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Institutional coordination arrangements as elements of policy design spaces: insights from climate policy

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Abstract

This study offers insights into the institutional arrangements established to coordinate policies aiming at the mitigation of and adaptation to climate change. Drawing on the literature on policy design, we highlight institutional arrangements as elements of policy design spaces and contend that they fall into four categories that either stress the political or problem orientation of this activity: optimal, technical, political, and sub-optimal. We use original data on 44 major economies and greenhouse gas-emitting countries to test this expectation. These data capture various properties of national coordination arrangements, including the types of coordination instruments in place, the degree of hierarchy, the lead government agency responsible for coordination, and the scope of cross-sectoral policy coordination. The dataset also captures the degree to which non-state actors are involved in coordination and whether coordination processes are supported by scientific knowledge. Using cluster analysis, we show that the institutional arrangements for the horizontal coordination of climate policy do indeed fall into the four above-mentioned categories. The cluster analysis further reveals that a fifth, hybrid category exists. Interestingly, the political orientation dominates in the institutional arrangements for the horizontal coordination of climate change mitigation, whereas the problem orientation is more important in the arrangements for the horizontal coordination of climate change adaptation.

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Introduction

One way of thinking about policymaking is to consider it as a design task (Howlett, 2014). Such a conception entails the consideration not only of specialized aspects of one policy measure, but also of how the measure concerned will be at least partly affected by other policy measures (Peters, 2018). Both academics and practitioners have called for adopting exactly this analytical lens on policymaking. For example, in 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, which comprises 17 Sustainable Development Goals (SDGs). Remarkably, Target 14 of SDG 17 stipulates the improvement of "policy coherence" for sustainable development (Tosun & Leininger, 2017; Wong & van der Heijden, 2019). Coherence refers to a constellation in which sets of policy instruments do not contradict each other (Sewerin, 2020, 192), which itself requires policy design. The *process* through which policymaking attempts to design coherent sets of policies is coordination (Candel & Biesbroek, 2016; Cejudo & Michel, 2017; Peters, 2015, 2018; Tosun & Lang, 2017; Trein & Ansell, 2021; Trein & Maggetti, 2020; Trein et al., 2019).

Research differentiates between *horizontal coordination*, which targets the policy activities of different sectoral actors working at the same level of government, and *vertical coordination*, which refers to linking the policy activities of actors at different levels of government (Peters, 2015, 2018). Vertical coordination is particularly important in multilevel systems in which subnational governments have high degrees of autonomy, since otherwise the central government would have difficulties in steering the political system as a whole. Of these two types, horizontal coordination is considered more challenging because it entails linking different policy sectors and therefore different policy subsystems, which each function according to their own logic.

In line with the dominant perspective in policy studies, we concentrate on institutional arrangements for the horizontal coordination of policy measures for the mitigation of and adaptation to climate change (see, e.g., Bauer et al., 2012; Biesbroek, 2021; Radtke et al., 2016). We define institutional arrangements as a set of organizational forms designed and deployed to facilitate climate policymaking by bringing together actors from different sectors such as inter-ministerial working groups.

Theoretically, the point of departure of this study is the literature on policy design spaces (Chindarkar, Howlett, and Ramesh 2017; Howlett & Mukherjee, 2014, 2018; Howlett et al., 2015). Institutional arrangements for the horizontal coordination of climate policy are an element of policy design spaces (e.g., Linder & Peters, 1991), but they have received less explicit attention than other elements of design spaces. We build on a classification put forth by Chindarkar, Howlett, and Ramesh (2017), which describes design spaces along two dimensions: The first concerns whether decision makers actually intend to solve a problem or whether other considerations (such as bargaining or log-rolling) are more important; the second dimension concerns whether a government can actually be instrumental in its actions, meaning that it has the necessary capabilities to solve a problem.

In this study, we assess whether these types of policy design spaces can indeed be observed and to which degree the existing policy design spaces match the ideal types put forth by Chindarkar, Howlett, and Ramesh (2017). More precisely, we contribute to the literature by developing an operationalization of the policy design spaces and showing that the ideal types identified in the conceptual literature can be observed empirically.

