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## **Regional Power Shifts and Climate Knowledge Systems: South Africa as a Climate Power?**

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## **Regional Power Shifts and Climate Knowledge Systems: South Africa as a Climate Power?**

### **Abstract**

In the international system, there has been a power shift towards regional powers, which can be illustrated by recent developments in climate governance. I argue that some of these regional powers are also climate powers, which benefit from an issue-specific power shift. The behavior and strategies of those climate powers are central for global climate governance. To analyze their strategies, a multi-level approach is required that captures the link between domestic climate governance and climate foreign policy. I develop such a concept of climate knowledge systems. It is based on Emanuel Adler's theory of cognitive evolution and communities of practice. A pragmatist philosophy such as this that allows for mixed methods research is most suitable for analyzing the proposed connection between knowledge, practices and change. It also presents the key to an extended regional powers framework, leaving the somewhat artificial boundaries of international relations in climate governance behind. The concept of climate knowledge systems is empirically applied to South Africa with some early tentative results of an online expert survey, as well as the analysis of data of the Carbon Disclosure Project.

Keywords: South Africa, regional powers, climate governance, communities of practice, knowledge systems, mixed methods

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## **Zusammenfassung**

### **Regionale Machtverschiebungen und Klima Wissenssysteme: Klimamacht Südafrika?**

Im Internationalen System findet eine Machtverschiebung zugunsten der regionalen Führungsmächte statt, die in den jüngeren Entwicklungen im Klima-Governance-Feld deutlich wird. Einige der regionalen Führungsmächte sind auch Klimamächte, die von einer policy-spezifischen Machtverschiebung profitieren. Das Verhalten und die Strategien regionaler Führungsmächte in Bezug auf den Klimawandel sind zentral für die globale Klima-Governance. Für die Analyse der Strategien ist ein Multi-Level-Ansatz notwendig, der die Verbindung zwischen nationaler Klima-Governance und Klima-Außenpolitik erfasst. Ich entwickle ein solches Konzept der Klima-Wissenssysteme. Es basiert auf Emanuel Adlers Theorie der kognitiven Evolution und Communities of Practice. Ein philosophischer Ansatz im Sinne des Pragmatismus, der den Einsatz von qualitativen und quantitativen Methoden ermöglicht, ist am besten für die Analyse der Verbindung von Wissen, Praktiken und Wandel geeignet. Er bildet ferner den Schlüssel zu einem erweiterten Analyserahmen für regionale Führungsmächte, in dem die teils künstlichen Grenzen der Internationalen Beziehungen im Klima-Governance-Feld hinter sich gelassen werden. Das Konzept der Klima-Wissenssysteme wird ferner empirisch auf Südafrika angewandt. Ich lege erste vorläufige Ergebnisse aus einer Online-Experten-Umfrage und den Daten des Carbon Disclosure Project vor.

# **Regional Power Shifts and Climate Knowledge Systems: South Africa as a Climate Power?**

**Babette Never**

## **Article Outline**

- 1 Introduction
- 2 Regional Powers and Power Shifts in the International Climate Negotiations
- 3 Communities of Practice and Climate Knowledge Systems
- 4 Drivers, Obstacles and Change in South Africa's Climate Governance
- 5 Conclusion

## **1 Introduction**

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the Bali conference in 2007 have once again brought climate change to the attention of policymakers. Two years later—and despite the financial crisis—climate change is still high on the agenda. Some authors argue that the next economic crisis is looming unless the transition to low carbon-energy systems is undertaken now (see Edenhofer/Stern 2009). For a truly green “New Deal” that effectively addresses climate change, countries such as China, India or South Africa have to firmly support it as well. Their current and prospective share of global greenhouse gas (GHG) emissions is considerable. At the same time, some of them will

be among the worst hit from the impacts of climate change. The role of these (tentatively termed) regional powers, both in their respective regions and the international system, underlines their importance in solving global crises. In the international climate negotiations that culminated in the Copenhagen conference of December 2009, a shift in power relations is discernible.

In this article<sup>1</sup>, I focus on three points. First, I elaborate on the content and implications of the power shift. Second, I argue that existing analytical frameworks need to be extended to take multi-level influences in climate governance into account, particularly concerning knowledge and norms. The analytical separation of global and domestic climate governance is obsolete—and therefore to a certain extent so are the boundaries between international relations and comparative politics. Third, I contend that new ideas, attitudes and practices begin to evolve in reaction to climate change. Building on this, I develop a theoretical concept suited to regional powers and the multi-level character of climate governance. It is based on Emanuel Adler's theory of cognitive evolution and communities of practice, but refines his ideas to include climate knowledge systems.

The article is divided into three parts. In the first part, I clarify some essential concepts: regional powers, leadership, and power. I also discuss the power shift in global climate governance and its possible implications for the international system. In the second part, I explain the multi-level quality of climate governance with respect to the role of knowledge and norms, particularly concerning the strategies of regional powers. I develop my concept of climate knowledge systems and show how it connects to the analytical framework of regional powers. The advantages of taking a pragmatist stance that focuses more on practices are also demonstrated. In the final section, I look at the case of South Africa in more detail. Some early empirical results concerning the existence and functioning of climate knowledge systems are given. In the light of these results, I assess South Africa's current quality as a (potential) climate power.

## **2 Regional Powers and Power Shifts in the International Climate Negotiations**

### **2.1 Definition and Concept of Regional Powers**

The terminology for the group of states that possess growing economic and political weight varies. There is neither a consensus as to which states constitute regional powers, nor a common set of analytic criteria. I do not intend to enter the debate about the advantages or disadvantages of each underlying concept. That is not the purpose of this article. Rather, I have chosen to employ the understanding of regional powers that is currently under development

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<sup>1</sup> The theoretical parts of this paper are forthcoming in the *Göttingen Journal of International Law (GoJIL)*, *Special Issue* on "Strategies for Solving Global Crises" (forthcoming February 2010). This working paper is published with the permission of the editors of *GoJIL*.

at the German Institute of Global and Area Studies (GIGA). It is one of the more complex concepts available that still gives enough room to include issue-specific dynamics. Moreover, it provides starting points for an extension beyond the analytic arena of international relations, which is essential for the analysis of climate governance.

Generally, regional powers are expected to possess a certain economic stability, a relative military power and a regional power base (see Nolte 2006; Nabers forthcoming). Based on this, Daniel Flemes identifies four basic criteria to help analyze regional powers. They must: (1) be part of a geographically delimited region, (2) be ready to assume leadership, (3) possess material and ideational capabilities for regional power projection, and (4) be highly influential in regional affairs (Flemes/Lemke 2009). Four more criteria serve to classify regional powers: (a) economic, political and cultural interconnectedness of the regional power within its region, (b) the provision of collective goods for the region, (c) the existence of an ideational leadership project, and (d) the acceptance of the leadership by potential followers (Flemes/Lemke 2009: 643). The countries that meet these criteria and can therefore currently be counted as regional powers are: Brazil, China, India, South Africa and Russia (albeit Russia differs from the others due to its lack of ideational capabilities) (Flemes/Lemke 2009: 644).

This approach to regional powers is closely related to the terms “leadership” and “power”<sup>2</sup>. Leadership is understood as a process rather than a static quality. As defined by Michael Barnett and Raymond Duvall, power is both resource- and process-based. This appears to be the most suitable definition for the analysis of regional powers because it allows for differentiated analyses. Thus, power has four dimensions (Barnett/Duvall 2005): compulsory power, institutional power, structural power and productive power. Compulsory power entails the direct control over others via material or symbolic resources. Institutional power refers to the indirect control through rules, processes and institutions. Structural power concerns the structures and constitutive relations (e.g. inter- and transnational) that define actors’ self-understanding, social capacities and interests. Finally, productive power (also called discursive or ideological power) is “the constitution of all social subjects with various social powers through systems of knowledge and discursive practices of broad and general scope” (Barnett/Duvall 2005: 20). Nolte also differentiates between direct and indirect applications of power, as well as three states of activity: active, passive or reactive power (Nolte 2006: 16).

