they do not satisfy the condition of individual concern as required by case law. The condition is only sustained when petitioners are affected in a way that is

> "[…] peculiar to them or by reason of circumstances in which they are differentiated from all other persons, and by virtue of these factors distinguishes them individually" (*Armando Ferrão Carvalho and Others v. The European Parliament and the European Council,* 2019, p.12*).*

Similarly, in *Verein KlimaSeniorinnen Schweiz et al. v. Federal Department of the Environment, Transport, Energy and Communications* (2018), the Swiss Federal Administrative Court dismissed the case on the grounds that the petitioners, who were Swiss women over 75 years of age at the time, are not the only part of the population that is affected by climate change. In other cases, the courts did not find a justiciable issue, e.g., concluding that it had "no role to play in reviewing the reasonableness of the government's response" to UNFCCC obligations (*Friends of the Earth v. Canada*, 2008, p.19). On the other hand, strategic cases against deforestation in Pakistan, India, and Colombia have been successful. The courts decided in favor of regulation. They ordered fines against deforestation activities and ordered the planting of new trees (see *Future Generation v. Ministry of the Environment and Others*, 2018; *Sheikh Asim Farooq v. Federation of Pakistan and Others*, 2018). Climate cases challenging airport expansions have also been successful in the UK and Austria by arguing national climate change policies and UNFCCC obligations. Hence, the data indicate that

strategic climate cases against federal governments offer potential for climate action and are more likely to succeed in the Global South or when specific violations and actions rather than climate change policies in general are targeted.

Federal agencies have filed cases against corporations mainly for false advertisement in Australia and have been successful. Against supranational governments in the climate topic of emissions trading schemes they achieved mixed results. Other governmental bodies on lower levels (state, local, and city) have been even less active in instigating climate action through the court system. Cities have only initiated two climate cases. The city of Lyon sought to gain access to information on emissions allowance sales and was denied (*Ville de Lyon v. Caisse des dépôts et consignations*, 2009). The London borough of Hillingdon challenged a preliminary approval of a third runway at the Heathrow airport by state officials based on a national climate change policy in the UK. In the end, the court did not decide on climate change related grounds (*R. (on the application of the London Borough of Hillingdon and others) v. Secretary of State for Transport*, 2010). As respondents, however, state and local governments had to deal with climate change litigation frequently. Local governments have been largely targeted by individual and citizen advocacy groups as well as corporations, mostly with routine cases (see Table 5.2). Local and city councils decide on planning permits. Hence, cases have challenged their decisions for granting or denying private construction permits or renewable projects (see Supplementary Table 14). Since the outcome of those judgements is neither predominantly negative nor positive and cases have both pursued anti- and pro-regulatory goals, no pattern can be identified. The same applies on state level. Here, governmental bodies faced climate cases concerning renewables, the extraction of fossil fuels, and emissions trading schemes mostly initiated by individuals and citizen advocacy groups as well as corporations (see Supplementary Table 14). Noticeable cases in the group of state governments as respondents are anti-regulatory cases commenced by individuals and citizen advocacy groups challenging renewables. These cases were all lost with one exception. Hence, the data might suggest it is risky to sue state governments for the development of renewables. Although no clear pattern emerges for the role of governmental agencies as respondents of climate change litigation, the data suggest that cases against governmental bodies in general have lower success rates. The average ratio of lost to won cases is at 1.37 to 1 for the whole data set. When extracting only the cases against governmental agencies the ratio increases to 1.45 to 1. Cases against non-governmental organizations have a ratio of 1 to 1 indicating that by addressing governmental organizations, petitioners are more likely to lose before the courts.

When regarding supranational governmental bodies as respondents, climate cases outside of the U.S. usually address the European Union for the EU ETS (emissions trading system). There are only two exceptions: in one case, the Commonwealth was addressed about new electricity fees on the Christmas Islands; in another case the EU

was challenged in the already mentioned 'people's climate case' (*Armando Ferrão Carvalho and Others v. The European Parliament and the European Council*, 2019; *Phosphate Resources Ltd. v. The Commonwealth*, 2004). All cases against the EU concerning the ETS had an anti-regulatory goal and were commenced by corporations or federal governments. Only three of those were successful indicating that the European Court of Justice and European General Court decide in favor of climate change regulation through the EU ETS thereby supporting the European form of a Pigovian tax on GHG emissions (see Supplementary Table 14; cf. Chapter 2.2).
In the U.S., roughly 11% of all climate cases have been petitioned by governmental bodies with the state government as the main driver (McCormick et al., 2018). The outcome of those climate cases is mixed and the majority of cases were settled outside the court room. Important climate topics are coal-fired power plants (CFPP) and other air quality related cases argued on the Clean Air Act, National Environment Policy Act, and other substitutes on state level. In the analysis of McCormick et al. (2018), the topic of CFPP is analogue to the climate issues of the extraction and combustion of fossil fuels in this thesis. Outside of the U.S., only one climate case by a governmental body involves the topic of CFPP. Also, state governmental bodies outside of the U.S. have initiated fewer climate cases than federal (national) governments and the overall numbers of governmental agencies as climate petitioners are smaller. Hence, the observations pertaining to U.S. American governmental bodies involved in climate change litigation as petitioners cannot be replicated when looking at cases from in the rest of the world.

Data from both within and outside of the U.S. show that climate change litigation with the intent to increase regulation on GHG emissions and adaptation measures is primarily instigated by ENGOs or citizen advocacy groups. In general, U.S. American climate change litigation is mainly driven due to ENGOs and other advocacy type organizations seeking pro-regulatory goals. With a total of 369 climate cases initiated by ENGOs and other citizen organizations, 355 were commenced with a pro-regulatory intent (McCormick, 2017). Out of those, 23% were won, 28% settled or indeterminate, and 49% were lost. Most successful were ENGOs and other advocacy groups in challenging quality of air related issues, biodiversity issues, and CFPP operations. However, the majority of cases addressing these climate issues have been lost. This suggests that until 2016, petitioners were not able to succeed in enforcing climate action through the judicial system in the U.S. Since McCormick et al. (2018) do not differentiate between strategic and routine cases, no statements can be made about the mode of the climate cases and whether climate activism was in fact the intent of the petitioners. McCormick et al. (2018) conclude

> "[…] both pro- and anti-regulatory plaintiffs are less successful than the defendants. Many cases brought by both business groups and ENGOs are against the state. Therefore both

> plaintiff types may lose more than win because they pursue many cases that are not strong or for which the courts are likely to defer to the judgement of state officials“ (McCormick et al., 2018, p.831).

Further, they point out that pro-regulatory petitioners "often build coalitions with plaintiffs who could more easily demonstrate standing“ (McCormick et al., 2018, p.831). To enhance the demonstration of standing, ENGOs often cooperate with local individuals that can prove their past or future suffering by climate impacts as a result of the respondent’s actions more easily. ENGOs thereby provide financial and human resources as well as experience and expertise of climate change science and judicial processes (McCormick et al., 2018). This coalition building is also common outside of the U.S., particularly in strategic climate cases and was noticed during the classification process of the data within in the category *Type of Petitioner*.[66]

Together, ENGOs and citizen advocacy groups or individuals have initiated the majority of pro-regulatory (67%) as well as strategic (85%) climate cases outside of the U.S., thereby driving climate change litigation that seeks to further regulate climate emissions and adaptation measures (see Table 5.2; Supplementary Table 13). Regarding total numbers, individuals or citizen advocacy groups have been more successful than ENGOs. However, compared to their achievements both groups have suffered more losses. When ENGOs or citizen advocacy groups seek to enforce existing policies or even increase the ambition of governments to mitigate GHG emissions, cases are predominantly lost with a ratio of 2.2 to 1. However, individuals or citizen advocacy groups that have the advantage of demonstrating better standing have been more successful, winning four out of 10 climate cases compared to two out of 9 climate cases initiated by ENGOs (see Supplementary Table 13). As already mentioned, most of these strategic cases against governments in the area of policy are built on coalitions between ENGOs and injured individuals. Therefore, a differentiation between the two groups in the category *Climate Issue* and code *Policy* should be made carefully. Still, the chances of winning cases are higher when topics of the extraction or combustion of fossil fuels, renewables, or deforestation are addressed and when access to (environmental) information is sought (see Supplementary Table 13). Within the climate issues of renewables and private construction, individuals and other advocacy groups have also pursued anti-regulatory goals mostly by challenging the development of new wind farms or the denial of planning permits for their own private construction.

With regard to the area of construction, the data show that climate cases concerning the development of public infrastructure tend to result in a negative outcome (see Supplementary Table 13). All climate cases challenging public construction were initiated with a pro-regulatory goal by ENGOs or other citizen advocacy groups. Initially,

---

[66] Due to the processing of the data for the statistical analysis every climate case was assigned to one code of the *Type of Petitioner*, e.g., *ENGO* or *Individuals or Citizen Advocacy Group.* Hence the information about coalition building is not represented in the final data set.

the differentiation between public and private construction was made to explore differences in the outcome between those two groups and to see whether the courts have decided in favor of the development of public infrastructure due to the public interest. At first glance, this hypothesis is supported by the data: in 9 out of 15 cases the courts outweigh the public interest for infrastructural development over the public interest for climate protection. However, drawing on the classification of strategic and routine cases, the data show that three out of four strategic cases challenging public construction have been successful.[67] Thus, by extending the scope of the climate case, also in relation to media coverage, petitioners have enhanced their chances at winning. It should be noted thought that any assumptions made based on a total number 15 cases (for public construction) are not robust and more data would be desirable.
Anyhow, while individuals or citizen advocacy groups are more active in private construction, renewables, and climate change policies, ENGOs rather focus on fossil fuel extraction as well as climate change policies. In terms of the claims made in court, ENGOs and other advocacy groups or individuals have achieved their goals by arguing the right to life, the precautionary principle as well as obligations stemming from national climate change policies, EU law, international human rights and the UNFCCC structure (see Supplementary Table 17). Human rights obligations in climate change litigation have increasingly become more important (see Figure 5.12). This trend is likely to continue as many new strategic climate cases, which are not part of the data set of this thesis, base their arguments *inter alia* on human rights (Peel & Osofsky, 2018). Overall, the data show that ENGOs and individuals or citizen advocacy groups are active in most climate issues with the exception of false advertisement and tort law. As already mentioned, great litigative potential exists in the application of liability law.

Both ENGOs and other citizen advocacy groups have been the target of climate change litigation mainly for their actions in civil disobedience. Climate activists regularly disrupt climate-damaging operations such as coal mining activities or occupy specific locations to raise awareness for climate action. For example, twelve climate activists occupied a Credit Suisse branch in 2018 and played tennis to protest against the bank's fossil fuel investments. As a result, they faced charges for trespassing. The first instance in the case, however, ruled that in light of the immense danger from climate change impacts, these actions were proportionate and waived the fine (Credit Suisse Protesters Trials, n.d.).[68] In the UK, Greenpeace activists damaged a coal-fired power station by painting a chimney and the jury decided in their favor in 2008. This case was the first in which the impacts of climate change were "used as lawful excuse in court“ (The Kingsnorth Six Trial, n.d.). Out of 8 cases against ENGOs and individuals or

[67] These three climate cases were decided in the UK.

[68] The decision was overturned by the court of appeals after the collection process of the data set for this thesis was finished. It is thereby not reflected in this data set (Credit Suisse Protesters Trials, n.d.).

other groups, 6 have been decided in favor of the climate activists recognizing the dangers resulting from climate change and the limitations of means to protest climate inaction (see Credit Suisse Protesters Trials, n.d.; Take Down Macron Protester Cases, n.d.; The Kingsnorth Six Trial, n.d.).

6.1.4. Factors Determining the Outcome

Some results of the logistic regression models and the test of independence were already cited in the discussion above. However, the findings of both analyses require a more detailed discussion in order to balance the interpretations above.
First of all, the test of independence indicates that the only statistically significant categories are the *Legal System* of the jurisdiction of the particular climate case as well as the *Goal of Petitioner* (see Table 5.5). The category *Case Mode* almost satisfies the significance level of 0.05.[69] Hence, for all other categorical categories the differences between the observed and expected frequencies in relation to the outcome of climate change litigation are likely a result of chance or sampling error. Any statements about the relationship between those variables and the outcome of climate change litigation should be treated carefully. The variables might be a factor in determining the outcome, however, their contribution cannot be verified by statistical means. There is another aspect that is important concerning the category *Case Mode.* The classification of climate cases as being strategic or routine is highly dependent on the researcher. If the classification was to be replicated by another researcher, the results would probably differ from the current results of this thesis. This aspect weakens statements about the contribution of the variables *Strategic* or *Routine* to the outcome of climate change litigation to a greater extent.

Unsurprisingly, the logistic regression models' results mostly indicate significant relationships between some of the independent variables of the three categories *Legal System*, *Goal of Petitioner*, and *Case Mode* that were deemed (almost) statistically significant by the chi-square test. For the independent variables *Strategic* and *Routine,* the null hypothesis was rejected by two models of categorical variables with *Strategic* cases having a negative impact on the outcome and *Routine* a positive impact (see Supplementary Table 20; Table 5.16). The variables were not significant in the model including the Rule of Law Index (see Table 5.11). By introducing the Rule of Law Index into the regression model, all 54 climate cases of international jurisdiction, mostly processed in the EU, were excluded from the analysis. In this model (Model05), the level of significance of *Strategic* cases changes to 10%. Hence, whether the climate

[69] Additionally, the re-classified *Type of Petitioner* also almost meets the significance level. After re-classification, the *Industry Advocacy Organization* was fused to *Corporation,* further *Local Government*, *City*, and *Supranational Government* were integrated into a new category *Other GOV*. However, the re-classified categories is not used in the logistic regression analysis as the new classes do not dwell on the desired detail about the petitioner or respondent. Therefore the re-classified *Type of Petitioner* is not discussed further.

case is of strategic or routine nature does not significantly explain the outcome within the boundaries of national jurisdictions. Neither are more likely to achieve a positive outcome of climate change litigation outside of the jurisdictions on EU level. This finding undermines previous statements about the importance of routine climate change litigation for climate protection.