We investigate an original dataset on the institutional arrangements for the horizontal coordination of climate policy in 44 advanced market democracies and transition countries, which constitute the major emitters of greenhouse gases (GHG) and therefore contribute

to climate change on a global scale. We use cluster analysis to show that the national institutional arrangements for the horizontal coordination of climate policy can indeed be assigned to the categories identified by Chindarkar et al. (2017). Further, we make the influence of problem definition on policy design spaces visible by showing that horizontal coordination differs depending on whether governments use them for the coordination of mitigation or adaptation policies.

The remainder of this article unfolds as follows. First, we give an overview of the literature on policy design and discuss the role of institutional arrangements for horizontal coordination therein. Next, we explain the motivation/reasoning behind our analytical perspective and provide clarifications on the methodological approach. We then turn to the presentation of our empirical findings and discuss their implications for the literature on policy design. In the final section, we offer some concluding remarks.

The policy design perspective on institutional arrangements for horizontal coordination

According to research on policy design, policy formulation is based on knowledge about how policy tools affect policy addressees and their behavior and is aimed at the attainment of a set of desired policy objectives (Capano & Pavan, 2019; Chindarkar, Howlett, and Ramesh 2017; Daugbjerg & Sønderskov, 2012; Howlett & Mukherjee, 2014; Howlett et al., 2015; Howlett & Rayner, 2007). In other words, this perspective emphasizes that policy problems can best be addressed if policymakers analyze them and come up with an appropriate policy design. The design orientation includes the need for policy analysis and coordination and is therefore inherently process-oriented, which makes it a good fit for this Special Issue (Cejudo & Trein, 2022). Consequently, by developing an improved understanding of policy design, we are also likely to develop a better understanding of the process of horizontal policy coordination.

The study of policy design dates back to the 1970s and 1980s and is associated with the work of prominent public policy scholars such as Christopher Hood or Guy Peters (Howlett et al., 2015). However, it was Michael Howlett who, in collaboration with various co-authors, breathed new life into this concept, among other things, by delineating the old approach to policy design from the new one (Howlett, 2014). The new take on policy design provides an ideal point of departure for this study since it incorporates the main arguments of the first-generation scholars while providing an updated and expanded version of the concept. Most importantly, the modern formulation of policy design stresses that not only technical considerations explain policy design, but also political factors (Chindarkar, Howlett, and Ramesh 2017; Howlett, 2014; Howlett & Mukherjee, 2014, 2018; Howlett et al., 2015).

Policy design takes place in so-called policy design spaces, which Howlett and Mukherjee (2014), in their benchmark publication, define as the degree to which a government is instrumental in its actions as well as the level of knowledge and other resources it has. The authors associate a high level of instrumental intention and knowledge with a *capable policy design space*. The other extreme is the *poor political non-design space*, in which it is not the intention to solve a problem that dominates, but considerations such as bargaining, corruption/clientelism, log-rolling, and electoral opportunism. If a government intends to solve a problem but has low levels of knowledge or other resources, this creates a *poor*

policy design space, whereas high levels of knowledge or resources and a low instrumental approach result in a *capable political non-design space*.

Chindarkar, Howlett, and Ramesh (2017) offer a modified version of the model originally put forth by Howlett and Mukherjee (2014). We embrace this model because it provides an even more rigorous argument as to why policy design should be affected by both *problem* and *political* considerations. Further, their model employs a more straightforward terminology for denoting the different policy design spaces.

According to Chindarkar, Howlett, and Ramesh (2017), an *optimal design space* is characterized by high-profile policymaking in which the interests and goals of both politicians and technical analysts and advisors are congruent. A *technical design* space facilitates legal–technical policymaking which pays little attention to legitimacy or the political feasibility of the policy tools. Policymaking in a *political design space* is driven by electoral considerations and therefore predominantly politically motivated, which may come at the expense of the technical feasibility of the policy tools developed. Low-profile policymaking that disregards both political and technical analyses corresponds to the *sub-optimal design* space (Chindarkar, Howlett, and Ramesh 2017).

Policy design spaces include considerations of the public capabilities and resources pertinent to policy formulation (Linder & Peters, 1991). In our view, such capabilities and resources materialize within the institutional arrangements in place for policy design. Chindarkar, Howlett, and Ramesh (2017) acknowledge that the policy design space comprises capabilities and resources, but they give more weight to the intention of governments to enact policies as the key characteristic of such spaces. We complement the reasoning offered by Chindarkar, Howlett, and Ramesh (2017) by focusing explicitly on institutional arrangements, and therefore on capabilities and resources. Put differently, we decompose the authors' definition of policy design spaces and assess the robustness of the underlying conceptualization by limiting the analysis to the institutional dimension.