The original GIGA concept of 2006 was criticized for its overemphasis on materialist factors as well as the insufficient integration of socialization effects and possibilities of policy linkage strategies (see Husar et al. 2008). This criticism has been met by the recent conceptual developments outlined here. The advantage of understanding and analyzing regional powers as presented is that its inherent multilevel approach looks at different actor relations, interests and issues on global and regional levels from various analytical angles. Regional powers’ strategies may differ depending on the issue, so that some present a stronger “re-

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<sup>2</sup> Note that both of these are contested terms in International Relations literature.

gion-ness” or power projection than others. To understand these choices and dynamics, I argue that domestic, local and transnational governance levels need to be more explicitly integrated with respect to both state and non-state initiatives.

While there is some danger to the complexity of the GIGA concept, it should serve as an overall framework inside of which more specific approaches can be developed. These may lead to differing results. But as long as the connection to the framework is made explicit, such results could actually be closer to actual practices—which is what all political scientists, even the most radical interpretivists, try to explain. The theoretical approach outlined in the second section of this paper shows one possible way of doing this. But first I explain what kind of power shift has taken place in the climate governance field, in which regional powers are involved, and what implications this might have for the development of the overall international system.

## 2.2 Power Shifts in Global Climate Governance

The change in the international system toward a multi-polar world has been extensively discussed for two decades. Various contributions have analyzed and projected changes in the power distributions towards regional powers, especially in regards to China and India. I argue that these power shifts are supported by the recent developments in climate governance, thus potentially qualifying some of the regional powers as climate powers. A shift in power implies (a) a change in actor relations on a general level in the international system, (b) a change in at least one of the dimensions of power mentioned above, and/or (c) a certain gain in leverage beyond the concrete issue or governance field (issue linkages).

The power shift in climate governance is linked to a new urgency of dealing with climate change. Despite the fact that climate change is not new to the international agenda, extended scientific knowledge about the speed of climate change today draws a specific and quickly closing policy window. The new scientific findings implicitly invoke an air of crisis. This could present the sort of trigger that generates a change in attitudes and ideas, a so-called cognitive punch (Adler 2005: 75) that induces processes of cognitive evolution (see section 3.2).

The increase in power in climate governance does not concern all regional powers as per GIGA concept, but primarily the heavyweights China and India, as well as Brazil and South Africa. Russia maintains a low profile in the international climate negotiations; parts of its climate strategy appear to even contradict other interests of the country (see Korppo et al. 2009). Also, large parts of Russia are expected to benefit rather than suffer from the impacts of climate change, setting it apart from the other four regional powers. Therefore, at this point Russia does not benefit from the power shift in the climate field and cannot be termed a (potential) climate power.



The power shift in global climate governance can be ascribed to three main points: (1) a regional powers' country profile with respect to both the emissions of greenhouse gases and the expected impacts of climate change (mitigation and adaptation)<sup>3</sup>, (2) their role assumed in the international climate negotiations, and (3) climate governance activities both by state and non-state actors.

### *(1) Country Profiles*

In terms of their climate profiles, China, India, Brazil and South Africa all belong to the top 20 of the global GHG emitting countries (see Netherlands Environmental Agency 2009). In 2009, China has surpassed the United States and now emits the most GHG per year in cumulative terms (ibid). Projections for India, for instance, range from 4 billion tons to 7.3 billion tons of GHG emitted in 2030 (see MoEF India 2009). These figures underline that it is imperative to include these countries in a new climate deal. Due to its large amount of rain forest, Brazil has a special role for both mitigation and adaptation. The forests function as carbon sink, explaining why the instrument "Reducing Emissions from Deforestation and forest Degradation" (REDD) is central to the negotiations. REDD is also linked to adaptation because of the livelihoods that depend on the forests as a source of income. The IPCC Fourth Assessment report and the UNDP Adaptation Country Profiles project severe impacts of climate change in several sectors and issue areas for all four regional powers, e.g. disaster risk, water, or food supply.

Given their level of economic and human development, regional powers are in a better initial position than other developing countries to face climate change impacts. They can help to foster adaptation in their region. Despite the fact that some of the science has been known for a decade, the actual scope of the climate change problem, as well as more concrete data on emissions and adaptation needs, have only become available in the past two to three years. This strengthens the initial power position for the four potential climate powers, particularly in the dimensions institutional and structural power. They are just too important for governing and protecting the global commons "climate" — a point that has become very clear in the international negotiations, both in the run-up to, and the Copenhagen-conference itself.

### *(2) Role of the Regional Powers in the International Climate Negotiations*

The high degree of difficulty in reaching agreement within any of the four big negotiating blocks—mitigation, adaptation, technology transfer and finance—is a clear sign for the

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<sup>3</sup> Mitigation refers to an anthropogenic intervention to reduce the anthropogenic-forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions, and enhancing greenhouse gas sinks. Adaptation can be defined as adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, see <http://www.ipcc.ch/pdf/glossary/ar4-wg2.pdf>; 10.09.2009).

power shift. If a coalition of states were able to dominate the negotiations and use its power to push for a specific solution, the amount of controversies would not be as high as it currently is. The grinding tug of war that characterized the negotiations in Copenhagen further illustrates this. The four regional powers tend to function as issue leaders of the G77, especially China. Additionally, South Africa often acts as a speaker for the Africa group. All four regional powers try to maintain a united position around three major principles: (1) the polluter pays principle—emphasizing the historical responsibility of industrialized countries for GHG emissions, and therefore their responsibility to take the lead, (2) the principle of common but differentiated responsibility, as recognized in Article 3 of the UNFCCC—strengthening the argument that industrialized countries need to financially support developing countries' adaptation to climate change impacts, (3) a right to (economic) development—often interpreted as a certain “right to emissions”.

The negotiations in the past few years have been characterized by the deadlock between the two biggest emitters, China and the United States. Both governments blame the other for the stalemate, with each refusing to act as long as the other country does not do so first. Yet with the change of administration in the US, pressure on the Chinese government has increased. The declaration of the G8+5 at the Major Economies Forum (MEF) in July 2009 could be attributed to these new dynamics in the international climate negotiations. Even the Indian Prime Minister Singh agreed to the 2°C goal, i.e. that the global average temperature should not increase more than 2°C compared to pre-industrial levels. The MEF declaration seemed to indicate that high-level political events are necessary to achieve a successful deal in Copenhagen. Yet the “Obama effect” (Never/Eucker 2009) did not last—neither on the regional powers, nor the US negotiating position itself. In Copenhagen, the full extent of the deadlock between China and the US became clear. Despite a number of direct consultations between the presidents of the two countries, there was no breakthrough. China, Brazil, India and South Africa fortified the dynamic of their group cohesion on most questions, meeting on several occasions to discuss and align their positions. Moreover, the relevance of these four countries was underlined through the small group consultations with the EU, US, and others. In the last days of the conference, when the heads of state tried to negotiate a political agreement among themselves, it all seemed to come down to these countries, with China and the US building the center. The Copenhagen Accord shows how firm the bargaining positions remained, particularly when coupled with domestic interests and constraints. Regardless of how follow-up negotiations proceed in 2010, it is already clear that there will be a differentiation between the four (potential) regional powers and lesser-developed countries. Let us now turn to each of the four countries.