Besides the significant predictors *Common Law (system)*, *Mixed Law (system)*, and *Rule of Law*, which have already been discussed above, the null hypothesis was further rejected for the respondent *Corporation* in Model03 as well as for the variables *Ante/Post 2015* in Model05 (see Supplementary Table 20 and Table 5.11). When examining the outcome of the respondent *Corporation* in detail, the data show 14 positive over 13 negative outcomes and do not suggest such an impact. Why the variable is marked as significant in the first categorical model is, at this point, considered an error. The variable *Ante 2015* shows a significant negative impact on climate protection when including the scores of Rule of Law Index in the model by which *inter alia* international jurisdictions are eliminated from the data sample. Thereby numerous positive outcomes generated before 2015 are not considered in the model and the importance of the ratio between positive to negative outcomes after 2015 increases. This indicates that outside of EU jurisdiction, climate change litigation is increasingly achieving results in favor of climate change mitigation and adaptation since 2015, particularly in countries of the civil law family.

Since the test of independence shows a significant relationship between the outcome and the legal system, it would have been interesting to see whether the outcome of litigative measures is predicted by different independent variables in the different legal systems. Unfortunately, the logistic regression models applied on data from civil law or common law jurisdictions do not produce statistically significant predictors on the outcome (see Supplementary Tables 22-27). This is partially explained by the relatively low numbers of climate cases on which the models are based. Only 31 climate cases are filed in jurisdictions of civil law systems. In common law characterized jurisdictions 159 cases have been decided. However, both common law models (Model08 and Model09) are not able to produce show significant predictors either and the data fit of the models are poor in comparison to the transnational models (Model03 to Model05) (see Table 5.13 and Supplementary Table 14). An important but not significant variable in the second common law model (Model09) is the *Goal of Petitioner* with a significance level of 0.061 (Supplementary Table 27). When examining the data, this can be translated into a great number of pro-regulatory routine cases processed in common law jurisdictions that have been lost and resulted in a negative outcome for climate change mitigation. Still, due to the poor data fit of the model, it cannot be deducted that a pro-regulatory goal significantly decreases the chances of a positive outcome of the litigative process in common law jurisdictions.

Following the recommendation of Spamann (2015) about empirical comparative law, differences between legal systems should be backed up by domestic evidence. Therefore, models were run for Australian and UK climate change litigation as those countries have processed the highest numbers of climate cases. Again, these models do not show any significant predictors (see Supplementary Tables 28 and 29). Initially another model based on Spanish climate change litigation was run to substantiate the findings of the civil law models. The Spanish model did not produce any significant predictors on the outcome either. Hence, neither the model results of international nor common or civil law litigation could be tested against domestic evidence.

During the execution of the logistic regression models, a number of additional models were run and explored. None of these results are illustrated in this thesis. For example, a regression model that only included the category *Climate Issue* was constructed to see if the significance levels of the predictors change when all other variables are excluded. The *Climate Issue* is one of the focal points of this thesis. Unfortunately, the level of significance did not improve substantially for any of the independent variables ranging between 0.355 (for *Other*) and 0.999 (for *False Advertisement*). The same applies for the additional models that each included the categories *Legal Obligations* as well as the *Type of Petitioner*. The model based solely on the *Type of Petitioner* shows *Corporation* (Sig. = 0.034), *City* (Sig. = 0.05), *Local Government* (Sig. = 0.02), *State Government* (Sig. = 0.026) as well as *Federal Government* (Sig. = 0.033) as significant predictors. However, the data fit is poor (Omnibus Test shows Sig. = 0.341) and, more importantly, the accuracy of the model did not increase at all when introducing the predictors (correctly predicted outcome remains at 56.3%). Therefore, the results are dismissed from display and further discussion.

Most categories that were developed for the analysis of the outcome of climate change litigation were not able to produce significant predictors based on the data set used in this thesis. The CCPI and therefore the efforts in climate change policy and regulation do not seem to have any effect on the outcome of climate change litigation (Table 5.7). Further, no legal obligation is likely to constitute a success factor for climate change litigation and no specific climate issue is favorable to others in order to achieve a positive outcome for climate change mitigation and adaptation. Hence, the data do not suggest a specific promising strategy for future litigation based on the available data at this time.

6.1.5. Implications

In the context of the economics of climate change, the data do not show clear evidence that climate change litigation instigates institutional change needed for effective climate governance (Klitgaard & Krall, 2011; Williamson, 2000). Certainly, some of the litigative measures were initiated by ENGOs and others because in the opinion of climate

activists and victims of climate change impacts, the current rules on climate governance have become unsuitable and insufficient in the light of the pressing danger of climate change (IPCC, 2014; Kingston & Caballero, 2009). In these cases, ENGOs and other activists sought to change the existing rules in order to close the emissions and ambition gap or to protect their livelihood and natural resources. The outcome of those cases is mixed. While some petitioners have not succeeded with their requests before the courts, such as a group of family farmers in coalition with Greenpeace in Germany, others have achieved their goals like the *Urgenda* Foundation (*Family Farmers and Greenpeace Germany v. Germany*, 2018; *Urgenda Foundation v. The State of the Netherlands*, 2015). For some of these progressive judgments, like in the *Urgenda* case as well as in *Gbemre v. Shell Petroleum,* orders of the courts were never enforced (*Gbemre v. Shell Petroleum Development Company of Nigeria Ltd. and Others,* 2005; Brouwer, 2020; Faturoti et al., 2019). However, the research design of this study is not arranged in a way to examine and observe institutional change through climate change litigation. It would require a higher focus on the impacts of climate change litigation over a longer period of time. Institutional change and change of governance structures is a slow and lengthly process (Williamson, 2000). Litigation addressing climate change has only been brought before the courts on a regular basis for 15 years (see Figure 5.6). To study the impact of litigation, a judgement by the court must be reached at first, then the order of the court must be implemented, and finally the impact observed with a suitable research design. So each climate case would enclose a time span of several years and all phases would need to unfold before being able to study the impact and whether institutional change was instigated. However, an aspect that can be observed today is that climate change is increasingly accepted as an aspect that is subject to judicial review (cf. Deppe-Burghardt, 2019).

Further, the data suggest that climate activism through the use of litigative measures has become more popular. An indicator is the increase of strategic climate cases (see Supplementary Table 16). Though litigation is a lengthy and costly process and climate activists potentially lose their petitions, the media attention strategic cases entail stimulates debates about climate change and responsibility that may be worth losing the actual lawsuit (Averill, 2007; Setzer & Byrnes, 2019). Also, climate activists form new initiatives and cooperations to establish standing and share resources, thereby expanding and consolidating their social networks as well as deepening their knowledge on climate change, climate change impacts, and legal issues (Peel & Osofsky, 2015; Jordan et al., 2015; Setzer & Byrnes, 2019).

The data further substantiate the role that climate change litigation plays for climate governance. Peel & Osofsky (2015) emphasize the importance of domestic regulatory solutions as international efforts fail. The majority of climate cases are based on constitutional and statutory obligations independently from obligations stemming from

the UNFCCC structure (see Supplementary Table 17). Furthermore, the data show that a variety of different stakeholders and coalitions between them are involved in climate change litigation: from local residents; farmers; youths; ENGOs; businesses; to governmental officials of different levels. Climate change litigation cuts through multiple scales and levels, facilitates accessibility to a broader range of people and thereby connects stakeholders that otherwise do not meet (Peel & Osofsky, 2015).

Climate change litigation also offers the opportunity to internalize the externalities of GHG emissions. In the area of emissions trading schemes, litigative measures are a prominent feature. However, the majority of cases involving ETS and other certificates seek to de-regulate these voluntary agreements (markets). On the other hand, the outcomes of cases addressing ETS and other certificates are predominantly in favor of regulation protecting the European GHG emissions market (Table 5.3). The opportunity to use strict or product liability as well as the negligence doctrine as alternative instruments of internalizing externalities in order to control GHG emissions and to incentivize polluters to implement precautionary measures and avoid legal action has not been widely used outside of the U.S. American context. One important factor for that is that the responsibility of one party having injured a third party needs to be established in the court room. This incorporates a number of legal challenges that could be minimized in the future with an increasing reliability of weather attribution science and foreseeability of weather events (Marjanac et al., 2017; Marjanac & Pattion, 2018; McCormick et al., 2017). While the instrument of liability concerns past activities, litigative measures are also able to protect future generations. To date, human rights violations have received greater attention in strategic climate change litigation than the application of liability law. Together with the application of the public trust doctrine, international human rights address the issue of intergenerational equity. Overall, the analysis of the outcome of climate change litigation shows that the opportunities for climate protection, adaptation, and the assignment of responsibility for loss and damage due to climate emissions are far from exhausted.

6.2. Limitations and Recommendations

In retrospect, the empirical analysis of international climate change litigation is able to offer some valuable insights into the trends in and outcomes of climate change litigation. However, the analysis does not paint a holistic picture of litigation related to climate change to date. The limitations commence with the data collection process. The data sample of this thesis exclusively consists of the climate cases collected by the Sabin Center and Grantham Research Institute which are both located in anglophone regions. This does not only imply a preselection by those research institutes and an

adaption to their definition of a climate case but also points to the fact that climate cases, in particular routine cases, of anglophone regions of the world are over-represented. As documents on any case are mostly made available in the official language of the respective country or region (at times unofficial translations exists), cases which have not received higher media attention reaching (trans)national news are not included in their databases (Arena & Ferris, 2018). So particularly the numbers of routine cases concerning renewables, such as wind farms, as well as cases about public or private construction are affected. For example, in the year 2019 there have been petitions against 325 wind turbines in Germany alone (Quentin, 2019).

> "This variation in coverage introduces unavoidable noise in the data which is common in cross-country empirical studies" (Arena & Ferris, 2018, p.31).

Hence, the limited data sample of this thesis results in a bias of the statistical analysis that follows. An exclusion of routine cases and a focus solely on strategic cases, however, would have neglected the possible potential of routine cases for climate protection (Bouwer, 2018). In accordance with Peel & Osofsky (2015), the outcomes of climate change mitigation and adaptation "rely on the cumulative effect of numerous smaller-scale decisions" (Peel & Osofsky, 2015). Further, Setzer & Vanhala (2019) state:

> "[…] to-date the research has focused primarily on small numbers of high-profile cases concentrated in North America, Europe and Australia. As a growing number of cases emerge in other countries […] the evidence base must also diversify" (Setzer & Vanhala, 2019, p.13).

This thesis was designed as an attempt to close the knowledge gap and investigate climate change litigation beyond high-profile cases. Hence, the unavoidable noise in the data of this cross-country empirical study is noticed and accepted.

McCormick et al. (2018) find that while their data on climate change litigation in the U.S. includes a broad range of climate cases, the cases are not equally significant to climate change mitigation. The distinction between strategic and routine cases in this analysis introduces a simplified way to deal with that limitation. However, the cases' impacts are not analyzed and therefore they are not weighed for their environmental effectiveness and actual contribution to mitigation and adaptation efforts.

Due to the scope of this thesis and for practical reasons, a narrow definition of a 'climate case' was applied and only cases explicitly mentioning climate change as a distinct issue in the case proceedings were included (see Chapter 4.1.2). For a complete picture of climate change litigation this working definition should be broadened (Bouwer, 2018). Further, the databases on climate change litigation, e.g., provided by the Sabin Center and the Grantham Research Institute, should be expanded, particularly by cases processed in countries of the civil law and mixed law families to compensate for the larger data body of common law jurisdictions and to

enable an analysis of the differences between legal systems and countries (Setzer & Vanhala, 2019).

The research objective of this thesis was to identify factors determining the outcome of climate change litigation. Those factors were not defined nor clear beforehand, therefore the analysis is of exploratory nature. The development of categories followed both deductive and inductive approaches on the material (Corbin & Strauss, 2018; Schreier, 2014). Thus, only those factors could be determined that were developed as a category and coded variable first. In hindsight, there is a considerable trade-off between the level of detail the analysis can provide and the performance of the statistical tests applied on the developed data sets. This trade-off runs through the whole analysis like a thread but only manifests itself after having executed the statistical tests. The results of the logistic regression models would probably improve by further reducing the number of variables in the same way that the levels of significance of the test of independence improved by re-classifying some of the core analytical categories such as the *Climate Issue* and *Legal Obligations*. Aldrich & Cunningham (2016) recommend to reduce the number of independent variables or increase the sample size. For future research this recommendation should be followed. However, in the trade-off between detail and statistical feasibility, this study was designed for a higher level of detail. In the process of the qualitative content analysis, the level of detail was already reduced. In the initial development of categories and coded variables, many codes were resolved or merged particularly within the inductive developed category *Climate Issue.* This resulted, for example, in the variable *Forest* where it was initially differentiated between deforestation and afforestation. Another variable *Protection of Livelihood* was eliminated altogether since it could only be assigned to three climate cases of the data set. Other coded variables, such as *Tort* cases, have only been assigned to one or two climate cases barely constituting a statistical unit linked to the outcome that is not just an error of sampling or chance. However, the information on tort cases within climate change litigation was considered as too important to just be absorbed by another undefined variable, i.e., *Other.* In order to be able to continuously improve categories and variables it was crucial to draw on the brief case summaries that were written for each case during the data collection process. Retrospectively, taking the time to generate these summaries was the most important methodological choice for the development of categories and variables. The development of coded variables for the categories *Climate Issue* and *Legal Obligations* was inductively though McCormick et al. (2018) used similar categories in their analysis. The authors, however, focus on U.S. climate litigation. Therefore their coding system is adapted to the specific conditions and laws in the U.S. whereas the data set of climate change litigation for the rest of the world has to incorporate the heterogeneity of those cases. Hence, the results of the climate issues and legal obligations involved

in climate change litigation outside of the U.S. could not definitely be compared to the climate topics and typical laws identified by McCormick et al. (2018).
In the beginning of the study, another category called *Claims* collected information about the claims brought in the court room for each climate case, e.g., whether the public trust doctrine was applied or the claims were based on environmental assessment and permitting. Additionally, the principle laws used were listed as well. During data processing it became evident that the category *Claims* was very similar to the category *Climate Issue* and therefore it was resolved and merged together with the principle laws into the category *Legal Obligations*. In the process information was lost about whether the climate cases concerned adaptation measures. Unfortunately this is the reason why this study is not able to provide insights into different outcomes of climate change litigation addressing either mitigation or adaptation measures. It is recommended to make that distinction in future research designs.