Conceptualization

What is the best way of conceptualizing the dimensions put forth by Chindarkar et al. (2017) when it comes to the horizontal coordination of climate policy? Our conceptualization draws on several different sources, including academic publications and policy documents published by international organizations. What ties our inductive approach together and connects it to Chindarkar's, Howlett's, and Ramesh's conceptualization is that we seek to capture the institutional arrangements that are likely to strengthen the political or the problem dimension in designing climate policy.

We first turn to how we measure the political dimension, i.e., the degree to which coordination is backed by high political levels. We postulate that the involvement of the *head of government* is an important criterion for policy design to become a politically high-profile activity. The United Nations (2018), for example, has stressed the importance of the head of government for effective horizontal coordination. Similarly, the *level of government* where coordination takes place can be expected to affect how policy design takes place. In this regard Breuer, Leininger, and Tosun (2019) note that for the effective coordination of complex policy issues, both high-level political actors and representatives from the lower working levels of government should be formally involved in decision making. Based on this reasoning, we contend that we need to differentiate between institutional arrangements and whether and to what

degree members who belong to the *cabinet*, the *ministries*, or a *technical* agency are active in them.

Institutional arrangements usually follow a certain hierarchy, from which it follows that some constitutive units are chosen to lead activities. Therefore, the next dimension concerns the question of which ministry or other institution is acting as that *lead agency* that steers the coordination process. Identifying the agency with steering responsibility can bring about important insights into a government's intentions in relation to solving a particular policy problem, which aligns directly with the conceptualization of Chindarkar, Howlett, and Ramesh (2017). To illustrate this point, if national climate policies are coordinated by a ministry in charge of governing environmental issues or climate change, this may be conducive to a higher willingness to take climate action. However, environmental ministries tend to be less powerful in intragovernmental bargaining compared to key economic sectors (Jordan & Lenschow, 2010). Governments tend to adopt relatively simple coordination structures for climate policy in which a ministry of the environment presides over the other relevant line ministries. In some countries, however, there exist *secondary lead agencies* that assume some coordination responsibility, which our measurement captures as well. In other cases, though, there exists no designated lead agency and the agencies involved operate in a more bottom-up fashion.

Another dimension concerns the steering logic inherent in institutional arrangements and whether it corresponds to a *hierarchical mode* or one in which agencies operate without clear hierarchies. On the one hand, Radtke et al. (2016), for instance, note that institutional arrangements without clear hierarchies may be more likely to be effective for achieving horizontal coordination. On the other hand, there is good reason to expect that institutional arrangements with clear hierarchies and a powerful steering unit are more likely to enable policy design by overcoming sectoral interests.

We now turn to the second dimension, the problem orientation, which shows whether a government directs technical and analytical foci toward solving the policy problem at hand and whether it is congruent with the political priority setting identified in the first dimension. We include *government agencies* important for the provision of specific knowledge, such as statistical offices. We expect such agencies to possess a high level of technical knowledge about their specific field (Bach et al., 2012). We thus contend that involving representatives from government agencies in horizontal coordination should benefit the policy design process and capture their involvement in our dataset.

The involvement of *external stakeholders* from academia, the private sector, and civil society will also affect the problem orientation of policy design, especially when the technical–analytical capacities of public bureaucrats is low (see Howlett & Wellstead, 2011). In some cases, actors are not official members of institutional arrangements for horizontal coordination but are organized into auxiliary institutions, such as expert groups or scientific councils, which support political and administrative actors in the policy process. We capture this situation as one where *knowledge support* is provided to policymakers. Depending on the specific constellations of the political and problem orientations, the institutional arrangements for climate policy design will allow for the emergence of an optimal, technical, political, or suboptimal design space (see Fig. 1).

		Political orientation: Head of government/level of government involved	
		High	*Low*
Problem orientation:	*High*	Optimal design space	Technical design space
Agencies involved, stakeholder			
participation, knowledge	*Low*	Political design space	Sub-optimal design space

Fig. 1 Possible design spaces for horizontal climate policy coordination

Operationalization

To obtain data on the existence and characteristics of the bodies responsible for the horizontal coordination of climate policy, we relied on the governments' national communications and biennial update reports to the United Nations Framework Convention on Climate Change (UNFCCC) published between 1990 and 2020. Where necessary (for reasons of data quality) and available, we complemented these materials with information retrieved from other sources such as scientific publications, newspaper articles, legal documents, and official government websites.