Up to Copenhagen, the Chinese delegation was seen as active and willing to achieve progress in international negotiations. Despite its refusal of to accept binding emission targets, the government appeared to accept its leadership position. In September 2009, the Chinese President stated the country would cut its emissions per GDP “by a notable margin by

2020" (Times of India 2009). This was firmed up to a cut of 40-45 percent per GDP unit from the 2005 level (note that science's baseline is usually 1990) just before the Copenhagen conference. Domestic climate governance efforts are comparably ambitious, clear efforts are undertaken to prepare the change to a low-carbon economy. This increased China's institutional power. Using Nolte's terminology, China shifted from a rather reactive power position in the past to an active power position in 2009. This first mover advantage could benefit China. But in Copenhagen, China did not pursue global leadership or try to use this first mover advantage. It successfully blocked the request to let the UN externally verify their climate protection, especially mitigation efforts. Despite the weak outcome for climate protection, China can therefore be counted as a winner in terms of its negotiation goals when viewed from a short-term, national interest point of view (see Guérin/Wemaere 2009).

India, the second heavyweight, has assumed a reactive blocking position ever since climate change first hit the international agenda in the early 1990s. The government continues to point to India's low per-capita emissions. It was only in September 2009, as a reaction to China, that environment minister Ramesh stated that India needs to take on more aggressive, voluntary mitigation measures (see Times of India 2009). In the run-up to Copenhagen, India announced voluntary emission reductions (but without concrete numbers), as well as a willingness to sign a global emission-reduction target. This was perhaps due to India's reluctance to be blamed for Copenhagen's failure. The government's position appears to have changed slightly toward a progressive-realist position, focusing on co-beneficial activities de-linked from a global commitment (Dubash 2009: 11). Since the 1970s, socio-economic development and protection of the environment have been understood as contradictory. Due to its relevance for the economy, technology transfer is still the only issue area in which India tries to constructively help achieve a solution. Outside the international negotiations, India has signed several bilateral agreements on technology cooperation, e.g. with the US. Given its important function for overall climate governance, India benefits from a direct power shift, even though its power currently manifests itself in a blocking attitude.

In the negotiations leading up to the Kyoto Protocol, Brazil was very active and progressive. Its delegation is still seen as rather progressive, but it has lost some influence in recent years. Activities center primarily on REDD, where the Brazilian voice exerts considerable power. If the principle of common but differentiated responsibility were respected, Brazil would consider accepting mandatory emission reduction targets.<sup>4</sup> At the Copenhagen negotiations, Brazil surprised attendees with its announcement to financially support less-developed countries. Together with South Africa, Brazil pushed more strongly for a legally binding agreement in Copenhagen than China or India, but nevertheless kept to the general positioning of the "BASIC-group".

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<sup>4</sup> This was said by Brazil's deputy Environmental Minister, see Osava 2009.

In general, South Africa no longer opposes emission reduction commitments. The South African delegation shifted to an active, progressive position under the now former environmental minister Van Schalkwyk. In 2005, despite a domestic move towards a proactive position, the government still felt bound by the reactive position of all other developing countries. Consequently, the South African position remained reactive as well (Koch et al. 2007: 1337). The change towards a progressive position implies a gain in institutional power, and potential leverage beyond the climate issue. As a speaker of the Africa group, South Africa actively advocates for financial support for the adaptation of all developing countries. The EU seems to recognize South Africa's potential, calling on the government to take a progressive lead function within the regional powers group. The power South Africa exerts in the international climate negotiations can therefore be termed active and direct.

### *(3) Activities by State and Non-state Climate Governance Actors*

Finally, the activities both by state and non-state actors in Brazil, China, India, and South Africa strengthen their respective governments' position in global governance questions. Increasing domestic activities show the countries' willingness to assume their share of responsibility, e.g. new public-private partnerships, or voluntary energy efficiency accords between governments and companies. For instance, Chinese provinces have been active in climate governance since 2007. Given the size of the country and the difficulties of integrating developmental and environmental concerns, the Chinese national climate policy is seen as comparably progressive (see Korppo et al. 2009). In South Africa, a long-term mitigation strategy that envisions emissions to peak by 2020/2025, plateau for a few years, and then decline, was approved by the ministerial cabinet in 2008. A roadmap with concrete steps for both adaptation and mitigation, was discussed and agreed upon at a National Climate Summit with stakeholders in March 2009.

The projects conducted under the Clean Development Mechanism (CDM) are part of the Kyoto Protocol. They are public-private partnerships or fully private projects, with the first project registered in 2004. China currently has the biggest share of roughly 35 percent of the 1,815 projects currently registered at the UNFCCC (2009)<sup>5</sup>; India comes second with 25 percent; and Brazil hosts 9 percent of all CDM projects. This underlines their economic attractiveness and importance as trading partners for the developed countries. Even though it is not clear yet what form the future emission trading system will take, it can be assumed that the structural power gain in this area will not be lost again. In addition, Brazil and India also possess some structural powers, in terms of competitive advantages in the renewable energy sector. Brazil is the world's biggest producer of biofuels. In terms of installed wind power plants, India is ranked fifth globally. The Indian company Suzlon is one of the world's

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<sup>5</sup> <http://cdm.unfccc.int/Statistics/Registration/NumOfRegisteredProjByHostPartiesPieChart.html> (14.09.2009).

leading wind turbine manufacturers. Moreover, the potential for innovations in green technology is deemed high, particularly in China and India.

Overall, China, India, Brazil and South Africa exert some qualities of climate power, and have the high potential to fully assume their role. A definite classification is subject to in-depth, multi-level empirical studies.

### 2.3 Implications for the International System

Given the impacts of climate change on key sectors such as the economy and its simultaneous catalyzing effects on many already existing problems, the developments in power relations in climate governance are crucial for the international system. Spillover effects on other issue areas appear possible. I contend that climate governance has the potential to become—if it hasn't already—one of the most important governance fields of this century. It cannot be put into the low-priority politics box the way environmental policy issues usually are. The challenge it presents to two of the state's core functions—welfare and security—is likely to transform the management of climate change into a domestic performance test for governments. In the international system, the assumption of a leadership function in climate governance is likely to strengthen both regional leadership and global recognition. China could benefit from a demonstration of global leadership ambitions via climate governance, thus affirming its ability to address global problems. Its power position in relation to the US would thus be reinforced. If India changed its current negotiation position somewhat to lobby for a specific type of emission trading, it could become the winner in a new climate deal. Due to its low per-capita emissions and already attractive location for CDM projects, India could significantly strengthen its economic attractiveness, and thus its power position.

The leap from low levels of development to a low-carbon society could improve the economic situation for all regional powers through the creation of green jobs, markets and attraction of investors seeking innovative but affordable technology. A distinct competitive advantage in green technology seems possible because all companies worldwide are nearly at the same level in this area now.<sup>6</sup>

Since the beginning of the G8+5 summits in 2005, it has become evident that the voice of the five Outreach countries has to be heard in questions of global importance. The G8 summits in Heiligendamm and L'Aquila (and the MEF meeting) reinforced this is point vis-à-vis climate change. Climate governance could induce a sustainable change in the G8+5 meetings by reorganizing the group into a true G11. In this sense, the G11 would be grouped according to their economic weight, and explicitly in terms of their political importance for global challenges. The negotiations in Copenhagen underlined the importance of the four po-

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<sup>6</sup> According to Duan Chengwu (analyst of His Global Insight Auto), this situation combined with the firm backing of its most dominant power source, the communist government, creates a great business opportunity for China; see Iveson 2009.

tential climate powers (China, Brazil, India and South Africa). This could be a further step towards a multi-polar world in which the regional powers occupy a central position.

### **3 Communities of Practice and Climate Knowledge Systems**

#### **3.1 The Role of Knowledge, Norms and Practice for Solving Global Crises**

Knowledge and norms play an important role for climate governance. There is reason to believe that actors in the climate regime choose options that conform to a dominant knowledge system or discourse (Breitmeier et al. 2007). A lack of understanding of climate change, as well as the knowledge of technological options to adapt and mitigate, count as inhibiting factors to climate governance in different areas of the world. Evidence of this exists for the Swedish forest sector (see Blennow/Persson 2009), and local climate governance in Durban, South Africa (see Roberts 2008). Knowledge relates to socialization processes. Three branches of research have discussed the social construction of climate change differently: epistemic communities, norm, and discourse-oriented scholars. But it is still not entirely clear what role knowledge plays in inducing change in climate governance mechanisms. The connection between science, knowledge and policy is still not sufficiently conceptualized (see Lahsen 2007)—especially for the non-OECD world to which the regional powers all belong.