Another important aspect of climate change litigation that was not a focus of this study is the impact climate cases have over time. Setzer & Vanhala (2019) identify different kinds of impacts of climate change litigation ranging from the impact on existing law and regulation, over the gap of the law in the books and in practice, to the impact on policy making. While Chapter 3 of this thesis has examined the literature on possible impacts of climate change litigation, it does not trace them back to each individual case of the data set analyzed in this thesis. Another aspect for future research could be to quantify how climate change litigation can contribute to closing the ambition and emissions gap and thereby evaluate the environmental effectiveness of litigative measures.
McCormick et al. (2018) have also examined the impact climate change science has in the litigative process by conducting in-depth interviews with litigants, scientists, and advocates. This methodology could be expanded into other regions where climate change litigation has already settled in.

7. Conclusion

There are several important findings to note about this analysis. Overall, the outcome of climate change litigation outside of the U.S. predominantly results in pro-regulatory positions in contrast to U.S. litigation which favors anti-regulatory positions to climate change protection (McCormick et al., 2018). To a great extent, the prevalence of pro-regulatory outcomes can be traced back to routine litigation, particularly within the EU jurisdiction. By far, the majority of climate cases are still processed in the U.S. and numbers increase weekly (Sabin Center for Climate Change Law, 2021). Climate cases have expanded throughout the world. Litigative measures related to climate change have frequently played a role since 2005 and continue to do so on all continents. Not only is a greater range of countries involved, but also total numbers of climate cases have increased. Due to the data collection process in this thesis that heavily relies on anglophone sources and excludes the U.S. from analysis, most climate cases appear in Australia and the UK. Within the jurisdictions of these two countries (as well as the EU), the majority of routine climate cases are processed. As strategic cases attract worldwide media attention they are also detected in non-anglophone regions and reflected in the data. Strategic climate change litigation has become more popular in recent years, particularly since 2015 when the *Urgenda* case was decided in favor of the climate activists, at a totaling success rate of 41% for non U.S. litigation. The interest in and use of strategic litigation for climate action has arrived in the Global South where it achieved progressive judgments (Setzer & Benjamin, 2020).

Pro-regulatory and strategic litigation is primarily driven by ENGOs as well as individuals and other citizen advocacy groups with the latter group being slightly more successful at enforcing their interests in the court room. In general, strategic cases have been more successful at higher instances, such as supreme courts. At times, both groups work in coalitions and thereby form bottom-up climate initiatives that contribute to the overall polycentric climate governance. This interaction and cooperation that at times connects people from different continents, especially in recent strategic cases, helps to build trust as well as a knowledge and experience transfer (Cole, 2015). As climate advocates and activists, ENGOs and individuals and other citizen advocacy groups are most active in seeking the enforcement of climate change policies, challenging the development of public infrastructure as well as deforestation activities. They base their arguments frequently on human rights violations and obligations from climate change policies both within and outside of the UNFCCC structure. Peel & Osofsky (2018) attest a human rights turn in climate change litigation in 2015 which is supported by the data of this thesis in combination with the review of climate cases that have since been filed but not concluded (see below). The approach to involve of human rights in the arguments of climate litigation is met by a "growing receptivity of

courts“ (Peel & Osofsky, 2018, p.48). Thereby, issues of intergenerational equity, which also play a role in, e.g., the public trust doctrine, are battled out in court (Burger & Gundlach, 2017). The future might hold more progressive judgements in cases arguing human rights (also in combination with obligations of the Paris Agreement) as recent judgements are indicating (Peel & Lin, 2018; Peel & Osofsky, 2018).

In general, governmental bodies face the majority of litigative measures as a respondent. While individuals and citizen advocacy groups file petitions against governmental agencies of all levels, ENGOs focus on federal governments. The majority of strategic litigation targeted federal governments and resulted predominantly in pro-regulatory positions to climate change. However, the data indicate that outside of the U.S., cases against governmental bodies in general show high risks and petitioners have lower success rates than by suing non-governmental actors. In terms of litigation addressing the EU ETS, the courts appear to uphold the regulation on GHG emissions reduction. Corporations drive this anti-regulatory litigation about emissions trading schemes as well as private construction and the renewables sector in which they also follow pro-regulatory goals. For corporations, climate change litigation poses high risks, particularly when functioning as the respondent to litigation. Outside of the U.S., petitioners have been quite successful against corporations. In general, anti-regulatory goals in climate change litigation have decreased in recent years, probably because anti-regulatory litigants have predominantly lost in the early years of 2007 and 2008.

As for the factors that determine the outcome of climate change litigation some statistically significant predictors have been identified by logistic regression analyses on different data samples. The strongest (negative) relation to a positive outcome for climate change mitigation and adaptation has been observed for the rule of law measured by the Rule of Law Index (WJP, 2020). The lower the score of a region in the Rule of Law Index the higher the possibility that the litigation results in an outcome that favors pro-regulative positions to climate change. Similarly, climate cases proceeding in countries of the common law family also show a negative relationship with the desired outcome of increased regulation on climate change mitigation but this relation shows a lower level of intensity. The relationship between climate cases being processed in mixed law systems and a positive outcome follow the opposite direction. The data indicate that climate cases within the jurisdictions of mixed law systems have better chances at resulting in pro-regulatory outcomes for climate change. Due to the scarcity of data from different legal families the logistic regression analysis could not provide conclusive results that detect any differences between legal families in relation to significant predictors on the outcome of climate change litigation. As a result of the specific way that the data set was constructed for this thesis and the subjective classification of climate cases to either being strategic or routine cases, the regression models suggest a negative relation between strategic cases and a positive outcome for

climate change mitigation. Hence, routine cases are more likely to achieve a positive outcome, particularly when falling within the jurisdiction of the EU. Similarly, cases which were concluded before 2015 have a statistically significant negative link to the outcome indicating that since 2015 the courts are more likely to favor pro-regulatory positions to climate protection. Unfortunately, the analysis was not able to produce conclusive results for the categories *Climate Issue* and *Legal Obligations* which were supposed to be the core of the analysis for recommending strategies for future climate change litigation. Therefore, it is recommended to increase the sample size by tracking more climate cases (specifically from non-anglophone regions in order to reduce data noise) or to reduce the number of variables in future analyses (Aldrich & Cunningham, 2016).

At first glance, the distinction between positive and negative outcomes of climate change litigation for climate protection and adaptation might be simple. The reality, however, is not as dualistic and shows ambiguity. Pro-regulatory climate cases, which were lost by either being dismissed or denied, are attributed as *Negative* in the analysis. But they can still have a positive impact on climate change mitigation or adaptation measures and on “climate-change responsive adjudication in the longer term“ (Ganguly et al., 2018, p.841). For example, through the recognition of climate change as a subject for judicial review, for allowing climate cases to proceed on the merits, the articulation of climate change as a legal and financial risk or by instigating policy debates as well as public debates about the responsibility of climate change (Averill, 2007; Deppe-Burghardt, 2019; Ganguly et al. 2018). Vice versa, anti-regulatory cases are classified as *Positive* if they are granted or partly-granted and are not equally contributing to climate change mitigation or adaptation (McCormick et al., 2018). The impact of climate change litigation is therefore still a field for future research from interdisciplinary scholars (Setzer & Vanhala, 2019).

With current mitigation and adaptation measures the impacts of climate change will become more severe and more frequent: coastal regions are threatened by rising sea levels; droughts and heavy rainfalls will diminish food supplies and trigger hunger crises; and wildfires will destroy property and biodiversity alike (IPCC, 2014). Upon experiencing the danger of climate change the call for stronger adaptation and mitigation measures will follow. It is likely that climate change litigation will gather pace in the most vulnerable regions of the world (Setzer & Benjamin, 2020). This development can already be observed today as more climate cases are being brought in the Global South revealing human rights violations through climate change (Peel & Osofsky, 2018). In recent years, a number of new climate cases were initiated by those particularly exposed to climate change impacts. For example, climate cases were filed in Pakistan by a group of women (*Maria Khan v. Federation of Pakistan and Others*, 2019) and by the youth (*Ali v. Federation of Pakistan*, 2016), by ENGOs in South Africa

(*Trustees for the Time Being of GroundWork v. Minister of Environmental Affairs, ACWA Power Khanyisa Thermal Power Station RF (Pty) Ltd, and Others*, 2017) and by ENGOs in Indonesia challenging CFPP (*Greenpeace Indonesia and Others v. Bali Provincial Governor*, 2018), by indigenous groups in Argentina battling the impacts of fracking (Goñi, 2019) or by Peruvian youth seeking to reduce net deforestation of the Amazon to zero (*Álvarez and Others v. Peru*, 2019). A major success was recently achieved by a group of Portuguese youths who have filed a complaint against 33 governments with the European Court of Human Rights as a result of the 2017 wildfires in Portugal. The court has accepted and fast-tracked the case awaiting the 33 countries' responses by February 2021 (Erster Erfolg für Klimaklage von Kindern, 2020).

As lawsuits related to climate change increase in numbers worldwide, the interest in climate change litigation by interdisciplinary scholars prospers with them. A growing body of knowledge "will help to develop a deeper understanding of the conditions under which litigation will strengthen or undermine climate governance“ (Setzer & Vanhala, 2019, p.1). Simultaneously, climate change science continues to improve enabling the establishment of cause-effect links in the court room which provides opportunities for tort and liability cases as well as an easement for demonstrating standing of petitioners (Marjanac et al., 2017; Marjanac & Patton, 2018; McCormick et al., 2017). More litigative potential also rises with the improved foreseeability of weather events, particularly for climate cases concerning adaptation, as decision-makers have to incorporate the risks of foreseeable damage into their planning (Marjanac & Patton, 2018). Further, by applying liability law the courts can directly assign responsibility to individual GHG polluters and compensate the victims of climate change impacts. Thereupon, using liability law against GHG polluters can create incentives for other polluters to implement precautionary measures and by that decrease GHG emissions furthermore (Faure & Nollkaemper, 2007; Faure & Peeters, 2011; Posner, 1986; Tietenberg, 1989; Zweifel & Tyran, 1994). This potential should be recognized by climate advocates to a greater extent. To date, liability cases against corporations seeking damages have been rare events. There were a number of climate cases involving the precautionary principle or that applied liability concepts pursuing the injunctive relief of climate-damaging operations. Outside of the U.S., however, only one case sought damages for climate change impacts by applying proportional liability (*Lliuya v. RWE AG*, 2015).

New possibilities for climate change litigation are also offered by the Paris Agreement and the NDCs of each contributing country. With the U.S. reentering the Agreement,

new potential also exists for U.S. American litigation.[70] Bouwer (2018) argues that the 'new' regime is

> "[…] far from rendering citizen's recourse to courts unnecessary [but] opens up space and scope for newer and more specific tranches of litigation to challenge the domestic processes designed to achieve the state's Paris goals" (Bouwer, 2018, p.496f).

Hence, the Paris Agreement facilitates accountability for future climate change litigation and is increasingly used as a legal obligation in strategic cases. Considering that so far climate cases that sought to enforce existing governmental emissions reduction targets have had only occasional successes, the legally binding nature of the NDCs offers new potential for litigation (Bouwer, 2018). In addition to the Paris Agreement, a variety of new (national) laws related to climate change have been created in the past decade (Burger & Gundlach, 2017). Their validity and appropriate implementation will also be tested by litigation inasmuch as climate advocates and activists continue to use their resources to file lawsuits (Burger & Gundlach, 2017; Townshend et al., 2013). As established, in order to stabilize the climate polycentric approaches to climate governance that go beyond the international structure of the UNFCCC are needed to address climate change across levels and scales (Bouwer, 2018; Cole, 2011; Cole, 2015; Graichen et al., 2017; Ostrom, 2010; Ostrom, 2012; Peel & Osofsky, 2015).
The data of this study show that in recent years strategic cases against governments have been more successful at achieving their goals by addressing specific actions and violations, such as deforestation activities or the combustion of fossil fuels, rather than seeking to enforce existing climate change policies (or increase mitigation ambitions) of governments. In addition, these emissions reduction targets of governments are rather based on political feasibility than on scientific evidence, so effective climate change litigation should address various topics of climate change at multiple levels of the judiciary and use a variety of legal obligations (Burger & Gundlach, 2017). In accordance with Peel & Osofsky (2015), the overall assessment of the outcome of international climate change litigation outside of the U.S. concludes that the regulatory impact of litigation is positive and offers opportunities to address market and policy failure by uniquely uniting disciplines of the law, science, policy, and ethics (Averill, 2007). Whether climate change litigation is able to instigate institutional change can be tested by a growing body of climate cases and future research on the impacts of climate change litigation (Kingston & Caballero, 2009; Klitgaard & Krall, 2011; Setzer & Vanhala, 2019).

In the end, in the same way that the concept of fungibility allows to assign responsibility for climate change to different actors based on their share of GHG emissions, the achievements of climate change litigation for mitigation do not stop at geographical

[70] The new U.S. president Joe Biden signed an executive order rejoining into the Paris Agreement after the Trump Administration withdrew from the Agreement in 2017 (Newburger, 2021).

boarders but are shared by all equally. Every climate case therefore has the potential to contribute to global efforts for climate protection (Marjanac & Patton, 2018; Peel & Lin, 2018).

8. Bibliography

ACCC (Australian Competition and Consumer Commission) (2010): *Company admits misleading consumers about marketing carbon credits*. http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2010/20100311_2521_press-release-1.pdf . Accessed 28/08/2020.

Aldrich, J.O., Cunningham, J.B. (2016): *Using SPSS Statistics: An Interactive Hands-On-Approach (2nd ed.)*. Thousand Oaks, CA: Sage Publications.

Arena, M. P., Ferris, S. P. (2018): A global analysis of corporate litigation risk and costs. In: *International Review of Law and Economics*, 56, 28-41.

Averill, M. (2007): Climate litigation: shaping public policy and stimulating debate. In: *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*. New York: Cambridge University Press, 462-474.