In total, we identified 119 coordination bodies (together with 35 coordinating ministries or steering units without the capacity for cross-sectoral coordination) in 44 countries. Thirty-eight of the countries selected are members of the Organization for Economic Cooperation and Development (OECD). The other six countries form the BRIICS group, namely Brazil, Russia, India, Indonesia, China, and South Africa. Table 1 gives an overview of the coordination bodies and/or coordinating ministries or steering units which we could identify in the national communications and UNFCCC biennial update reports. Of all countries included in the sample, Luxembourg is the only one for which we could not identify any coordination body or central steering unit.

The differentiation between mitigation and adaptation is not part of our conceptualization of institutional arrangements for the horizontal coordination of climate policy. From an empirical viewpoint, however, it appears reasonable to expect the institutional arrangements to have specific characteristics depending on whether they focus on adaptation, mitigation, or both. With climate change mitigation, we expect coordination bodies to be located at higher levels of government and to observe more centralized or hierarchical institutionalized arrangements, since mitigation policies are heavily influenced by international cooperation. Given that subnational and local-level actors dominate adaptation-related measures (Lesnikowski et al., 2021), we expect to observe fewer centralized institutional arrangements that facilitate stakeholder participation and for the technical level to be more prominent than the political level. However, research has also shown that climate change mitigation efforts interact with efforts to adapt to climate change (e.g., Chen et al., 2021). Therefore, it is interesting to see what the institutional arrangements look like when they are designed to coordinate horizontally both mitigation and adaptation policies.

Three researchers coded the empirical material. The coders assessed the year in which these coordinating bodies were established, whether their focus is on adaptation, mitigation, or both, which policy sectors they cover, whether a central authority oversees horizontal coordination, at which level of government the central authority is located, whether external stakeholders are involved, and whether the coordinating actors receive institutionalized knowledge support. Table 2 gives an overview of the variables and their operationalization; Table 3 provides the summary statistics.

Table 1 Overview of coordination bodies

Adaptation-specific coordination bodies	Mitigation-specific coordination bodies	Joint coordination bodies	Coordinating ministry only
Australia	Austria	Austria	Luxembourg
Brazil	Colombia	Belgium	
Czech Republic	Czech Republic	Brazil	
Denmark	France	Canada	
Finland*	Germany	Chile	
Germany	Greece	Colombia	
India	Hungary	Costa Rica	
Ireland	Israel	Estonia	
Israel	Italy	Finland*	
Italy	Netherlands	India	
Japan*	New Zealand*	Indonesia	
Netherlands	Slovakia	Ireland	
New Zealand*	South Korea*	Latvia	
Norway*	Spain*	Lithuania	
South Korea*	Turkey	Mexico	
Sweden	United Kingdom	New Zealand	
Switzerland	United States	Poland*	
United Kingdom		Portugal	
United States		Russia	
		South Africa	
		Spain*	
		Turkey	
		United Kingdom	

*Contains missing data; China, Iceland, and Slovenia omitted from table due to completely missing data

We adopted an inductive approach to develop the coding scheme, which means that we started with a few categories for coding the data and expanded these sequentially as we coded. Upon finalizing the coding scheme, we applied it to all the cases coded to ensure that the data were not affected by deviations from the coding rules. To increase the reliability of our data, each coder was instructed to code all 44 countries from our case selection. The resulting codes were subsequently compared, and mismatches were discussed until consensus was reached among all coders. Only then was the dataset finalized.