Epistemic communities, e.g. the IPCC, are transnational scientific networks that help overcome policymakers' uncertainty by providing policy-relevant knowledge. It is widely acknowledged that scientific knowledge matters for shaping climate governance processes and outcomes. Therefore, it also exerts a certain power. Discourse-oriented scholars critique the epistemic community's research for its dichotomous treatment of interests and knowledge versus power. They do not treat ideas or knowledge as given, but argue that effective governance requires the constant assessment of global and local knowledge-power formations (see e.g. Jasanoff /Martello 2004). Norm research indicates an increasing transnationalization in climate governance. For instance, transnational advocacy networks play an important role in diffusing climate protection norms in China (see Schröder 2008). Other transnational initiatives include cooperative efforts between communities and cities or business partnerships that lobby for climate protection (e.g. 3-C Combat Climate Change); and multi-lateral efforts beyond the UNFCCC regime. The Asia-Pacific Partnership on Clean Development and Climate's technology cooperation is a well-known example for such a multilateral network. In all these initiatives (and therefore across country boundaries and governance levels) ideas, knowledge, and practices are exchanged. Acknowledging the norm-building function of these transnational networks has impacts on global governance and the global order—they are the first steps toward the development of a global civil society (Jakobeit et al. 2009).

But how does this body of research relate to the behavior of regional powers and their strategies for climate governance? What role do norms, ideas and knowledge play for advancing climate governance? Two points are relevant: The first concerns the multi-level quality of climate governance; the second relates to its change and practices.

First, since climate governance simultaneously takes place top-down, bottom-up and across all levels, climate governance is indeed multi-level governance.<sup>7</sup> The linkages between the domestic and international spheres, as well as different actor groups, are acknowledged in the literature. Due to these different types of activities on different levels, climate governance architecture is increasingly fragmented. The production of knowledge, ideas and norms, as well as their diffusion, takes place across many levels. In Brazil, there is a considerable lack of trust between national scientists and policymakers (see Lahsen 2007). Policymakers additionally perceive the IPCC to be dominated by the North, and infer from this a political disadvantage. Science, in this view, becomes situated knowledge and a vector for hegemonic power (Lahsen 2007: 186). By contrast, the Indian government relies a lot more on national scientific advisory institutions than on IPCC reports (see Biermann 2002). Consequently, analyzing the behavior of regional powers in global climate governance, and their possible ideational projects, remains incomplete without taking into account knowledge, ideas, and norms in a more comprehensive way. Those actors who craft and exert a regional powers' foreign policy do not act in a vacuum or in isolation from the developments in their countries. Nor do they act apart from the activities of transnational actors groups. Socialization effects do not recognize or stop at governance levels. All global climate governance is local, and all local or domestic climate governance is global.

Second, constructivist research has established that knowledge, ideas, attitudes, and norms influence how actors behave, and what they actually do. They inform practices, at least to some extent, and practices inform change (see Adler/Pouliot 2009). Under what conditions and to what extent knowledge, ideas, and norms shape regional powers' climate governance, and how change is induced through practices, is not yet clear. My theoretical approach outlined below presents a step towards this. Furthermore, because the solutions for dealing with climate change in terms of concrete adaptation steps or techniques and mitigation technologies are currently under development in many different parts of the world, the exchange of knowledge and best practices is essential. Technology transfer therefore presents a highly contested issue. Exchanges of local adaptation practices are supported by various initiatives, ranging from regional workshops to Internet platforms. Regional powers could play an important role here because of their higher level of development, availability of resources and their leadership role in other issue areas. To what extent some regional powers have already consciously or unconsciously pursued these strategies through state and non-state governance actors have not yet been thoroughly investigated. Given the importance of

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<sup>7</sup> This has been underlined by various authors, see e.g. Brunnengraber/Walk 2007.

climate governance for the economy, for instance, these links between knowledge and climate governance may yet prove to enhance or diminish ideological leadership and projections of region-ness.

### 3.2 Emanuel Adler's Theory of Cognitive Evolution and Communities of Practice

The theory of cognitive evolution and communities of practice builds an appropriate starting point for an analysis of change in climate governance. It has been developed by Emanuel Adler as a process-based, communitarian approach to explain change in international relations. While international relations is the major field for analyzing regional powers, in climate governance, as stated, processes on other levels need to be integrated in order to fully understand the strategies of regional powers. Adler himself proposes the application of his theory to the environmental field on international, transnational and national levels (Adler 2008: 223). I outline the essentials of his theory below.

Adler's theory concentrates on collective learning and the evolution of widespread knowledge. Communities of practice are informal, dynamic social structures that cut across levels of society, and may transcend country boundaries as well. They consist of like-minded people who learn from each other and share practices that embody the knowledge the community develops, shares and maintains (see Wenger et al. 1998). In contrast to social networks, members also develop an identity and have a "sense of joint enterprise" (Adler 2005: 15). In this way, members are connected without ever necessarily meeting each other. Rather, they are bound by the exchange of knowledge, ideas and practices. Communities of practice can take different forms, such as security communities, epistemic communities or transboundary advocacy networks. Because they "encompass the social space where structure and agency overlap, and where knowledge power and community intersect," (Adler 2008: 199), the concept can serve as an umbrella concept. Cognitive evolution is Adler's term for a collective learning process. It explains how communities of practice establish themselves; how their background knowledge diffuses and becomes institutionalized; how their members' expectations and dispositions become preferentially selected; and how social structure spreads. Cognitive-evolution theory helps reveal why certain ideas become practices and how practices evolve (Adler 2008: 202).

According to his understanding, knowledge is more than the individual information held by a person, but also the "inter-subjective, background or context of expectations, dispositions, and language that gives meaning to material reality" (Adler 2005: 4). He differentiates between four dimensions of knowledge—scientific, technological, ideological, and normative—and connects these to institutional and productive power (Adler/Bernstein 2005: 300). Processes of cognitive evolution can change these background dispositions, as well as the inter-subjective collective social structures that Adler also calls epistemes. An episteme is "the sum of collective understanding and discourse about *material capabilities, knowledge* [...],



*legitimacy* [...] and *fairness* [...]” (Adler/Bernstein 2005: 300). Cognitive evolution—and therefore a change of epistemes through the activities of communities of practice—means the institutionalizing of new conceptual categories that people can draw on. This process follows the stages of creation, selection, diffusion and institutionalization (Adler 2005: 75). Events that take the form of (or are perceived as) a crisis can jump-start processes of cognitive evolution.

The notion of epistemes has a certain degree of fuzziness to it; in terms of the research process, the problem of measurement immediately comes to mind. Therefore, I do not employ this conceptualization, but focus on knowledge. In his more recent texts, Adler advocates for a practice turn, which means that he shifts practices as a conceptual term to the center of his theory. Practices—understood as socially meaningful routine practices or that what people actually do—present the core that rests between structure and agency. Practices therefore have the potential to connect the different “-isms” present in international relations (Adler/Pouliot 2009). Thus, Adler tries to synthesize constructivist and rationalist approaches. He continues to build on constructivism, but moves somewhat closer to pragmatism. In his own words: “My approach offers a pragmatist reading of rationality that takes strategic construction into account” (Adler 2008: 222). In the next section, I explain how a concept of knowledge systems based on Adler’s theory can provide the necessary extension for the analysis of regional powers in climate governance. I also show the advantages of a pragmatist philosophy for the analysis of climate governance. Consequently, I advance the theory of communities of practice and cognitive evolution towards pragmatism, both philosophically and methodologically.