Baumol, W. J. (1972): On taxation and the control of externalities. In: *The American Economic Review*, 62(3), 307-322.

Bellprat, O., Guemas, V., Doblas-Reyes, F., Donat, M. G. (2019): Towards reliable extreme weather and climate event attribution. In: *Nature communications*, 10(1), 1-7.

Boom, K., Richards, J. A., Leonard, S. (2017): *Climate justice. The international momentum towards climate litigation.* http://admin.indiaenvironmentportal.org.in/files/file/Report-Climate-Justice-2016.pdf . Accessed 21/05/2020.

Bouwer, K. (2018): The Unsexy Future of Climate Change Litigation. In: *Journal of Environmental Law*, 30, 483-506.

Boyatzis, R.E. (1998): *Transforming Qualitative Information: Thematic Analysis and Code Development*. Thousand Oaks, CA: Sage Publications.

Brennan, G. (2009): Climate change: a rational choice politics view. In: *The Australian Journal of Agricultural and Resource Economics*, 53(3), 309-326.

Britt, A., Barber, J., et al. (2013): *Australia's Mineral Resource Assessment 2013*. https://www.ga.gov.au/data-pubs/data-and-publications-search/publications/australian-minerals-resource-assessment . Accessed 23.09.2020.

Brouwer, E.J. (2020): *Climate and Energy Outlook 2020: achieving Urgenda reduction target 2020 is uncertain, Cabinet target for 2030 not yet in sigh*t. https://www.pbl.nl/en/news/2020/climate-and-energy-outlook-2020-achieving-urgenda-reduction-target-2020-is-uncertain-cabinet-target-for-2030-not-yet . Accessed 25/01/2021.

Burck, J., Hagen, U., Höhne, N., Nascimento, L., Bals, C. (2020a): *Climate Change Performance Index: Results 2020*. https://www.climate-change-performance-index.org/sites/default/files/documents/

ccpi-2020-results-the_climate_change_performance_index.pdf/ . Accessed 09/04/2020.

Burck, J., Hagen, U., Bals, C., Helling, V., Höhne, N., Nascimento, L. (2020b): *Climate Change Performance Index: Methodology and Background*. https://www.climate-change-performance-index.org/sites/default/files/documents/ccpi_2020_background_and_methodology.pdf/ . Accessed 25/04/2020.

Burger, M., Gundlach, J. (2017): The Status of Climate Change Litigation: A Global Review (United Nations Environment Programme). In: *Columbia Public Law Research Paper,* 1-41.

Cole, D.H. (2011): From global to polycentric climate governance. In: *Climate Law*, *2*(3), 395-413.

Cole, D.H. (2014): The Problem of Shared Irresponsibility in International Climate Law. In: *SHARES Research Paper*, 54, 1-30.

Cole, D.H. (2015): Advantages of a polycentric approach to climate change policy. In: *Nature Climate Change*, 5, 114-118.

Cole, D. H. (2017): Laws, norms, and the Institutional Analysis and Development framework. In: *Journal of Institutional Economics*, *13*(4), 829-847.

Cook, J., Oreskes, N., Doran, P.T., Anderegg, W., Verheggen, B., Maibach, E.W., Carlton, J.S., Lewandowsky, S., Skuce, A.G., Green, S.A., Nuccitelli, D., Jacobs, P., Richardson, M., Winkler, B., Painting, R., Rice, K. (2016): Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. In: *Environmental Research Letters*, 11(4), 1-7.

Corbin, J., Strauss, A. (2018): *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory (3rd ed.)*. Thousand Oaks, CA: Sage Publications.

CHISQ.TEST function (n.d.). https://support.microsoft.com/en-us/office/chisq-test-function-2e8a7861-b14a-4985-aa93-fb88de3f260f . Accessed 02/10/2020.

Credit Suisse Protesters Trials (n.d). http://climatecasechart.com/non-us-case/credit-suisse-protesters-trial/ . Accessed 09/12/2020.

Deppe-Burghardt, C. (2019): Klimakläger-Familien und Greenpeace verzichten auf Berufung: Urteil wegweisend für den Klimaschutz. https://www.greenpeace.de/presse/presseerklaerungen/klimaklaeger-familien-und-greenpeace-verzichten-auf-berufung-urteil . Accessed 25/11/2020.

Devlin, P. (1979): *The Judge*. Oxford: Oxford University Press.

Erster Erfolg für Klimaklage von Kindern (2020). https://www.tagesschau.de/ausland/klimaklage-kinder-101.html . Accessed 22/12/2020.

Faturoti, B., Agbaitoro, G., Onya, O. (2019): Environmental Protection in the Nigerian Oil and Gas Industry and Jonah Gbemre v. Shell PDC Nigeria Limited: Let the Plunder Continue? In: *African Journal of International and Comparative Law*, 27(2), 225-245.

Faure, M. G., Nollkaemper, A. (2007): International liability as an instrument to prevent and compensate for climate change. In: *Stanford Environmental Law Journal*, 26, 123-180.

Faure, M., Peeters, M. (2011): *Climate change liability*. Northampton, MA / Cheltenham: Edward Elgar Publishing.

Ganguly, G., Setzer, J., Heyvaert, V. (2018): If at first you don't succeed: Suing corporations for climate change. In: *Oxford Journal of Legal Studies*, 38(4), 841–868.

Garner, B. A. (2009): *Black's law dictionary (9th ed*.). St. Paul, MN: West Group.

Ghaleigh, N. S. (2010): "Six honest serving-men": climate change litigation as legal mobilization and the utility of typologies. In: *Climate Law*, 1(1), 31-61.

Gollier, C., Jullien, B., Treich, N. (2000): Scientific progress and irreversibility: an economic interpretation of the 'Precautionary Principle'. In: *Journal of Public Economics*, 75(2), 229-253.

Goñi, D. (2019): *Indigenous Mapuche pay high price for Argentina's fracking dream*. https://www.theguardian.com/environment/2019/oct/14/indigenous-mapuche-argentina-fracking-communities . Accessed 22/12/2020.

Graichen, J., Healy, S., Siemons, A., Höhne, N., Kuramochi, T., Gonzales-Zuñiga, S., Sterl, S., Kersting, J., Wachsmuth, J. (2017): *International climate initiatives. A way forward to close the emissions gap? Initiatives' potential and role under the Paris agreement. Final report.* https://inis.iaea.org/collection/NCLCollectionStore/_Public/49/072/49072173.pdf . Accessed 21/05/2020.

Grantham Research Institute on Climate Change and the Environment and Sabin Center for Climate Change Law (n.d.): *Climate Change Laws of the World database*. www.climate-laws.org/ . Accessed 21/04/2020.

Grossman, D. A. (2003): Warming up to a not-so-radical idea: tort-based climate change litigation. In: *Columbia Journal of Environmental Law*, 28(1), 1-62.

Hagedorn, K. (2002): *Environmental Co-operation and Institutional Change. Theories and Policies for European Agriculture*. Northampton, MA / Cheltenham, UK: Edward Elgar Publishing.

Haritz, M. (2011): Liability with and liability from the precautionary principle in climate change cases. In: *Climate Change Liability*,15-46.

Harrington, L. J., Otto, F. E. (2018): Adapting attribution science to the climate extremes of tomorrow. In: *Environmental Research Letters*, 13(12), 123006.

Hasson, R., Löfgren, A., Visser, M. (2010): Climate change in a public goods game: Investment decision in mitigation versus adaptation. In: *Ecological Economics*, 70, 331-338.

Hertel, C. (2009): Legal Systems of the World - an overview. In: *Notarius International*, 1-2, 128-141.

Hodgson, G. M. (2004): *The evolution of institutional economics*. London: Routledge.

Hodgson, G. M. (2006): What are institutions?. In: *Journal of Economic Issues*, 40(1), 1-25.

Hovi, J., Sprinz, D.F., Bang, G. (2010): Why the United States did not become a party to the Kyoto Protocol: German, Norwegian, and US perspectives. In: *European Journal of International Relation*, 18(1), 129-150.

IPCC (2014): *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC.

Jordan, A. J., Huitema, D., Hildén, M., van Asselt, H., Rayner, T. J., Schoenefeld, J. J., Boasson, E. L. (2015): Emergence of polycentric climate governance and its future prospects. In: *Nature Climate Change*, 5(11), 977– 982.

Juriglobe (2020a): *Alphabetical Index of the Political Entities and Corresponding Legal Systems.* http://www.juriglobe.ca/eng/sys-juri/index-alpha.php/ .
Accessed 09/04/2020.

Juriglobe (2020b): *Introductory remarks.* http://www.juriglobe.ca/eng/sys-juri/intro.php/ .
Accessed 24/04/2020.

Kaswan, A. (2007): The Domestic Response to Global Climate Change: What Role for Federal, State, and Litigation Initiatives. In: *University of San Francisco Law Review*, 42, 39-110.

Kaufman, B. E. (2007): The institutional economics of John R. Commons: complement and substitute for neoclassical economic theory. In: *Socio-Economic Review*, 5(1), 3-45.

Kingston, C., Caballero, G. (2009): Comparing theories of institutional change. In: *Journal of Institutional Economics*, 5(2), 151-180.

Klimapolitik vor Gericht (2020). https://www.greenpeace.de/klimaklage-aktuell .
Accessed 26/11/2020.

Klitgaard, K., Krall, L. (2011): Ecological economics and institutional change. In: *Annals of the New York Academy of Sciences*, 1219(1), 185-196.

Kuckartz, U. (2014): *Qualitative text analysis: A guide to methods, practice and using software*. Thousand Oaks, CA: Sage Publications.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W. (1998): Law and Finance. In: *Journal of Political Economy*, 106(6), 1113-1155.

Libecap, G. D. (1989): *Contracting for Property Rights.* Cambridge: Cambridge University Press.

Lin, A. C. (2011): Public Trust and Public Nuisance: Common Law Peas in a Pod. In: *UCDL Rev.*, 45, 1075-1097.

Lyons, K. (2020): *Climate refugees can't be returned home, says landmark UN human rights ruling*. https://www.theguardian.com/world/2020/jan/20/climate-refugees-cant-be-returned-home-says-landmark-un-human-rights-ruling . Accessed 10/06/2020.

Makdisi, J. (1988): Proportional Liability: A Comprehensive Rule to Apportion Tort Damages Based on Probability. In: *North Carolina Law Review*, 67(5), 1063-1102.

Marjanac, S., Patton, L. (2018): Extreme weather event attribution science and climate change litigation: an essential step in the causal chain?. In: *Journal of Energy & Natural Resources Law*, 36(3), 265-298.

Marjanac, S., Patton, L., Thornton, J. (2017): Acts of God, human influence and litigation. In: *Nature Geoscience*, 10(9), 616-619.

Markell, D., Ruhl, J. B. (2012): An empirical assessment of climate change in the courts: a new jurisprudence or business as usual. In: *Florida Law Review*, 64(15), 1-59.

Mayring, P. (2010): *Qualitative Inhaltsanalyse [Qualitative content analysis] (11 ed.)*. Weinheim: Beltz.

McCormick, S. (2017): *Climate Litigation*. Harvard Dataverse, V1. https://doi.org/10.7910/DVN/JMPD3K/ . Accessed 22/12/2020.

McCormick, S., Glicksman, R. L., Simmens, S.J., Paddock, L., Kim, D., Whited, B. (2018): Strategies in and outcomes of climate change litigation in the United States. In: *Nature Climate Change*, 8(9), 829-835.

McCormick, S., Simmens, S. J., Glicksman, R. L., Paddock, L., Kim, D., Whited, B., & Davies, W. (2017): Science in litigation, the third branch of US climate policy. In: *Science*, 357(6355), 979-980.

Mclean, R., Chapple, I. (2015): *BP settles final Gulf oil spill claims for $20 billion*. https://money.cnn.com/2015/10/06/news/companies/deepwater-horizon-bp-settlement/index.html . Accessed 19/08/2020.

Moser, S. C., Dilling, L. (2004): Making climate hot: Communicating the urgency and challenge of global climate change. In: *Environment*, 46(10), 32-46.

Newburger, E. (2021): *President Joe Biden rejoins the Paris climate accord in first move to tackle global warming*. https://www.cnbc.com/2021/01/20/biden-inauguration-us-rejoins-paris-climate-accord.html . Accessed 15/02/2021.

Nimon, K. F., Oswald, F. L. (2013): Understanding the results of multiple linear regression: Beyond standardized regression coefficients. In: *Organizational Research Methods*, 16(4), 650-674.

Nordhaus, W. (2015): Climate Clubs: Overcoming Free-Riding in International Climate Policy. In: *American Economic Review*, 105(4), 1339-1370.

North, D. C. (1991): Institutions. In: *Journal of Economic Perspectives*, 5(1), 97-112.

Olander, L. P., Wollenberg, E., Tubiello, F. N., Herold, M. (2014): Synthesis and Review: Advancing agricultural greenhouse gas quantification. In: *Environmental Research Letters*, 9(7), 1-7.

Ornes, S. (2018): Core Concept: How does climate change influence extreme weather? Impact attribution research seeks answers. In: *Proceedings of the National Academy of Sciences*, 115(33), 8232-8235.

Osofsky, H. M. (2005): The geography of climate change litigation: Implications for transnational regulatory governance. In: *Washington University Law Review*, 83, 1789-1855.

Osofsky, H.M., Peel, J. (2013): Divergent responses to climate change in a multipolar world. In: *American Society of International Law*, 107, 73-75.

Osofsky, H. M. (2013a): The Complexities of Multipolar Approaches to Climate Change: Lessons from Litigation and Local Action. In: *Proceedings of the ASIL Annual Meeting,* 7, 73-75.

Osofsky, H.M. (2013b): Scales of Law: Rethinking Climate Change Governance (PhD Dissertation, Department of Geography University of Oregon). https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/13297/Osofsky_oregon_0171A_10730.pdf?sequence=1&isAllowed=y . Accessed 27/05/2020.

Ostrom, E. (2005): *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.

Ostrom, E. (2010): Polycentric systems for coping with collective action and global environmental change. In: *Global Environmental Change*, 20(4), 550-557.