A limitation to our study is the sub-optimal data availability on the institutional design of coordination bodies in climate change, which results in a large number of missing values across several key variables. This is primarily due to the absence of a central data source and standardized reporting requirements. While the National Communications to the UNFCCC requires parties to report on the institutional arrangements responsible for achieving their climate policy initiatives, they have considerable discretion in deciding what they report and at which level of detail. We observed that many countries did not report horizontal coordination bodies with a high level of detail. Thus, we were not always able to judge whether a coordination body lacked a certain characteristic or if it simply was not reported. Also, it was only possible in a small number of cases to judge whether some

Table 2 Overview of the variables

Variable	Description	Categories
Year	Year in which the mechanism was established	none
Country	Country in which the mechanism was established	none
Level	The level of government where coordination takes place. This variable captures the highest level of government from which institutions are involved in the coordination	1: government agencies, 2: ministerial, 3: cabinet
Hierarchical	Captures whether one or more actors or lead agencies are in charge of steering the coordination progress	0: no; 1: yes
Lead agency	This variable captures the agency in charge or the agency the presiding officer is affiliated with	none
Secondary agency	This variable captures the agencies having a secondary role in steering the coordination process	none
Head of government	Captures whether the head of government is formally involved in the coordination process	0: no; 1: yes
Knowledge support	Captures whether the coordination process is supported with scientific evidence	0: no; 1: yes
Government agencies	Captures whether specialized government agencies are involved in the coordination process (e.g., technical or scientific councils)	0: no; 1: yes
Civil society	Captures whether representatives of civil society organizations are members of the coordinating body	0: no; 1: yes
Private sector	Captures whether representatives from the private sector are members of the coordinating body	0: no; 1: yes
Academia	Captures whether representative from academia are members of the coordination body	0: no; 1: yes
Content focus	Captures whether the coordinating body is responsible for coordination in the realms of adaptation, mitigation, or both	1: adaptation, 2: mitigation, 3: both

Table 3 Summary statistics

	Response categories			
	No	*Yes*		Obs
I. Political dimension				
Head of government	75.4	24.6		110
Hierarchical	19.0	81.0		105
	Cabinet	*Ministerial*	*Government agency*	
Political level	47.6	49.5	2.9	105
II. Problem dimension				
	No	*Yes*		
Knowledge support	43.0	57.0		86
Academia	81.1	18.9		106
Private sector	91.5	8.5		106
Civil society	89.6	10.4		106
Government agencies	70.7	29.3		106

institutional arrangement was still in place following several changes in government or had been discontinued.

One important weakness we thus need to stress is that the quality of reporting may be biased toward the countries with governments that have high ambitions regarding climate change and/or high government capacity. This holds true more generally considering that institutional arrangements do not necessarily have to translate into better climate policy outputs and outcomes. Keeping these limitations in mind, we are still confident that our descriptive analyses will produce important insights into the institutional design of such coordination bodies as well as their strengths and weaknesses.

To unveil empirical patterns that underlie our dataset, we relied on k-means clustering. More precisely, we used this technique to identify groups within the data that showed some internal similarities or significant differences to other clusters. Our objective was to find out whether the types of coordination bodies that exist in the empirical reality corresponded to institutional arrangements that could enable the types of policy design spaces put forth by Chindarkar, Howlett, and Ramesh (2017). Also, we wanted to examine which of those groups dominated in climate policy coordination and see if there were any significant differences between institutional arrangements that were set up to coordinate adaptation, mitigation, or both jointly. Ideally, this would enable us to formulate clear implications for the design of future coordination bodies. Therefore, after successfully identifying the clusters, we analyzed the institutional design patterns in each cluster using descriptive statistics.

To determine the number of clusters, we relied on the elbow criterion. We entered the variables *head of government*, *hierarchical*, *political level* (representative of the political dimension), *knowledge support*, *government agencies*, *civil society*, *private sector*, and *academia* (representive of the policy dimension) into the analysis and executed it for all ks between one and eight. We then plotted the within sum of squares (WSS) for each solution and examined this scree plot for elbows, i.e., points after which the reduction in WSS is only marginal and thus the fit of the model can no longer be significantly improved by

increasing model complexity (Makles, 2012). A first elbow was visible at the solution with five clusters. We also identified a second elbow that was apparent at eight clusters, which corresponds to the number of input variables we entered into the analysis. As one of our goals was to reduce dimensionality, we report the results of the analysis with five clusters. Also, since we mostly expected to find types of coordination bodies that deviate from the ideal types we described in the previous section, we accepted some variance within clusters.

Empirical findings

Table 4 presents the results of the cluster analysis, which produced a total of five clusters. Four of these refer to the four constellations identified by Chindarkar, Howlett, and Ramesh (2017) and are denoted, in accordance with their terminology, as *optimal*, *technical*, *sub-optimal*, and *political*. The remaining cluster captures constellations that deviate from the ideal types. Since the conceptual model aims at identifying ideal types, it is common to observe types that deviate from these nor does the presence of deviant types indicate shortcomings of this conceptual model.