### 3.3 Climate Knowledge Systems

The previous sections have shown that there is reason to assume a connection between knowledge and climate governance mechanisms. Climate governance can be defined as “all purposeful mechanisms and measures aimed at steering social systems toward preventing, mitigating, or adapting to the risks posed by climate change” (Jagers/Stripple 2003: 338). This definition becomes less general when climate governance mechanisms are understood as purposeful practices that are actually performed in some way to achieve mitigation or adaptation: Clear activity and efforts towards implementation are required, even if effectiveness cannot be measured. Knowledge, and more specifically knowledge systems, could present one of the key factors shaping the climate governance strategies that evolve in China, Brazil, India and South Africa. I hypothesize that the existence and characteristics of climate knowledge systems are a necessary but insufficient condition for the emergence of climate governance. In an empirical test, climate knowledge systems would be the independent variable, and climate governance mechanisms the dependent variable. If evidence for this is found, a subsequent hypothesis concerning regional powers’ foreign policy could be: The characteris-

tics of climate knowledge systems decisively impact regional powers' behavior in global climate governance.

I draw on Adler's definition of knowledge with its four dimensions: scientific, technological, ideological, and normative. Applied to climate governance, scientific knowledge refers to the consensual understanding of climate change<sup>8</sup>, models and projections, impacts and explanations climatologists provide about climate change. Technological knowledge includes the available tools and options for adaptive and mitigative measures. Here, a relation to innovation or research and development exists. Ideological knowledge refers to a set of beliefs about the relation between humans and nature or economic development versus the environment—a basic “green” or “non-green” attitude. Normative knowledge then means the assessment of climate change-related issues as good or bad, e.g. that reducing GHG emissions is good and should be promoted.

Climate knowledge systems are my advancement to the theory of communities of practice and cognitive evolution. Climate knowledge systems consist of the following (see also Figure 1):

- (1) *Knowledge*. It is individual and inter-subjective (normative, ideological, scientific, technological), and influences actors' behavior and is shaped by:
- (2) *Different communities of practice*. These can (but do not have to) have members from different backgrounds and different levels. Some of these communities may primarily produce knowledge, while others primarily diffuse this knowledge or develop and exchange practices. These communities hold a certain institutional and productive power.
- (3) *A knowledge-related climate change discourse*. It helps the selection and diffusion of new conceptual categories.
- (4) *Dynamic boundaries*. There are no strict boundaries of the knowledge system, because different communities of practice influence processes of selection and diffusion. In an ideal process, new widespread conceptual categories and practices come surface in a manner that provides the climate knowledge system with a dynamic character.

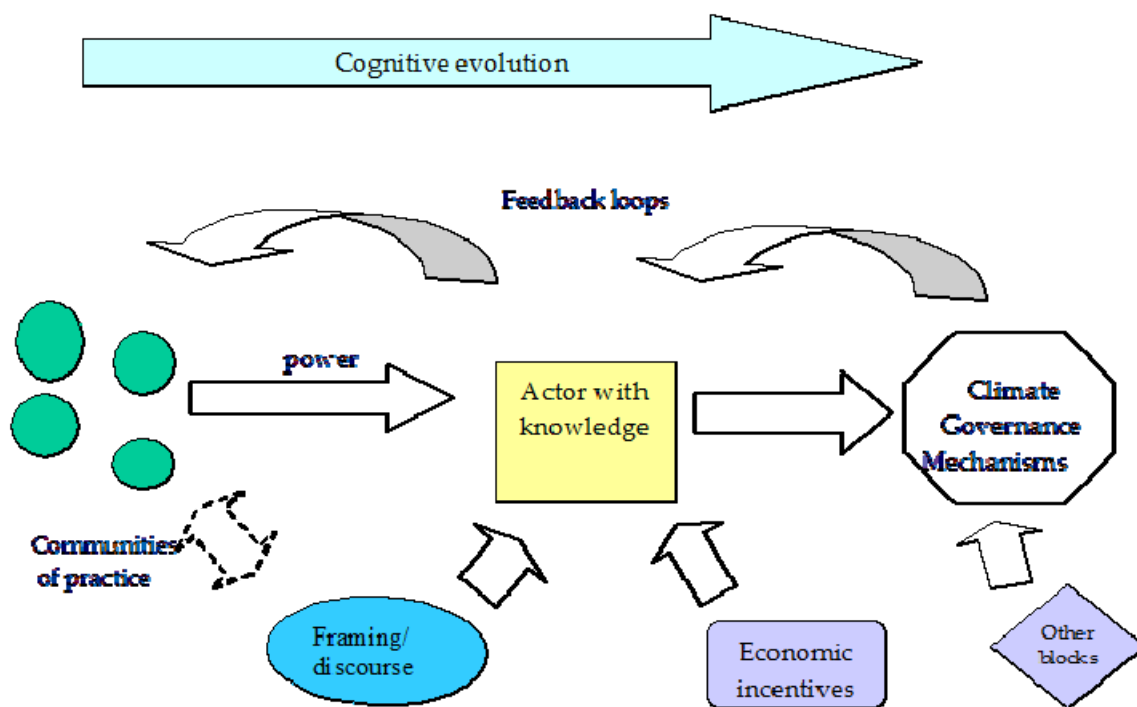
Bridges to studies that could focus more explicitly on discourses or climate norms form a part of my concept. The definition of knowledge that I employ has a normative component to it. In the theory of cognitive evolution, ideas, attitudes, knowledge and discourse are not isolated from each other. However, to keep the concept of climate knowledge systems manageable, discourses need to be treated as existent and somewhat independent. In Adler's understanding, communities of practice produce a discourse or language that corresponds to their practices and knowledge. While I do not contest this completely, I would argue that other actors outside the overall climate discourse (e.g. the media) exert an influence on it as well. Moreover, Adler doesn't differentiate between discourse and practice. I agree with this only

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<sup>8</sup> While the outcomes of specific models or projections may be somewhat contested between climatologists, the overall existence and dynamics of climate change are not.

to some extent within the communities of practice. In most cases, discourse or language and the real action may correspond. But there is enough reason to believe that saying one thing in climate governance doesn't necessarily correlate to a corresponding action, i.e. actually instituting and enforcing a mechanism that adheres to a community of practice's approach. In an empirical application, the question would therefore be: What effects does the discourse have on climate governance and on actors' decision making? Tracing its development in detail would be a good starting part for an additional discourse-analytical study. The state of development of regional powers (i.e. as "advanced" developing countries) requires the integration of economic incentives or the economic strategy in any empirical study treating climate governance. Moreover, it is possible that other building blocks, e.g. economic incentives, impact climate governance (see Figure 1). This has to be empirically tested.

**Figure 1: Sketch of a Climate Knowledge System**



Source: Author's own compilation.

By allowing for economic incentives as another independent variable (or hindrances, if the necessary financial resources do not exist) in addition to other influencing factors, I take a pragmatic position that truly starts from the research question. I do not negate any explanation a priori for ontological or epistemological reasons. Finding an explanation or interpretation to cope with a specific problem takes precedence over abstract analytic principles. In terms of epistemology and ontology, pragmatism means that meta-theoretical debates such as the question of structure and agency are somewhat avoided. There are different strands of

pragmatism in political science, and none of them support an “anything goes” approach. I understand pragmatism in the form of analytical eclecticism, as proposed by Peter Katzenstein and Rudra Sil. In their view, it means expanding the range of available concepts, assumptions, methods and empirical data. The aim is not to build a genuine synthetic, unified theory. Instead, analytical eclecticism focuses “on a given problem and assumes the continued existence of, and growing engagement between, competing research traditions” (Katzenstein/Sil 2008: 118).