Ostrom, E., Basurto, X. (2011): Crafting analytical tools to study institutional change. In: *Journal of Institutional Economics*, *7*(3), 317-343.

Ostrom, E. (2012): Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales? In: *Economic Theory*, 49, 353-369.

Otto, F. E. (2017): Attribution of weather and climate events. In: *Annual Review of Environment and Resources*, 42, 627-646.

Paciorek, C. J., Stone, D. A., Wehner, M. F. (2018): Quantifying statistical uncertainty in the attribution of human influence on severe weather. In: *Weather and climate extremes*, 20, 69-80.

Peel, J., Lin, J. (2019): Transnational climate litigation: the contribution of the global South. In: *American Journal of International Law*, 113(4), 679-726.

Peel, J., Osofsky, H.M. (2013): Climate Change Litigation's Regulatory Pathways: A Comparative Analysis of the United States and Australia. In: *Law & Policy*, 35(3), 150-183.

Peel, J., Osofsky, H.M. (2015): *Climate Change Litigation: Regulatory Pathways to Cleaner Energy*. Cambridge: Cambridge University Press.

Peel, J., & Osofsky, H. M. (2018): A rights turn in climate change litigation?. In: *Transnational Environmental Law*, 7(1), 37-67.

Peng, C. Y. J., Lee, K. L., Ingersoll, G. M. (2002): An introduction to logistic regression analysis and reporting. In: *The journal of educational research*, 96(1), 3-14.

Pigou, A.C. (1920): *The Economics of Welfare*. London: Palgrave Macmillan.

Posner, R. (1986): *Economic Analysis of Law (3rd.ed.)*. Boston, MA: Little, Brown and Company.

Quentin, J. (2019): *Hemmnisse beim Ausbau der Windenergie in Deutschland – Ergebnisse einer Branchenumfrage*. Berlin, Germany: Fachagentur Windenergie an Land e.V.

Rajamani, L. (2016): Ambition and differentiation in the 2015 Paris Agreement: Interpretative possibilities and underlying politics. In: *International & Comparative Law Quarterly*, 65(2), 493-514.

Rocha, M., Krapp, M., Guetschow, J., Jeffery, L., Hare, B., Schaeffer, M. (2015): *Historical Responsibility for Climate Change – from countries emissions to contribution to temperature increase*. Potsdam, Germany: Climate Analytics and Potsdam Institute for Climate Impact Research.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F.S., Lambin, E., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, J.V., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J. (2009): Planetary boundaries: exploring the safe operating space for humanity. In: *Ecology and Society*, 14(2), 32.

Ross, C., Mills, E., Hecht, S. B. (2007): Limiting liability in the greenhouse: Insurance risk-management strategies in the context of global climate change. In: *Standford Journal of International Law*, 43, 251-334.

Sabin Center for Climate Change Law (2021): *About*. http://climatecasechart.com/about/ . Accessed 14/02/2021.

Sabin Center for Climate Change Law (n.d.): *Climate Change Litigation Databases*. http://climatecasechart.com/ . Accessed 29/04/2020.

Sax, J. L. (1998): Defending the environment: A strategy for citizen action. In: *Law and the Environment: A Multidisciplinary Reader*. Philadelphia, PA: Temple University Press, 300-500.

Schreier, M. (2012): *Qualitative content analysis in practice*. Thousand Oaks, CA: Sage publications.

Schreier, M. (2014): Ways of doing qualitative content analysis: disentangling terms and terminologies. In: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*. 15(1), 1-27.

Setzer, J., Benjamin, L. (2020): Climate litigation in the Global South: constraints and innovations. In: *Transnational Environmental Law*, 9(1), 77-101.

Setzer, J., Byrnes, R. (2019): *Global trends in climate change litigation: 2019 snapshot*. http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2019/07/GRI_Global-trends-in-climate-change-litigation-2019-snapshot-2.pdf/ . Accessed 25/04/2020.

Setzer, J., Nachmany, M. (2018): National Governance. In: *Governing Climate Change: Polycentricity in Action?* Cambridge: Cambridge University Press, 47-62.

Setzer, J., Vanhala, L.C. (2019): Climate change litigation: A review of research on courts and litigants in climate governance. In: *WIREs Climate Change*, 10(3), 1-19.

Slangen, A. B. A., Adloff, F., Jevrejeva, S., Leclercq, P. W., Marzeion, B., Wada, Y., Winkelmann, R. (2017): A review of recent updates of sea-level projections at global and regional scales. In: *Surveys in Geophysics*, 38(1), 385-406.

Snyder, C. M., Nicholson, W., Stewart, R. (2017): *Microeconomic Theory: Basic Principles and Extensions (12th ed.)*. Boston, MA: Cengage Learning.

Spamann, H. (2015): Empirical Comparative Law. In: *Annual Review of Law and Social Science*, 11, 131-151.

Stott, P. A., Stone, D. A., Allen, M. R. (2004): Human contribution to the European heatwave of 2003. In: *Nature*, 432(7017), 610-614.

Stott, P. A., Christidis, N., Otto, F. E., Sun, Y., Vanderlinden, J. P., van Oldenborgh, G. J., Vautard, R., von Storch, H., Walton, P., Yiou, P., Zwiers, F. W. (2016): Attribution of extreme weather and climate−related events. In: *Wiley Interdisciplinary Reviews: Climate Change*, 7(1), 23-41.

Take Down Macron Protester Cases (n.d.). http://climatecasechart.com/non-us-case/state-v-delahalle-goinvic/ . Accessed 09/12/2020.

Tietenberg, T. H. (1989): Indivisible toxic torts: the economics of joint and several liability. In: *Land Economics*, 65(4), 305-319.

The Kingsnorth Six Trial (n.d.). http://climatecasechart.com/non-us-case/the-kingsnorth-six-trial/ . Accessed 09/12/2020.

Townshend, T., Fankhauser, S., Aybar, R., Collins, M., Landesman, T., Nachmany, M., Pavese, C. (2013): How national legislation can help to solve climate change. In: *Nature Climate Change*, 3(5), 430-432.

UNFCCP (2016): *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015.* https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf . Accessed 21/05/2020.

Vautard, R., Yiou, P., Otto, F., Stott, P., Christidis, N., Van Oldenborgh, G. J., Schaller, N. (2016): Attribution of human-induced dynamical and thermodynamical contributions in extreme weather events. In: *Environmental Research Letters*, 11(11), 114009.

Wattie, C. (2011): *Canada formally abandons Kyoto Protocol on climate change*. https://www.theglobeandmail.com/news/politics/canada-formally-abandons-kyoto-protocol-on-climate-change/article4180809/ . Accessed 21/05/2020.

Whitaker, M., Heath, G. A., O'Donoughue, P., Vorum, M. (2012): Life cycle greenhouse gas emissions of coal−fired electricity generation: Systematic review and harmonization. In: *Journal of Industrial Ecology*, 16, S53-S72.

Williamson, O. E. (2000): The new institutional economics: taking stock, looking ahead. In: *Journal of Economic Literature*, 38(3), 595-613.

(WJP) World Justice Project (2020): *WJP Rule of Law Index 2020*. https://worldjusticeproject.org/sites/default/files/documents/WJP-ROLI-2020-Online_0.pdf/ . Accessed 09/04/2020.

Zweifel, P., Tyran, J. R. (1994): Environmental impairment liability as an instrument of environmental policy. In: *Ecological Economics*, 11(1), 43-56.

9. Legal Resources

Alanvale Pty. Ltd. v. Southern Rural Water Authority, 2010 VCAT 480 (VCAT 2010)

Ali v. Federation of Pakistan (SCP April 1, 2016)

Álvarez and Others v. Peru (SCJ Lima Dec. 16, 2019)

Armando Ferrão Carvalho and Others v. The European Parliament and the European Council, Order of 8.5.2019, CaseT-330/18 (EGC 2019)

Australian Competition and Consumer Commission v. Global Green Plan Ltd., 2010 FCA 1057 (FCA 2010)

Baltimore & Ohio R. Co. v. Goodman, 275 U.S. 66 (U.S. 1927)

City of Los Angeles v. National Highway Traffic Safety Administration, 21 ELR 20170 (D.C. Cir. 1990)

Costa Rica v. Nicaragua, 2018 I.C.J. 150 (I.C.J. 2018)

ENvironment JEUnesse v. Canada, 2019 QCCS 2885 (QCCS 2019)

Family Farmers and Greenpeace Germany v. Germany, VG 10 K 412.18 (OVG Berlin 2018)

Friends of the Earth v. Canada, 3 F.C.R. 201 (2008 FC 1183)

Future Generations v. Ministry of the Environment and Others, No. 11001 22 03 000 2018 00319 00 (STC4360-2018)

Gbemre v. Shell Petroleum Development Company of Nigeria Ltd. and Others, 2005 AHRLR 151 (NgHC 2005)

Gippsland Coastal Board v. South Gippsland SC & Ors, 2008 VCAT 1545 (VCAT 2008)

Greenpeace Australia Ltd. v. Redbank Power Co., 86 LGERA 143 (LEC NSW 1994)

Greenpeace Indonesia and Others v. Bali Provincial Governor, 2/G/LH/2018/ PTUN.DPS (Denpasar Admin. Ct. 2018)

In re Court on its own motion v. State of Himachal Pradesh and Others, CWPIL No. 15 of 2010 (CWPIL 2010)

In re Greenpeace Southeast Asia and Others, Case No. CHR-NI-2016-0001 (PCHR 2015)

Juliana v. United States, No. 18-36082 (9th Cir. Jan. 17, 2020)

Leghari v. Federation of Pakistan, W.P. No. 25501/2015 (LHC 2015)

Lliuya v. RWE AG, 2 O 285/15 (LG Essen 2015)

Lliuya v. RWE AG, I-5 U 15/17 (OLG Hamm 2018)

Maria Khan v. Federation of Pakistan and Others, No. 8960 of 2019 (LHC 2019)

Northcape Properties v. District Council of Yorke Peninsula, 2008 SASC 57 (SASC 2008)

Pacific Coast Federation of Fishermen's Associations, Inc. v. Chevron Corp., CGC—18-571285 (SFSC Nov. 14, 2018)

Pandey v. India, 2007 NGT 187 (NGT 2017)

Phosphate Resources Ltd. v. The Commonwealth, 211 FCA 2004 (FCA 2004)

PUSH Sweden, Nature and Youth Sweden and Others v. Government of Sweden, CGC-18-571285 (Stockholm District Court Nov. 14, 2016)

R. (on the application of the London Borough of Hillingdon and others) v. Secretary of State for Transport, 2010 EWHC 626 (EWHC 2010)

Sao Paulo Public Prosecutor's Office v. United Airlines and Others, Civil Appeal No. 000292010.2014.4.03.9999 (TJSP 2014)

Sheikh Asim Farooq v. Federation of Pakistan and Others, W.P. No. 192069/2018 (LHC 2018)

Teitiota v. The Chief Executive of the Ministry of Business, Innovation and Employment, 2015 NZSC 107 (NZSC 2015)

Trustees for the Time Being of GroundWork v. Minister of Environmental Affairs, ACWA Power Khanyisa Thermal Power Station RF (Pty) Ltd, and Others, Case no. 61561/17 (GSJ 2017)

UN Human Rights Committee Views Adopted on Teitiota Communication, CCPR/C/127/D/2728/2016 (HRC 2019)

Urgenda Foundation v. The State of the Netherland, C/09/456689 HA ZA 13-1396 (GHDHA 2015)

Verein KlimaSeniorinnen Schweiz et al. v. Federal Department of the Environment, Transport, Energy and Communications, Judgment A-2992/2017 (BVGer 2018)

Ville de Lyon v. Caisse des dépôts et consignations, Case C-524/09 (ECJ 2009)

Wohl v. City of New York, 2014 NY Slip Op 51618(U) (N.Y. 2014)

10. Appendix

The data set of this thesis containing climate cases of the world (excluding the U.S.) from 1994 to 2019 is existing and stored separately from the thesis. It can be retrieved from the author at request. For this purpose, please use the following e-mail address: neele.schaefer@posteo.de

List of Supplementary Tables

Supplementary Table 1: Overview of Categories and Coded Variables

Category	Codes (and Sub-Codes)
Marker 2015	1.0 Ante 2015 2.0 Post 2015
Legal System	1.0 Civil Law 2.0 Common Law 3.0 Muslim Law 4.0 Customary Law 5.0 Mixed System 6.0 International Law
Type of Petitioner and Type of Respondent	1.0 Individual or Citizen Advocacy Group 2.0 ENGO 3.0 Corporation 4.0 Industry Advocacy Organization 5.0 City 6.0 Local Government (Local GOV) 7.0 State Government (State GOV) 8.0 Federal Government (Federal GOV) 9.0 Supranational Government (Supranational GOV)
Climate Issue	1.0 Policy 2.0 Trading & Certificates 3.0 Tort 4.0 Civil Disobedience 5.0 Construction 5.1 Public 5.2 Private 6.0 Forest 7.0 Fossil Fuels 7.1 Extraction 7.2 Combustion 8.0 Renewables 9.0 Funding 10.0 Access to Information 11.0 False Advertisement 12.0 Other

Legal Obligations	1.0 International Law 1.1 EU 1.2 EU + Human Rights 1.3 EU + UNFCCC 1.4 Human Rights 1.5 Human Rights + UNFCCC 1.6 UNFCCC 1.7 Other 2.0 Constitutional Provisions 2.1 Right to Life 2.2 Precautionary Principle 2.3 Precautionary Principle + Right to Life 2.4 Other 3.0 Statutory Provisions 3.1 Climate Change 3.2 Other 4.0 Local Provisions 4.1 Planning 4.2 Other 5.0 Common Law 5.1 Public Trust Doctrine 5.2 Tort Law 5.3 Other
Goal of Petitioner	1.0 Pro-Regulatory 2.0 Anti-Regulatory
Case Mode	1.0 Strategic 2.0 Routine
Outcome (at First Instance, Appellate Court, Supreme Court)	1.0 Won 2.0 Lost 3.0 Pending
Overall Outcome	1.0 Won 2.0 Lost
Typology Outcome	1.0 Pro-Won 2.0 Pro-Lost 3.0 Anti-Won 4.0 Anti-Lost
Evaluative Outcome	1.0 Positive 0.0 Negative

Supplementary Table 2: Chi-Square Statistic for Type of Petitioner

Type of Petitioner	Observed Frequency		Expected Frequency		Total
	Positive	Negative	Positive	Negative	
Individual or Citizen Advocacy Group	43	39	46.144	35.856	82
ENGO	17	22	21.947	17.053	39
Corporation	57	45	57.399	44.601	102
Industry Advocacy Organization	3	0	1.688	1.312	3
City	1	1	1.125	.875	2
Local GOV	5	0	2.814	2.186	5
State GOV	8	2	5.627	4.373	10
Federal GOV	12	5	9.567	7.433	17
Supranational GOV	2	1	1.688	1.312	3
Total	148	115	148	115	263
Significance = 0.1075 > 0.05 α : not significant					

Supplementary Table 3: Chi-Square Statistic for Type of Petitioner (re-classified)

Type of Petitioner (re-classified)	Observed Frequency		Expected Frequency		Total
	Positive	Negative	Positive	Negative	
Individual or Citizen Advocacy Group	43	39	46.144	35.856	82
ENGO	17	22	21.947	17.053	39
Corporation[1]	57	45	57.399	44.601	102
State GOV	8	2	5.627	4.373	10
Federal GOV	12	5	9.567	7.433	17
Other GOV[2]	11	2	7.316	5.684	13
Total	148	115	148	115	263
Significance = 0.0515 > 0.05 α : not significant					

[1] includes Industry Advocacy Organization
[2] includes City, Local Government, Supranational Government

Supplementary Table 4: Chi-Square Statistic for Type of Respondent

	Observed Frequency		Expected Frequency		
Type of Respondent	Positive	Negative	Positive	Negative	Total
Individual or Citizen Advocacy Group	3	2	2.814	2.186	5
ENGO	4	2	3.376	2.624	6
Corporation	14	13	15.194	11.806	27
City	7	7	7.878	6.122	14
Local GOV	29	27	31.513	24.487	56
State GOV	22	20	23.635	18.365	42
Federal GOV	51	40	51.209	39.791	91
Supranational GOV	18	4	12.38	9.62	22
Total	148	115	148	115	263
Significance = 0.4000 > 0.05 α : not significant					

Supplementary Table 5: Chi-Square Statistic for Type of Respondent (re-classified)

	Observed Frequency		Expected Frequency		
Type of Respondent (re-classified)	Positive	Negative	Positive	Negative	Total
Individual or Citizen Advocacy Group + ENGO	7	4	6.19	4.81	11
Corporation	14	13	15.194	11.806	27
City	7	7	7.878	6.122	14
Local GOV	29	27	31.513	24.487	56
State GOV	22	20	23.635	18.365	42
Federal GOV	51	40	51.209	39.791	91
Supranational GOV	18	4	12.38	9.62	22
Total	148	115	148	115	263
Significance = 0.2998 > 0.05 α : not significant					

Supplementary Table 6: Chi-Square Statistic for Climate Issue

	Observed Frequency		Expected Frequency		
Climate Issue	Negative	Positive	Negative	Positive	Total
Policy	14	10	10.494	13.506	24
Trading & Certificates	26	48	32.357	41.643	74
Tort	1	1	.875	1.125	2
Civil Disobedience	2	6	3.498	4.502	8
Construction (Public)	9	6	6.559	8.441	15
Construction (Private)	19	23	18.365	23.635	42
Forest	1	4	2.186	2.814	5
Fossil Fuels (Extraction)	12	9	9.183	11.817	21
Fossil Fuels (Combustion)	6	5	4.810	6.19	11
Renewables	16	20	15.741	20.259	36
Funding	1	2	1.312	1.688	3
Access to Information	4	6	4.373	5.627	10
False Advertisement	0	6	2.624	3.376	6
Other	4	2	2.624	3.376	6
Total	115	148	115	148	263

Significance = 0.2246 > 0.05 α : not significant

Supplementary Table 7: Chi-Square Statistic for Climate Issue (re-classified)

	Observed Frequency		Expected Frequency		
Climate Issue (re-classified)	Negative	Positive	Negative	Positive	Total
Policy	14	10	10.494	13.506	24
Trading & Certificates	26	48	32.357	41.643	74
Responsibility[1]	3	7	4.373	5.627	10
Construction (Public)	9	6	6.559	8.441	15
Construction (Private)	19	23	18.365	23.635	42
Fossil Fuels[2]	18	14	13.992	18.008	32
Renewables	16	20	15.741	20.259	36
Transparency[3]	5	14	8.308	10.692	19
Other[4]	5	6	4.810	6.190	11
Total	115	148	115	148	263

Significance = 0.1949 > 0.05 α : not significant

[1] includes Tort, Civil Disobedience
[2] includes Extraction and Combustion of Fossil Fuels
[3] includes Funding, Access to Information, False Advertisement
[4] includes Forest

Supplementary Table 8: Chi-Square Statistic for Legal Obligation (re-classified)

	Observed Frequency		Expected Frequency		
Legal Obligation (re-classified)	Negative	Positive	Negative	Positive	Total
EU[1]	16	42	26.138	31.862	58
Human Rights[2]	5	3	3.605	4.395	8
UNFCCC	9	7	7.211	8.789	16
Precautionary Principle	6	8	6.309	7.691	14
Right to Life[3]	7	8	6.760	8.240	15
Climate Change	10	11	9.464	11.536	21
Other Statutes	70	79	67.148	81.852	149
Planning	11	5	7.211	8.789	16
Common Law[4]	3	4	3.155	3.845	7
Total	137	167	137	167	304

Significance = 0.1151 > 0.05 α : not significant

[1] includes EU + Human Rights, EU + UNFCCC
[2] includes Human Rights + UNFCCC
[3] includes Precautionary Principle + Right to Life
[4] includes Tort Law, Public Trust, Other Common Law

Supplementary Table 9: Chi-Square Statistic for Case Mode

	Observed Frequency		Expected Frequency		
Case Mode	Negative	Positive	Negative	Positive	Total
Routine	95	134	100.133	128.866	229
Strategic	20	14	14.867	19.133	34
Total	115	148	115	148	263

Significance = 0.0572 > 0.05 α : not significant

Supplementary Table 10: Chi-Square Statistic for Marker 2015

	Observed Frequency		Expected Frequency		
Marker 2015	Negative	Positive	Negative	Positive	Total
Ante 2015	90	107	86.141	110.859	197
Post 2015	25	41	28.859	37.141	66
Total	115	148	115	148	263

Significance = 0.2685 > 0.05 α : not significant

Supplementary Table 11: Chi-Square Statistic for Goal of Petitioner

	Observed Frequency		Expected Frequency		
Goal of Petitioner	Negative	Positive	Negative	Positive	Total
Anti-Regulatory	43	80	53.783	69.217	123
Pro-Regulatory	72	86	61.217	78.783	140
Total	115	148	115	148	263
Significance = 0.0072 < 0.05 α : significant					

Supplementary Table 12: Chi-Square Statistic for Legal System

	Observed Frequency		Expected Frequency		
Legal System	Positive	Negative	Positive	Negative	Total
Civil Law	19	18	16.179	20.821	37
Common Law	80	81	70.399	90.601	161
International Law	39	15	23.612	30.388	54
Mixed Law	10	1	4.810	6.190	11
Total	148	115	148	115	263
Significance = 0.0000 > 0.05 α : significant					

Supplementary Table 13: Cases by Climate Issue, Type of Petitioner, Goal of Petitioner, and Outcome

Climate Issue	Individual Citizen Advocacy Group	ENGO	Corporation	Industry Advocacy Org.	City	Local GOV	State GOV	Federal GOV	Supra-national GOV	Total
(1) Policy	**10**	**9**	**2**	**1**				**2**		**24**
Pro-Won	4	2						2		8
Pro-Lost	6	7								13
Anti-Won			1							1
Anti-Lost			1	1						2
(2) Trading & Certificates		**2**	**58**	**2**			**2**	**7**	**3**	**74**
Pro-Won		1	3						2	6
Pro-Lost		1	2					2		5
Anti-Won			17					3	1	21
Anti-Lost			36	2			2	2		42
(3) Tort	**1**							**1**		**2**
Pro-Won								1		1
Pro-Lost	1									1
(4) Civil Disobedience			**1**				**6**	**1**		**8**
Anti-Won			1				1			2
Anti-Lost							5	1		6
(5.1) Construction (Public)	**10**	**3**			**1**	**1**				**15**
Pro-Won	3	1			1	1				6
Pro-Lost	7	2								9
(5.2) Construction (Private)	**25**		**14**			**3**				**42**
Pro-Won	8		1			2				11
Pro-Lost	6		1							7
Anti-Won	7		5							12
Anti-Lost	4		7			1				12
(6) Forest	**4**						**1**			**5**
Pro-Won	3									3
Pro-Lost							1			1
Anti-Lost	1									1
(7.1) Fossil Fuels (Extraction)	**9**	**9**	**3**							**21**
Pro-Won	6	2								8
Pro-Lost	3	7								10
Anti-Won			2							2
Anti-Lost			1							1
(7.2) Fossil Fuels (Combustion)	**3**	**6**	**1**				**1**			**11**
Pro-Won		4					1			5
Pro-Lost	3	2								5
Anti-Won			1							1
(8) Renewables	**14**	**3**	**18**			**1**				**36**
Pro-Won	2	1	5							8
Pro-Lost	1		12							13
Anti-Won	2	1								3
Anti-Lost	9	1	1			1				12
(9) Funding		**2**	**1**							**3**
Pro-Won		1								1
Pro-Lost		1								1
Anti-Lost			1							1
(10) Access to Information	**3**	**5**	**1**		**1**					**10**
Pro-Won		4								4
Pro-Lost	1	1	1		1					4
Anti-Lost	2									2
(11) False Advertisement								**6**		**6**
Pro-Won								6		6
(12) Other	**3**		**3**							**6**
Pro-Won	1									1
Pro-Lost	2		1							3
Anti-Won			1							1
Anti-Lost			1							1
Total	**82**	**39**	**102**	**3**	**2**	**5**	**10**	**17**	**3**	**263**

Supplementary Table 14: Cases by Climate Issue, Type of Respondent, Goal of Petitioner, and Outcome

Climate Issue	Individual or Citizen Advocacy Group	ENGO	Corporation	City	Local GOV	State GOV	Federal GOV	Supranational GOV	Total
(1) Policy	**1**		**3**			**1**	**18**	**1**	**24**
Anti-Lost							2		2
Anti-Won	1								1
Pro-Lost			2				10	1	13
Pro-Won			1			1	6		8
(2) Trading & Certificates			**4**		**2**	**8**	**40**	**20**	**74**
Anti-Lost					1	2	22	17	42
Anti-Won			1			1	16	3	21
Pro-Lost			2			3			5
Pro-Won			1		1	2	2		6
(3) Tort			**1**				**1**		**2**
Pro-Lost			1						1
Pro-Won							1		1
(4) Civil Disobedience	**3**	**5**							**8**
Anti-Lost	2	4							6
Anti-Won	1	1							2
(5.1) Construction (Public)			**1**	**1**	**5**	**2**	**6**		**15**
Pro-Lost			1	1	4	1	2		9
Pro-Won					1	1	4		6
(5.2) Construction (Private)			**2**	**10**	**25**	**5**			**42**
Anti-Lost				2	9	1			12
Anti-Won				4	7	1			12
Pro-Lost			1	1	2	3			7
Pro-Won			1	3	7				11
(6) Forest			**1**				**4**		**5**
Anti-Lost							1		1
Pro-Lost			1						1
Pro-Won							3		3
(7.1) Fossil Fuels (Extraction)		**1**	**5**			**8**	**7**		**21**
Anti-Lost						1			1
Anti-Won		1				1			2
Pro-Lost			3			3	4		10
Pro-Won			2			3	3		8
(7.2) Fossil Fuels (Combustion)			**2**	**1**	**2**	**3**	**3**		**11**
Anti-Won						1			1
Pro-Lost			1		1	2	1		5
Pro-Won			1	1	1		2		5
(8) Renewables				**2**	**21**	**11**	**2**		**36**
Anti-Lost				1	4	7			12
Anti-Won					1	1	1		3
Pro-Lost				1	11	1			13
Pro-Won					5	2	1		8
(9) Funding			**1**				**1**	**1**	**3**
Anti-Lost								1	1
Pro-Lost							1		1
Pro-Won			1						1
(10) Access to Information						**3**	**7**		**10**
Anti-Lost						1	1		2
Pro-Lost						1	3		4
Pro-Won						1	3		4
(11) False Advertisement			**6**						**6**
Pro-Won			6						6
(12) Other	**1**		**1**		**1**	**1**	**2**		**6**
Anti-Lost	1								1
Anti-Won					1				1
Pro-Lost						1	2		3
Pro-Won			1						1
Total	**5**	**6**	**27**	**14**	**56**	**42**	**91**	**22**	**263**

Supplementary Table 15: Share of Climate Issue in % over Time

Year	1	2	3	4	5.1	5.2	6	7.1	7.2	8	9	10	11	12
1994									100					
1995										100				
2001										100				
2002	50					50								
2004									50		50			
2005	25	25				13		13		25				
2006		33						33	11	11		11		
2007	4	35		4	8	8		4	4	31		4		
2008	8	42		6	6	11		6	6	3			11	3
2009		27			9	36		5		9		9		
2010		20	4			64							8	4
2011	17	8			25			17	8	17		8		
2012	6	25			6	19		6	13	13		13		
2013	5	32			5	18		5		23		5		9
2014		33			11	11	22			22				
2015	19	38	5				5			19		5		10
2016	18	29		6		6		24	12	6				
2017	30	10			20	10		20		10				
2018	19	25		13	6		13	19			6			
2019		20		40						20		20		
Total	9	28	1	3	6	16	2	8	4	14	1	4	2	2

The share of cases is calculated from the sum of each row, so each year constitutes 100%. The Climate Issue is coded by numbers as shown in Supplementary Table 1.