In terms of methodology, pragmatism enables the use of multiple methods, both qualitative and quantitative. Mixed methods approaches are often undertaken for the purpose of significance enhancement. This is relevant for analyzing complex, hard-to-measure problems. Therefore, many mixed methods researchers defend pragmatism as their philosophical stance. Indeed, I propose an explicit mixed-methods approach for testing my concept of climate knowledge systems as well as for enhancing the analytical framework for regional powers. Looking at complex multi-level influences, like those found in climate governance, and discerning their relevance for the foreign policy standing of regional powers becomes easier to handle if the research question can be investigated with all (promising) data collection methods. Moreover, if practices come into focus, the problems of too few cases and designation of variables may be attenuated somewhat. Concrete practices in specific issue areas could become cases, with communities of practice presenting the hinge between governance levels or domestic and international policy/governance strategies. Additionally, concentrating on practices and communities of practice (e.g. in the concept of knowledge systems) enables the extension of a regional powers framework beyond the state. Communities of practice in a specific governance field function either as dependent or independent variables, depending on the focus of the prospective study. The reintegration of (empirical) results into the overall regional powers network could take place via an encompassing explanation of change that looks for explanatory factors beyond international relations.

#### **4 Drivers, Obstacles and Change in South Africa’s Climate Governance**

In this section, I present empirical data relating to the drivers of, and obstacles to, climate governance in South Africa with specific emphasis on the relevance of knowledge and communities of practice. In line with the mixed methods approach, the data presented are taken from the Carbon Disclosure Project (CDP)<sup>9</sup> and an online expert survey conducted in September/October 2009 that included both open and closed, scaled questions. Expert surveys, also termed expert judgments, are located between the qualitative and quantitative method.

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<sup>9</sup> The CDP is an independent non-profit organization that conducts a survey on corporate climate change activities. Each year, the survey is sent to the top 100 or 200 companies listed at the stock exchange in various countries.

The number of experts (i.e. sample size) is not as relevant as in other surveys; it's the level of expertise of the participants that matters (see Benoit/Wiesehomeier 2009). In this survey, only seven experts<sup>10</sup> have participated this far. Therefore, the results presented here are tentative and should be understood as early indicators that require follow-up<sup>11</sup>. Given that major parts of the climate knowledge system are hard to measure directly (e.g. the different dimensions of knowledge), a mixed-methods approach is suitable. The rationale for mixing is significance enhancement.

There is unanimity among the experts participating in the survey that the most important development in South Africa's domestic climate governance is the Long Term Mitigation Strategy (LTMS), published in June 2008. Moreover, all agree that a change in the general attitude toward climate change has taken place, beginning about five years ago and accelerating in the past two-to-three years. In 2004, the first national climate strategy was published. Activities focused primarily on awareness raising, to which the first round of the CDP survey in 2007 contributed as well. The change in South Africa's international position, described above, seems to be paralleled by the increasing domestic levels of activity of various actor groups. In March 2009, the second national climate change summit since 2004 took place. It initiated the development of a White Paper that specifies sectoral, regulatory, and fiscal measures. To give sufficient room for the inclusion of the Copenhagen outcomes, some 900 delegates participating in the summit agreed on the translation of the White Paper into policy and law by 2012.

The results and reports of the CDP can serve to illustrate some of the developments taking place in the corporate world. Moreover, in mixed methods research it is possible and reasonable to formulate different research question for the qualitative and quantitative parts, each of which contribute to answering the overall research question of the study. For this empirical demonstration of the concept of climate knowledge systems, the overall research questions would be: What kind of climate knowledge system exists in South Africa and how does it influence climate governance? Given the focus of the CDP, the questions the quantitative CDP data could help to answer are: Are there discernible trends in awareness, perceptions of climate change and governance activities of large and transnational companies in South Africa? Is there an association between the perception of risk and opportunity and the governance measures companies take? I assume that the risk and opportunity perceptions depend—at least to some extent—on the different dimensions of knowledge. Due to variation in sample size, I only look at the CDP results of 2008 and 2009. In 2008, 58 percent of the

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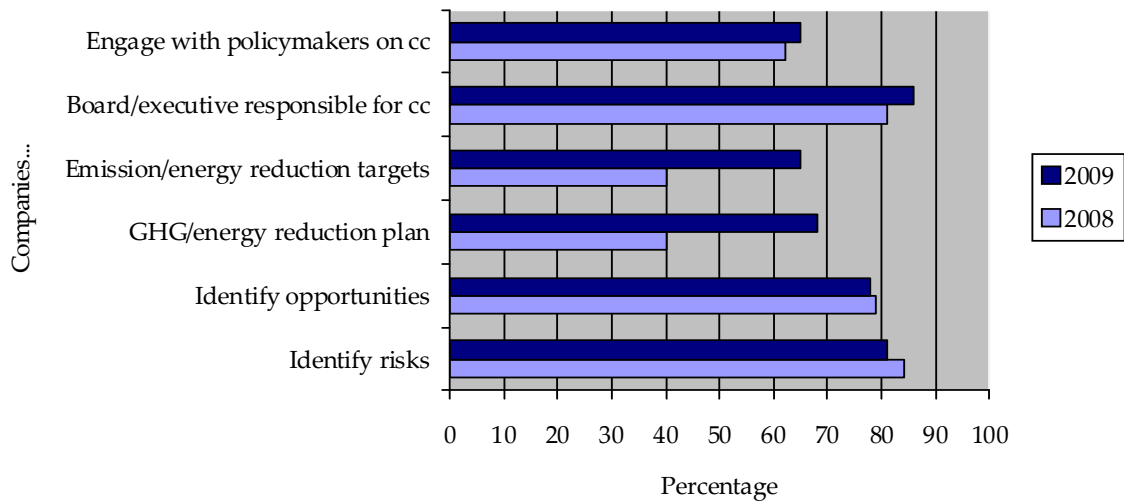
<sup>10</sup> They include: three working academics; one expert representing an environmental civil society association as well as the academic field; and three experts from consultancy and legal sector. The experts were contacted individually due to their activities and reputation in the broader climate field. More than seven experts were contacted, but not all responded.

<sup>11</sup> To strengthen results, semi-structured interviews will be conducted with actors and experts in South Africa. The questionnaire (in paper) will be added to the expert interviews where appropriate.

JSE 100 companies responded, in 2009 68 percent of companies answered the questionnaire. The data and analysis below are only representative for this group of large and transnational companies.

Relevant key trends are depicted in Table 1. They show that the perceptions of risks and opportunities remain approximately the same, with nearly 80 percent of the responding companies identifying some sort of risk and/or opportunity for their company in association with climate change. In the questionnaire, risks and opportunities are further differentiated into regulatory, physical and general risks, and opportunities, respectively. Since the differences are nearly the same within these dimensions, they are taken together in the table. Yet there seems to be an increase in governance activity. More companies have set GHG and energy reduction targets and/or have reduction plans (65 percent and 68 percent in 2009, compared to 40 percent and 40 percent in 2008). The number of companies having a board committee or executive responsible for climate change has increased just slightly (81 percent 2008; 86 percent 2009), as well as the number of companies that engage with policymakers on issues relating to climate change (62 percent 2008; 65 percent 2009). However, these figures have to be treated with care. In many South African companies, risk management generally lies within the responsibility of the executive board. Since most companies classify climate change as a risk, it automatically becomes a board issue (see CDP 2008). With respect to collaboration with policymakers, two points need to be made. First, the dichotomous questions that result in percentages do not differentiate between kinds of collaboration, i.e. lobbying through business associations, direct contact, set-up of public-private partnerships, or other kinds. Second, engaging with policymakers does not necessarily lead to concrete governance measures. Therefore, these frequencies can only serve as rough indicators of awareness and interest in climate governance by companies. Moreover, the frequencies as such do not tell us much about possible associations between risk and opportunity perceptions, and governance activity. The increase in GHG/energy reduction plans and targets is not mirrored by an increase in regulatory risk and/or opportunity perception—this was already high in 2008. Looking only at these frequencies, the picture is not clear.

**Table 1: South African Companies' Response to Climate Change: CDP Key Trends 2008-2009**



Source: CDP Reports South Africa 2008 and 2009. Note: cc denotes climate change.

Therefore, I also analyze some crosstabs, and look at measures of association on the nominal scale (Phi, Cramer’s V). The database consists of the 2008 CDP answers only. For data security reasons, the analysis had to be restricted to the publicly available answers of companies. This reduces the sample size to 47 companies. Moreover, a lot of missing values increased the difficulty of analysis. Still, some tests were possible. When taking the number of companies that identify regulatory risks as an independent variable, and the existence of a GHG reduction plan as an indicator for governance activity as the dependent variable, an association can be assumed with a high level of significance (see Tables 2 and 3).

**Table 2: Regulatory Risks \* GHG Reduction Plan Crosstabulation**

Count				
		GHG reduction plan		Total
		yes	no	
Regulatory Risks	yes	18	14	32
	no	3	3	6
Total		21	17	38

Source: Author’s own calculation.

**Table 3: Regulatory Risks \* GHG Reduction Plan  
Symmetric Measures**

		Value	Approx. Sig.
Nominal by Nominal	Phi	.046	.778
	Cramer's V	.046	.778
N of Valid Cases		38	

Source: Author's own calculation.

This reflects the perception of companies (given in the open-ended questions of the CDP questionnaire) that the regulatory environment will change in the near future. Some companies specifically mentioned the Copenhagen conference and the LTMS (see CDP report 2009). The association test between the companies that identify physical risks due to the impacts of climate change, and those having a GHG reduction plan, is also very high (0.87). This points toward the interpretation that an understanding of the problem of climate change and its impacts (scientific knowledge) leads to climate governance activity, at least for mitigative efforts such as the establishment of a GHG/energy reduction plan as a first step.

Furthermore, it could be assumed that those companies that identify regulatory risks (independent variable) also engage with policymakers in some way to exert influence (dependent variable). Yet levels of significance for this association are low (0.29). This is different for a presumed association between those companies that see physical risks for their company, and the interaction with policymakers (see Tables 4 and 5). Here, a middle level of confidence for the association exists. To understand the relevance of these outcomes, it would be necessary to look at the open-ended questions in the questionnaire and follow results up with qualitative methods. This cannot be part of this paper.

**Table 4: Physical Risks \* Engage with Policymakers  
Crosstabulation**

Count				
		engage with policymakers		Total
		yes	no	
Physical Risks	yes	28	11	39
	no	1	1	2
Total		29	12	41

Source: Author's own calculation.



**Table 5: Physical Risks \* Engage with Policymakers  
Symmetric Measures**

		Value	Approx. Sig.
Nominal by Nominal	Phi	.103	.509
	Cramer's V	.103	.509
N of Valid Cases		41	

Source: Author's own calculation.

How about the identification of opportunities? With the state of climate governance being what currently is, and with the Copenhagen conference approaching, it seems reasonable to assume that those companies that identify regulatory opportunities (independent variable) engage in interaction with policymakers (dependent variable). Due to a high level of missing values (20), this association could not be tested because a misleading picture would result. The same goes for the variables physical opportunities and general opportunities.

In sum, these results do not give a clear-cut answer to the research question posed for the CDP data. Some trends in awareness, perception and activity can be identified by looking at the frequencies. And there is a growing level of awareness and scientific knowledge or understanding among companies. Yet responses differ in comprehensiveness and quality, suggesting that the depth of understanding still varies significantly (CDP Report 2009: 38). For instance, a lot of companies refer to the threat climate change presents to water and energy supply in South Africa, indicating they understood the general predictions of the IPCC and national scientific advisory institutions. However, they fail to generate a specific risk analysis for their company (see CDP 2008; 2009). Prospective reputational risks are often referred to because companies see public awareness of climate change rising (see CDP 2009). More companies have GHG/energy reduction plans and targets, underlining the focus on mitigation and energy efficiency. Concerning adaptation, the state of company activity is much lower (see Vogel 2009). The association between risk and opportunity perception of companies and the measures they take is not quite clear, but the results presented here encourage the pursuit of the question from a different (methodological) starting point. The drivers of climate governance activity of large and transnational South African companies appear to be somewhat influenced by knowledge. Scientific knowledge in terms of the understanding of the problem matters, as well as normative knowledge, seems to play a role, both in the regulatory and reputational area. These results by themselves do not give any definite answers about the drivers of climate governance or the existence and influence of climate knowledge systems. They merely serve as a point of departure.

In the online expert survey, questions were more comprehensive and more directly targeted my concept. Therefore, a separate research question for this data set is not necessary. I will not present the answers to all questions posed, but highlight the most significant findings. Compared to other emerging economies, five of seven experts rated the state of plan-

ning for climate governance in South Africa as rather advanced<sup>12</sup>. With the same level of agreement, the state of mitigation efforts was judged as being average. In the mean, the state of implementation was rated as average as well (4 experts selected average, 2 rather poor, 1 rather advanced). The state of adaptation efforts appears to be lowest with the mean opinion judging it as rather poor (3 rather poor, 2 average, 2 poor/unsatisfactory). This question and its results are important to recall, as the reader of the level and mechanisms of climate governance have to be seen in perspective to peers; not industrialized countries.

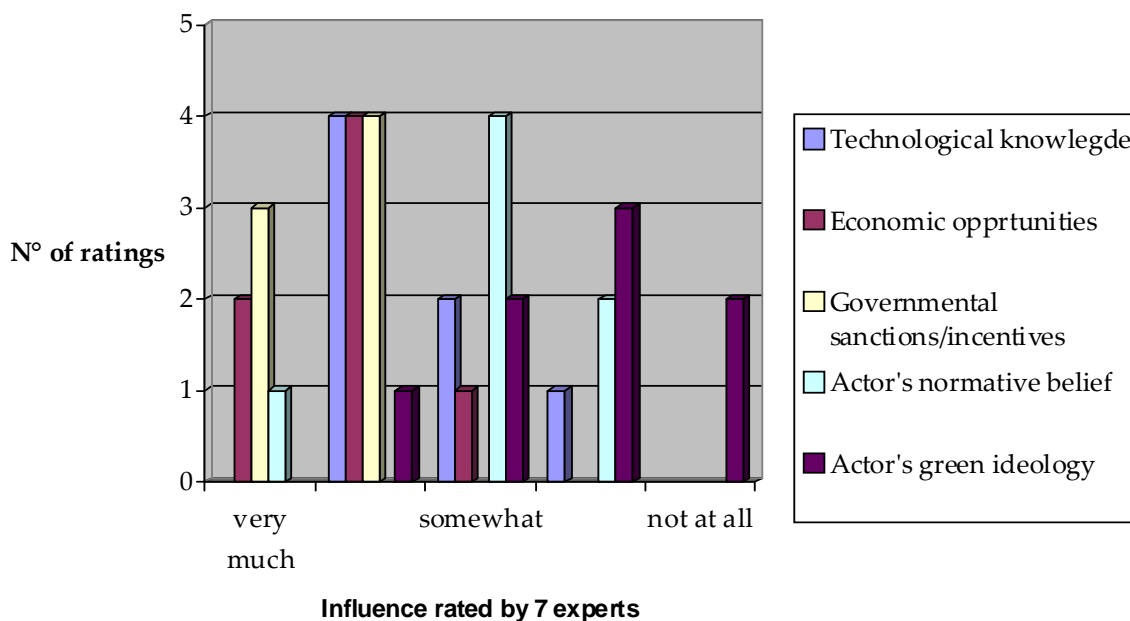
The survey shows that the most relevant drivers of climate governance are technological knowledge about mitigation and adaptation options, economic opportunities and governmental incentives/sanctions. Actors' belief that climate change is happening, and it is good to control it, influences to some extent, and the relevance of actors' green ideology is judged to be less relevant as a driving force (see Table 6). I also asked the experts to rate a list of possible obstacles to climate governance in South Africa. Here, the understanding that climate protection measures hinder economic growth, and a lack of awareness and understanding of the problem, were seen as very much of a hindrance by most experts. A lack of financial resources, a lack of technological knowledge about mitigation and adaptation options, as well as actors' understanding that climate change is a problem industrialized countries need to solve, all present somewhat of an obstacle (see Table 7).