Supplementary Table 16: Strategic Cases by Climate Issue over Time, and Outcome

Year	Policy	Tort	Construction (Public)	Forest	Fossil Fuels (Extraction)	Renewables	Funding	Other	Total
2005	2 (1:1)				1 (1:0)				3 (2:1)
2008	2 (0:2)		1 (1:0)						3 (1:2)
2009							1 (0:1)		1 (0:1)
2011			1 (1:0)			1 (0:1)			2 (1:1)
2012	1 (0:1)								1 (0:1)
2013	1 (1:0)							1 (0:1)	2 (1:1)
2014				2 (1:1)					2 (1:1)
2015	4 (4:0)	1 (0:1)						1 (0:1)	6 (4:2)
2016	2 (1:1)				2 (0:2)				4 (1:3)
2017	3 (0:3)		1 (0:1)						4 (0:4)
2018	3 (0:3)		1 (1:0)	2 (2:0)					6 (3:3)
Total	18 (7:11)	1 (0:1)	4 (3:1)	4 (3:1)	3 (1:2)	1 (0:1)	1 (0:1)	2 (0:2)	34 (14:20)

Results are shown as Total (Positive : Negative). Blank cells stand for Total = 0.

Legal Obligation	Policy	Trading & Certificates	Tort	Civil Disobedience	Construction	Forest	Fossil Fuels	Renewables	Funding	Access to Information	False Advertisement	Other	Total
International Law	14 (4:10)	53 (41:12)			2 (1:1|0:0)	1 (1:0)	5 (2:2|1:0)	1 (0:1)		4 (2:2)		2 (0:2)	83 (53:30)
EU		51 (39:12)					1 (0:1|0:0)			4 (2:2)			56 (41:15)
EU + HR	1 (1:0)												1 (1:0)
EU + UNFCCC								1 (0:1)					1 (0:1)
HR	4 (1:3)						1 (1:0|0:0)						7 (2:5)
HR + UNFCCC	1 (1:0)												1 (1:0)
UNFCCC	8 (1:7)	2 (2:0)			2 (1:1|0:0)	1 (1:0)	1 (0:1|0:0)						14 (4:9)
Other							2 (1:0|1:0)						2 (2:0)
Constitution	9 (4:5)	2 (2:0)			6 (1:1|3:1)	2 (2:0)	10 (3:3|1:3)	1 (1:0)					30 (17:13)
Right to Life	5 (3:2)				1 (0:1|0:0)	1 (1:0)	3 (2:1|0:0)	1 (1:0)					11 (7:4)
Precautionary Princ.	1 (0:1)	1 (1:0)			5 (1:0|3:1)	1 (1:0)	6 (1:1|1:3)						14 (8:6)
Precautionary Princ. + Right to Life	3 (1:2)						1 (0:1|0:0)						4 (1:3)
Other		1 (1:0)											1 (1:0)
Statutory Provisions	14 (5:9)	22 (8:14)	1 (0:1)	7 (5:2)	49 (5:7|20:17)	4 (3:1)	28 (8:9|5:6)	27 (18:9)	3 (2:1)	6 (4:2)	6 (6:0)	3 (1:2)	170 (90:80)
Climate Change	7 (2:5)	3 (2:1)			4 (2:2|0:0)	1 (1:0)	4 (2:0|1:1)	1 (1:0)					21 (11:10)
Other	7 (3:4)	19 (6:13)	1 (0:1)	7 (5:2)	45 (3:5|20:17)	3 (2:1)	24 (6:9|4:5)	26 (17:9)	3 (2:1)	6 (4:2)	6 (6:0)	3 (1:2)	149 (79:70)
Local Provisions					9 (1:2|3:3)			7 (1:6)					16 (5:11)
Planning					9 (1:2|3:3)			7 (1:6)					16 (5:11)
Other													0 (0:0)
Common Law	1 (0:1)		1 (0:1)	2 (1:1)		2 (2:0)						1 (1:0)	7 (4:3)
Public Trust	1 (0:1)					1 (1:0)							2 (1:1)
Tort			1 (0:1)	2 (1:1)								1 (1:0)	4 (2:2)
Other						1 (1:0)							1 (1:0)
Total	38 (13:15)	77 (51:26)	2 (0:2)	9 (6:3)	66 (8:11|26:21)	9 (8:1)	43 (13:14|7:9)	29 (19:10)	3 (2:1)	10 (6:4)	6 (6:0)	6 (2:4)	306 (169:137)

The results are shown as Total (Positive : Negative). For the variable Construction results are divided into sub-codes Total Construction (Construction (Public) Positive : Negative | Construction (Private) Positive : Negative) and for the variable Fossil Fuels results are divided into sub-codes as well as yielding Total Fossil Fuels (Fossil Fuels (Extraction) Positive : Negative | Fossil Fuels (Combustion) Positive : Negative). The left column represents the legal obligations sorted by level of law with each sum given in the darker shaded rows. The abbreviation HR stands for Human Rights.

Supplementary Table 18: Independent and Dependent Variables

Possible Independent Variables X_k	Scale of X_k	Dependent Variable Y
Legal System	Nominal	Evaluative Outcome Positive = 1 Negative = 0
Marker 2015	Nominal	
Case Mode	Nominal	
CCPI	Metric	
Rule of Law	Metric	
Goal of Petitioner	Nominal	
Petitioner	Nominal	
Respondent	Nominal	
Climate Issue	Nominal	
International Law	Nominal	
Constitutional Provisions (Constitution)	Nominal	
Statutory Provisions (Statutes)	Nominal	
Local Provisions	Nominal	
Common Law	Nominal	

Supplementary Table 19: Spearman's Correlation Coefficients

Correlations

		Evaluative Outcome	Marker 2015	Legal System	Case Mode	Rule of Law	CCPI	Goal of Petition	Petitioner	Respondent	Climate Issue	International Law	Constitution	Statutes	Local Prov.	Common Law
Evaluative Outcome	C	1	.068	.177**	.117	-.134	-.021	.166**	.141*	.094	-.069	-.260*	-.135	.004		.242
	Sig.		.27	.004	.058	.057	.77	.007	.022	.13	.264	.017	.477	.957		.602
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Marker 2015	C	.068	1	.014	-.247**	-.086	.266**	.002	-.063	.11	-.174**	.228*	.013	-.442**		-.617
	Sig.	.270		.827	0	.223	0	.97	.308	.076	.005	.038	.946	0		.14
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Legal System	C	.177**	.014	1	.063	.072	-.146*	.170**	.205**	.299**	-.248**	-.643**	.031	-.051		-.301
	Sig.	.004	.827		.305	.308	.038	.006	.001	0	0	0	.87	.511		.511
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Case Mode	C	.117	-.247**	.063	1	.066	-.210**	.361**	.235**	-.200**	.249**	-.772**	.184	.590**		.242
	Sig.	.058	0	.305		.346	.003	0	0	.001	0	0	.329	0		.602
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Rule of Law	C	-.134	-.086	.072	.066	1	-.557**	-.085	-.182**	-.218**	.275**	.068	.267	.05		.396
	Sig.	.057	.223	.308	.346		0	.228	.009	.002	0	.742	.179	.517		.38
	N	204	204	204	204	204	196	204	204	204	204	26	27	167	16	7
CCPI	C	-.021	.266**	-.146*	-.210**	-.557**	1	-.012	.180*	.247**	-.456**	-.36	-.063	-.204**		0
	Sig.	.77	0	.038	.003	0		.862	.011	0	0	.077	.776	.008		1
	N	201	201	201	201	196	201	201	201	201	201	25	23	166	16	6
Goal of Petition	C	.166**	.002	.170**	.361**	-.085	-.012	1	.309**	.202**	-.261**	-.721**	.157	.181*		.176
	Sig.	.007	.97	.006	0	.228	.862		0	.001	0	0	.407	.018		.705
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Petitioner	C	.141*	-.063	.205**	.235**	-.182**	.180*	.309**	1	.048	-.342**	-.574**	-.155	.109		.174
	Sig.	.022	.308	.001	0	.009	.011	0		.439	0	0	.413	.159		.709
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Respondent	C	.094	.11	.299**	-.200**	-.218**	.247**	.202**	.048	1	-.443**	-.243*	.172	-.382**		-.292
	Sig.	.13	.076	0	.001	.002	0	.001	439		0	.027	.363	0		.525
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
Climate Issue	C	-.069	-.174**	-.248**	.249**	.275**	-.456**	-.261**	-.342**	-.443**	1	-.118	.071	.166*		.335
	Sig.	.264	.005	0	0	0	0	0	0	0		.29	.71	.031		.463
	N	263	263	263	263	204	201	263	263	263	263	83	30	170	16	7
International Law	C	-.260*	.228*	-.643**	-.772**	.068	-.36	-.721**	-.574**	-.243*	-.118	1	-.113	.194		
	Sig.	.017	.038	0	0	.742	.077	0	0	.027	.29		.742	.568		
	N	83	83	83	83	26	25	83	83	83	83	83	11	11	0	1
Constitution	C	-.135	.013	.031	.184	.267	-.063	.157	-.155	.172	.071	-.113	1	-.023		
	Sig.	.477	.946	.87	.329	.179	.776	.407	.413	.363	.71	.742		.925		
	N	30	30	30	30	27	23	30	30	30	30	11	30	19	0	2
Statutes	C	.004	-.442**	-.051	.590**	.05	-.204**	.181*	.109	-.382**	.166*	.194	-.023	1		.577
	Sig.	.957	0	.511	0	.517	.008	.018	.159	0	.031	.568	.925			.423
	N	170	170	170	170	167	166	170	170	170	170	11	19	170	2	4
Local Provi.	C															
	Sig.															
	N	16	16	16	16	16	16	16	16	16	16	0	0	2	16	0
Common Law	C	.242	-.617	-.301	.242	.396	0	.176	.174	-.292	.335			.577		1
	Sig.	.602	.14	.511	.602	.38	1	.705	.709	.525	.463			.423		
	N	7	7	7	7	7	6	7	7	7	7	1	2	4	0	7

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Abbreviations: C = Correlation Coefficient ; Sig. = Sig. (2-tailed) ; N = total cases

Supplementary Table 20: Predictors for Model03

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
LegalSystem		3	0,546			
Civil Law	-0,281	1	0,771	0,755	0,113	5,022
Commons Law	-1,071	1	0,254	0,343	0,055	2,154
Mixed Law System	40,048	1	0,998		0,000	
Case Specifications						
Ante 2015	-0,570	1	0,215	0,565	0,229	1,393
Strategic	-2,582	1	0,041	0,076	0,006	0,905
Pro-Regulatory	-0,168	1	0,687	0,845	0,373	1,916
Petitioner		8	0,435			
Individual or Citizen Advocacy Group	0,585	1	0,682	1,795	0,109	29,558
ENGO	0,623	1	0,675	1,864	0,101	34,315
Corporation	-0,108	1	0,937	0,898	0,062	12,916
Industry Advocacy Organization	21,254	1	0,999		0,000	
City	1,403	1	0,609	4,066	0,019	872,632
Local Government	24,630	1	0,999		0,000	
State Government	1,496	1	0,451	4,463	0,092	217,353
Federal Government	-1,886	1	0,244	0,152	0,006	3,616
Respondent		7	0,605			
Individual or Citizen Advocacy Group	-1,762	1	0,337	0,172	0,005	6,255
ENGO	-0,433	1	0,821	0,648	0,015	27,710
Corporation	-2,291	1	0,045	0,101	0,011	0,946
Industry Advocacy Organization	-1,064	1	0,381	0,345	0,032	3,735
City	-0,956	1	0,378	0,384	0,046	3,218
Local Government	-1,296	1	0,196	0,274	0,038	1,953
State Government	-1,417	1	0,097	0,242	0,045	1,294
Federal Government		13	0,937			
Climate Issue						
Policy	-1,590	1	0,341	0,204	0,008	5,393
Access to Information	-1,399	1	0,432	0,247	0,008	8,083
False Advertisement	23,618	1	0,999		0,000	
Other	-0,682	1	0,729	0,506	0,011	24,042
Trading & certificates	-1,422	1	0,392	0,241	0,009	6,280
Tort	-19,610	1	1,000	0,000	0,000	
Civil Disobedience	-1,181	1	0,664	0,307	0,001	63,559
Construction (Public)	-2,130	1	0,223	0,119	0,004	3,648
Construction (Private)	-0,918	1	0,591	0,399	0,014	11,322
Forest	0,678	1	0,778	1,969	0,018	221,054
Fossil Fuels (Extraction)	-1,495	1	0,366	0,224	0,009	5,748
Fossil Fuels (Combustion)	-1,762	1	0,321	0,172	0,005	5,552
Renewables	-0,694	1	0,679	0,500	0,019	13,332
InternationalLaw		7	0,996			
EU	-40,919	1	0,999	0,000	0,000	
EU + Human Rights	-18,190	1	1,000	0,000	0,000	
EU + UNFCCC	-61,259	1	0,999	0,000	0,000	
Human Rights	-59,606	1	0,999	0,000	0,000	
Human Rights + UNFCCC	18,883	1	1,000	158.771.672,187	0,000	
UNFCCC	-39,752	1	0,999	0,000	0,000	
Constitution		4	0,986			
Right to Life	-19,191	1	1,000	0,000	0,000	
Precautionary Principle	-19,628	1	1,000	0,000	0,000	
Precautionary Principle + Right to Life	-56,507	1	0,999	0,000	0,000	
Statutes		2	0,414			
Climate Change	0,902	1	0,323	2,465	0,412	14,750
Local Provisions (blank cells)	2,260	1	0,052	9,583	0,980	93,735
Common Law		3	0,996			
Public Trust	-1,179	1	1,000	0,308	0,000	
Tort	19,778	1	1,000	388.534.159,658	0,000	
Constant	40,551	1	1,000			

a. Variable(s) entered on step 1: LegalSystem, Marker2015, CaseMode, GoalOfPetitioner, Petitioner, Respondent, ClimateIssue, InternationalLaw, Constitution, Statutes, LocalProvisions, CommonLaw.

Note: The numbers in this table are presented in German style, i.e., the decimal separator is a comma and the thousands separator a dot.