These results indicate that scientific and technological knowledge present an important driver of climate governance, but that this knowledge is still very much lacking, thus slowing down progress in South Africa's climate governance. In a set of further questions aimed at technological knowledge in particular, results show that this lack is more of a problem in adaptation than mitigation, and more on the sub-national than on the national level. Large national and small and medium enterprises were also assessed to have more problems with insufficient technological knowledge than transnational companies. Yet judgments were not clear-cut here. This would have to be further investigated with an expansion of the expert sample and alternative qualitative methods such as semi-structured interviews.

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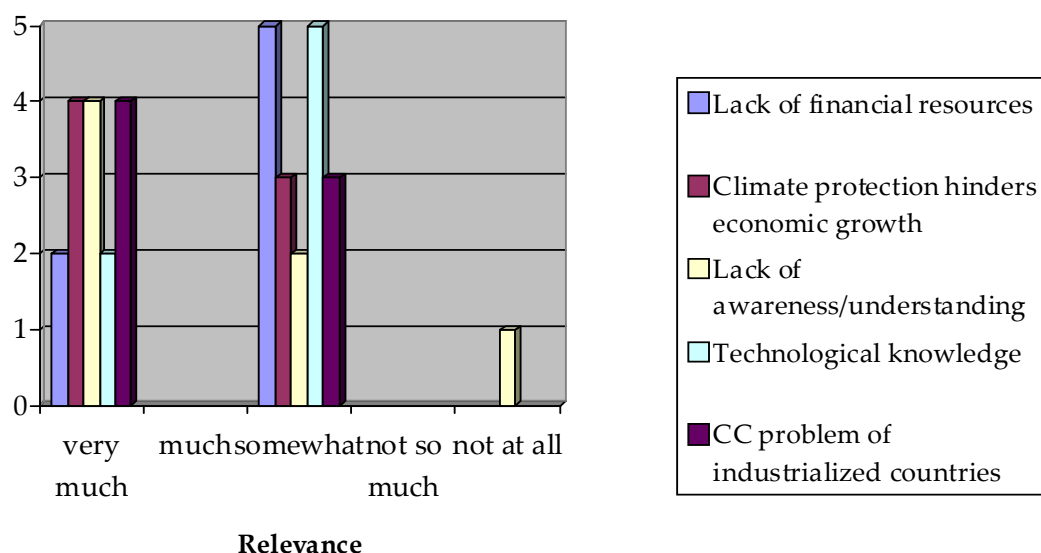
<sup>12</sup> The question had a Likert-Scale answer grid, ranging from very advanced to poor/unsatisfactory.

**Table 6: Drivers of Climate Governance in South Africa**



Source: Author’s own calculation.

**Table 7: Obstacles to Climate Governance in South Africa**



Source: Author’s own calculation.

In addition, respondents were asked to identify and rank the most influential actors in South Africa’s climate governance field. Government and state officials on the national level clearly

came first, with six experts ranking them in first place. National scientific advisory institutions were ranked as the second most influential actor group by three experts, with the rest of the judgments on the second rank splitting between large and transnational companies (including Eskom, the state-owned electricity provider), government and state officials at the sub-national level, and environmental civil society organizations. Significantly, no expert chose communities of practice in this question. This could be due to the fact that the concept of communities of practice was newly introduced in the survey, or it could point to a lack of power of these communities—if they exist at all in South Africa. Therefore, in a different section of the survey, experts were asked to select a statement about communities of practice in the climate field that comes closest to the situation in South Africa (see Table 8).

**Table 8: Communities of Practice in South Africa**

Statement Corresponding Most to the Situation in South Africa	No of ticks
There are no communities of practice.	-
There are some communities of practice in the climate field that try to establish new ideas and practices across society, but they do not have enough power to diffuse them effectively.	5
The number and power of communities of practice are growing, so that a change in general ideas, and practices of how to deal with climate change, are taking place.	2

Source: Author's own calculation.

Clearly, all experts agree that communities of practice exist. Most also state that they lack the power to diffuse their ideas effectively, while two experts agree that communities of practice are growing, and already play a significant role in climate governance. Again, this requires further investigation. Taking these results together with the answers to the other parts of the survey and the CDP results the question becomes: What meta-inferential conclusions can be drawn for the existence and influence of a climate knowledge system in South Africa?

It has become clear that a change in attitude, perceptions and some practices is currently taking place. Also, the different dimensions of knowledge, especially scientific and technological knowledge, play an important role in advancing climate governance in South Africa. These results can be taken as the first evidence of the theory of cognitive evolution and the concept of climate knowledge systems. There seems to be some sort of climate knowledge system emerging, even if the exact role and influence of communities of practice cannot be determined. Their power appears to be somewhat limited, but processes of change are taking place in which they are active. It needs to be further investigated as to who belongs to these communities of practice and at which level, and through what exact processes they influence—or at which points change occurs, and where it grinds to a halt. Moreover, the drivers of climate governance activity in the corporate world, as well as in other actor groups, require further investigation with other methodological (primarily qualitative) tools.

The tentative empirical evidence points to a combination of risk and opportunity perception, knowledge, and economic opportunities. Knowledge, norms, practices and economic incentives/resources therefore occupy central functions in South Africa's climate governance. The implications of these first empirical results for South Africa's overall role as potential climate power are two-fold. On the one hand, the evolution in ideas, knowledge, and practices between the levels correspond and perhaps mutually reinforce each other. On the other hand, different actor groups and communities of practice could reinforce the international role as a regional power in the climate issue area if the beginning change spreads and is reflected in expanding climate governance measures and efforts on multiple levels. Therefore, taking its international position, as well as the development at domestic and transnational levels as depicted here, South Africa can be termed a climate power in the making.

## 5 Conclusion

The power shift towards China, India, South Africa and Brazil has a decisive impact on global climate governance. Their reactions and strategies in the face of climate change are central to the quality and effectiveness of the global response. I have argued that these four countries are (potential) climate powers—a final classification depends on in-depth empirical studies on the climate governance activities taking place, both domestically and concerning their respective regions. To undertake these empirical studies the analytical framework for regional powers as used by GIGA needs to be extended. It has to account for the multi-level dynamics in climate governance. The concept of climate knowledge systems and communities of practice presents a point of departure for this. The production and diffusion of knowledge takes place across governance levels. It is closely connected to ideas, norms and attitudes that together account for the socialization processes of governance actors and inform practices. Climate knowledge systems and communities of practice could play an important role in inducing change—a change that may start crosscutting national, local or transnational levels before it impacts the climate foreign policy of the regional power as such. Thus, communities of practice may fulfill the function of an interlink or hinge.

A stronger focus on practices and pragmatism that avoids the paradigm wars, and connects research schools to some extent, appears viable. Methodologically, pragmatism, if understood as analytical eclecticism, opens up ways to understand complex phenomena such as climate governance without a priori ruling out the explanatory power of some factors due to abstract philosophical reasons. This is essential for the development of an encompassing, dynamic framework for the analysis of regional powers beyond international relations. For the analysis of regional powers' behavior in (global) climate governance, taking practices into account in a more pragmatic way could help to solve the methodological problems of identifying variables and cases to compare.

The tentative results for South Africa presented in this paper show early evidence for the theory of cognitive evolution and the concept of climate knowledge systems. Knowledge plays an important role in advancing South Africa's climate governance. Communities of practice in the climate field exist, but their power to diffuse their ideas appears to be somewhat limited. Further empirical work is required to clarify and strengthen these tentative results, and not only for South Africa. This will show the strengths and weaknesses of the theoretical approach presented here.

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