Supplementary Table 21: Model05 Performance

	Chi-square	df	Sig.
Omnibus Test	20.473	6	.002
Hosmer-Lemeshow	4.97	7	.664
Prediction	61.3% correctly predicted (8.8% points increase)		

Supplementary Table 22: Predictors for Model06

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Case Specifications						
Ante 2015	759,555	1	0,999		0,000	
Strategic	-620,410	1	0,999	0,000	0,000	
Pro-Regulatory Goal	-811,197	1	0,999	0,000	0,000	
Rule of Law	2.642,233	1	0,999		0,000	
CCPI	1,888	1	1,000	6,606	0,000	
Petitioner		3	1,000			
Individual or Citizen Advocacy Group	-559,990	1	0,999	0,000	0,000	
ENGO	-508,348	1	0,999	0,000	0,000	
Corporation	-2.228,228	1	0,999	0,000	0,000	
Respondent		3	1,000			
Individual or Citizen Advocacy Group	-1.468,676	1	0,999	0,000	0,000	
Corporation	69,657	1	1,000		0,000	
State Government	-543,638	1	0,999	0,000	0,000	
ClimateIssue		5	1,000			
Policy	193,869	1	0,999		0,000	
Access to Information	-1.195,33	1	0,999	0,000	0,000	
Tort	124,215	1	0,999		0,000	
Forest	-349,891	1	0,999	0,000	0,000	
Fossil Fuels (Combustion)	-927,895	1	0,999	0,000	0,000	
InternationalLaw		2	1,000			
EU	811,195	1	0,999		0,000	
Constant	-496,621	1	0,999	0,000		

a. Variable(s) entered on step 1: Marker2015, CaseMode, GoalOfPetitioner, RuleofLaw, CCPI, Petitioner, Respondent, ClimateIssue, InternationalLaw.

Note: The numbers in this table are presented in German style, i.e., the decimal separator is a comma and the thousands separator a dot.

Supplementary Table 23: Model07 Performance

	Chi-square	df	Sig.
Omnibus Test	18.216	3	.000
Hosmer-Lemeshow	3.485	4	.480
Prediction	81.1 % correctly predicted (29.7 % point increase)		

Supplementary Table 24: Predictors for Model07

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Ante 2015	-2.174	1	.065	.114	.011	1.145
Strategic	-23.305	1	.999	.000	.000	
Pro-Regulatory	21.356	1	.999		.000	
Constant	1.501	1	.179	4.486		

a. Variable(s) entered on step 1: Marker2015, CaseMode, GoalOfPetitioner.

Supplementary Table 25: Predictors for Model08

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Case Specifications						
Ante 2015	-0,329	1	0,615	0,720	0,200	2,591
Strategic	0,691	1	0,789	1,995	0,013	310,948
Pro-Regulatory Goal	-0,414	1	0,376	0,661	0,265	1,652
CCPI	0,001	1	0,969	1,001	0,967	1,036
Rule of Law	-20,719	1	0,411	0,000	0,000	
Petitioner		7	0,968			
Individual or Citizen Advocacy Group	21,019	1	1,000		0,000	
ENGO	20,872	1	1,000		0,000	
Corporation	20,340	1	1,000	681.827.265,447	0,000	
Industry Advocacy Organization	44,046	1	0,999		0,000	
City	42,552	1	0,999		0,000	
Local Government	43,180	1	0,999		0,000	
State Government	62,567	1	0,999		0,000	
Respondent		7	0,825			
Individual or Citizen Advocacy Group	-44,206	1	0,999	0,000	0,000	
ENGO	-42,968	1	0,999	0,000	0,000	
Corporation	-44,426	1	0,999	0,000	0,000	
City	-43,093	1	0,999	0,000	0,000	
Local Government	-42,923	1	0,999	0,000	0,000	
State Government	-43,811	1	0,999	0,000	0,000	
Federal Government	-44,133	1	0,999	0,000	0,000	
ClimateIssue		11	0,981			
Policy	21,039	1	1,000		0,000	
Access to Information	22,482	1	1,000		0,000	
False Advertisement	65,180	1	0,999		0,000	
Other	21,763	1	1,000		0,000	
Trading & Certificates	22,775	1	1,000		0,000	
Civil Disobedience	-19,344	1	1,000	0,000	0,000	
Construction (Public)	20,725	1	1,000		0,000	
Construction (Private)	21,922	1	1,000		0,000	
Fossil Fuels (Extraction)	22,209	1	1,000		0,000	
Fossil Fuels (Combustion)	21,366	1	1,000		0,000	
Renewables	22,295	1	1,000		0,000	
InternationalLaw		3	0,840			
EU	-1,194	1	0,552	0,303	0,006	15,559
Human Rights	-20,475	1	1,000	0,000	0,000	
Constitution		3	0,807			
Right to Life	22,144	1	1,000		0,000	
Precautionary Principle	20,795	1	1,000		0,000	
Statutes		2	0,829			
Climate Change	0,685	1	0,559	1,985	0,199	19,830
Local Provisions (blank cells)	1,670	1	0,188	5,312	0,443	63,680
Common Law (blank cells)	-20,736	1	0,999	0,000	0,000	
Constant	14,868	1	1,000	2.864.555,137		

a. Variable(s) entered on step 1: Marker2015, CaseMode, GoalOfPetitioner, CCPI, RuleofLaw, Petitioner, Respondent, ClimateIssue, InternationalLaw, Constitution, Statutes, LocalProvisions, CommonLaw.

Note: The numbers in this table are presented in German style, i.e., the decimal separator is a comma and the thousands separator a dot.

Supplementary Table 26: Model09 Performance

	Chi-square	df	Sig.
Omnibus Test	5.484	3	.140
Hosmer-Lemeshow	.980	3	.806
Prediction	57.1 % correctly predicted (6.8 % point increase)		

Supplementary Table 27: Predictors for Model09

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Ante 2015	-.321	1	.454	.726	.313	1.680
Strategic	-.417	1	.541	.659	.173	2.510
Pro-Regulatory	-.636	1	.061	.529	.272	1.031
Constant	.665	1	.114	1.945		

a. Variable(s) entered on step 1: Marker2015, CaseMode, GoalOfPetitioner.

Supplementary Table 28: Predictors for Model10

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Case Specifications						
Ante 2015	1,741	1	0,293	5,702	0,222	146,646
Pro-Regulatory Goal	1,834	1	0,094	6,261	0,730	53,685
Petitioner		5	0,848			
Individual or Citizen Advocacy Group	40,938	1	0,999		0,000	
ENGO	43,431	1	0,999		0,000	
Corporation	41,275	1	0,999		0,000	
Local Government	81,886	1	0,999		0,000	
State Government	62,323	1	0,999		0,000	
Respondent		7	0,999			
Individual or Citizen Advocacy Group	-42,406	1	0,999	0,000	0,000	
ENGO	-21,048	1	1,000	0,000	0,000	
Corporation	-2,966	1	1,000	0,052	0,000	
City	19,812	1	1,000	402.078.471,593	0,000	
Local Government	20,036	1	1,000	502.869.234,088	0,000	
State Government	-1,178	1	1,000	0,308	0,000	
Federal Government	-23,306	1	1,000	0,000	0,000	
ClimateIssue		7	0,867			
Access to Information	-22,769	1	0,999	0,000	0,000	
False Advertisement	42,406	1	0,999		0,000	
Other	-61,551	1	0,998	0,000	0,000	
Construction (Public)	-43,430	1	0,998	0,000	0,000	
Construction (Private)	-41,005	1	0,998	0,000	0,000	
Fossil Fuels (Extraction)	-21,358	1	0,999	0,000	0,000	
Fossil Fuels (Combustion)	-43,297	1	0,998	0,000	0,000	
Constitution		2	0,761			
Right to Life	25,426	1	0,999		0,000	
Statutes		2	0,512			
Climate Change	2,069	1	1,000	7,918	0,000	
Local Provisions (blank cells)	1,473	1	0,347	4,362	0,202	94,019
Constant	-24,435	1	1,000	0,000		

a. Variable(s) entered on step 1: Marker2015, GoalOfPetitioner, Petitioner, Respondent, ClimateIssue, Constitution, Statutes, LocalProvisions.

Note: The numbers in this table are presented in German style, i.e., the decimal separator is a comma and the thousands separator a dot.

Supplementary Table 29: Predictors for Model11

Variables in the Equation						
	B	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Step 1[a]					Lower	Upper
Case Specifications						
Ante 2015	-1,198	1	0,303	0,302	0,031	2,957
Strategic	24,191	1	1,000		0,000	
Pro-Regulatory Goal	0,093	1	0,950	1,097	0,062	19,282
Petitioner		5	0,777			
Individual or Citizen Advocacy Group	-15,309	1	1,000	0,000	0,000	
ENGO	-17,424	1	1,000	0,000	0,000	
Corporation	-17,720	1	1,000	0,000	0,000	
City	-40,498	1	1,000	0,000	0,000	
Local Government	4,164	1	1,000	64,329	0,000	
Respondent		6	0,982			
Individual or Citizen Advocacy Group	47,254	1	1,000		0,000	
ENGO	90,387	1	1,000		0,000	
Corporation	-19,464	1	1,000	0,000	0,000	
City	-15,776	1	1,000	0,000	0,000	
Local Government	1,924	1	0,387	6,846	0,088	532,958
State Government	1,769	1	0,299	5,867	0,208	165,607
ClimateIssue		8	1,000			
Policy	23,074	1	1,000		0,000	
Access to Information	104,398	1	0,999		0,000	
Other	61,324	1	1,000		0,000	
Trading & Certificates	85,603	1	0,999		0,000	
Construction (Public)	65,480	1	0,999		0,000	
Construction (Private)	85,646	1	0,999		0,000	
Fossil Fuels (Extraction)	62,109	1	0,999		0,000	
Renewables	84,925	1	0,999		0,000	
InternationalLaw		2	1,000			
EU	-42,313	1	0,999	0,000	0,000	
Statutes		2	1,000			
Climate Change	41,594	1	0,999		0,000	
Local Provisions (blank cells)	69,689	1	0,999		0,000	
Common Law (blank cells)	24,214	1	1,000		0,000	
Constant	-186,633	1	1,000	0,000		

a. Variable(s) entered on step 1: Marker2015, CaseMode, GoalOfPetitioner, Petitioner, Respondent, ClimateIssue, InternationalLaw, Statutes, LocalProvisions, CommonLaw.

Note: The numbers in this table are presented in German style, i.e., the decimal separator is a comma and the thousands separator a dot.

Supplementary Table 30: Overview of all Logistic Regressions Models, Included Independent Variables, Significant Predictors, and Model Performance

Model	Independent Variables	Data Set (No. of cases)	Significant Predictors	B	Sig.	H_0	Model Performance
Model01							
	Rule of Law	204	Rule of Law	-5.577	.006	rejected	good
Model02							
	CCPI	201	-				poor
Model03							
	Legal System; Marker 2015; Case Mode; Goal; Petitioner; Respondent; Climate Issue; Legal Obligations (all levels)	263	Strategic	-2.582	.041	rejected	good
			Respondent Corporation	-2.291	.045	rejected	

Model04							
	Legal System; Marker 2015; Case Mode; Goal	263	Strategic	-1.197	.018	rejected	good
			Common Law (System)	-.849	.022	rejected	
			Mixed Law (System)	2.308	.046	rejected	
Model05							
	Rule of Law; Legal System; Marker 2015; Case Mode; Goal	204	Ante 2015	-.805	.043	rejected	good
			Rule of Law	-7.29	.033	rejected	
Model06							
	Rule of Law; CCPI; Marker 2015; Case Mode; Goal; Petitioner; Respondent; Climate Issue; International Law	31 (civil law systems)	-				good
Model07							
	Marker 2015; Case Mode; Goal	31 (civil law)	Ante 2015	-2.174	.065	accepted	good
Model08							
	Rule of Law; CCPI; Marker 2015; Case Mode; Goal; Petitioner; Respondent; Climate Issue; International Law	159 (common law systems)	-				ok
Model09							
	Marker 2015; Case Mode; Goal	159 (common law systems)	Pro-Regulatory Goal	-.636	.061	accepted	poor
Model10							
	Marker 2015; Case Mode; Goal; Petitioner; Respondent; Climate Issue; Constitution; Statutes; Local Provisions	80 (Aus-tralian)	-				good
Model11							
	Marker 2015; Case Mode; Goal; Petitioner; Respondent; Climate Issue; Legal Obligations (all levels)	54 (UK)	-				ok

Supplementary Table 31: U.S. Cases by Type of Respondent, Goal of Petitioner, and Outcome

Goal & Outcome	ENGO	In-du-stry	Busi-ness	Local GOV	State GOV	Fed GOV	Individual / Citizen Advocacy Group	Total
Pro-Regulatory Goal		**8**	**76**	**105**	**96**	**248**	**2**	**535**
lose		6	31	55	53	126	1	272
win		1	10	30	25	48		114
other		1	35	20	18	74	1	149
Anti-Regulatory Goal	**4**	**1**	**6**	**23**	**52**	**139**	**1**	**226**
lose	1		2	12	26	69	1	111
win	3		2	8	10	14		37
other		1	2	3	16	56		78
N/A	**6**	**2**	**13**	**6**	**14**	**29**	**7**	**77**
lose	3		6	4	4	13	2	32
win	1	1	4	2	5	11	3	27
other	2	1	3		5	5	2	18
Total	**10**	**11**	**95**	**134**	**162**	**416**	**10**	**838**

Source: McCormick (2017)

Declaration of Authorship

I hereby declare that my thesis is the result of my own work and that I have marked all sources, including online sources, which have been cited without changes or in modified form, especially sources of texts, graphics, tables and pictures.

I assure that I have not submitted this thesis for any other examination yet.

I am aware that in case of any breach of these rules procedures concerning fraud or attempted fraud will be taken in accordance with the subject-specific examination regulations and/or the *Allgemeine Satzung für Studien- und Prüfungsangelegenheiten (ASSP) or the Allgemeine Satzung zur Regelung von Zulassung, Studium und Prüfung der Humboldt-Universität zu Berlin* (ZSP-HU).

10.03.2021 

Date Signature