It should be noted that during the observation period, some countries established different types of coordination bodies or even multiple coordination bodies, which is why they appear in more than one cluster. This means the clusters do not capture countries but the national coordinating bodies in place in a country at a given point in time.

The bodies in charge of horizontally coordinating climate policy in cluster 1 correspond most closely to what Chindarkar, Howlett, and Ramesh (2017) refer to as an *optimal policy design space*. They are characterized by a significant degree of involvement of the head of government, which suggests that coordination is achieved in a top-down manner. This

Table 4 Results of the cluster analysis

Cluster	Head of government		Political level			Hierarchical		Knowledge support	
	No	*Yes*	*Cabinet*	*Ministerial*	*Agency*	*No*	*Yes*	*No*	*Yes*
Optimal	66.7	33.3	0.5	0.5	–	–	100.0	16.7	83.3
Technical	100.0	–	–	–	100.0	33.3	66.7	33.3	66.7
Sub-optimal	100.0	–	61.5	38.5	–	100.0	–	23.1	76.9
Hybrid	72.4	27.6	–	100.0	–	–	100.0	37.9	62.1
Political	65.4	34.6	100.0	–	–	3.8	96.2	76.9	23.1

Cluster	Academia		Private sector			Civil society		Government agencies	
	No	*Yes*	*No*	*Yes*		*No*	*Yes*	*No*	*Yes*
Optimal	66.7	33.3	91.7	8.3		91.7	8.3	–	100.0
Technical	100.0	–	100.0	–		100.0	–	–	100.0
Sub-optimal	84.6	15.4	92.3	7.7		76.9	23.1	84.6	15.4
Hybrid	79.3	20.7	79.3	20.7		82.8	17.2	100.0	–
Political	100.0	–	100.0	–		96.2	3.8	100.0	–

cluster is also characterized by a high degree of involvement of actors who possess relevant knowledge as well as representatives of academic institutions and government agencies. The representation of the private sector and civil society is moderately strong. Examples of coordination bodies that, based on their design, could enable an optimal design space are the German Inter-ministerial Working Group and the Coordination Committee for International Environmental Policy in Belgium. Interestingly, we also find a Russian climate institution in this group, even though the country is usually viewed as a laggard in climate action (Tosun & Shyrokykh, 2022). This suggests that well-composed coordination bodies do not automatically lead to more ambitious climate action – a point to which we will return in the concluding sections. Other countries with similar institutional arrangements in place are Estonia, India, the Netherlands, Switzerland, Turkey, and the United States. Only 14 percent of all coordination arrangements observed fall into this category.

Cluster 2 on technical design policy comprises a group of countries in which the government agencies coordinate climate policy measures horizontally. Consequently, the involvement of political actors is low, but the problem orientation can be considered high. Therefore, while we expect that coordination bodies in this cluster are equipped to facilitate climate policy coordination, these proposals may not find sufficient political support to be implemented in practice. This cluster is the smallest by far: Only 3 percent of the observations in our dataset possess such institutional characteristics. This cluster includes the Network on Vulnerability in Germany, the Inter-Departmental Committee on Climate in Switzerland, and the Swedish National Network for Adaptation.

Cluster 3 on sub-optimal design space is characterized by the coordination of climate policies at a high political level. In most cases, coordination takes place in the cabinet, but the head of government is not part of the institutional arrangements. Furthermore, while this coordination type relies on committees to provide knowledge on climate change, the participation of academia and the private sector correspond to an average level, and the participation of government agencies is very low. It is this latter aspect, in tandem with the absence of a powerful steering structure due to the exclusion of the head of state, which makes this cluster correspond to a sub-optimal design space. Around 16 percent of the coordination bodies included in the analysis belong to this cluster, including the Institutional Panel in Italy and the Chilean National Advisory Committee on Global Change. Other structures included in this cluster are found in Austria, Costa Rica, Greece, Ireland, Spain, the United Kingdom, and the United States.

Cluster 4 suggests the existence of a *hybrid design space*. The coordinating bodies in this cluster are characterized by coordination through political bodies, but ones which are below the cabinet level. Nonetheless, the head of government is involved in such arrangements, and coordination takes place in a top-down fashion. The problem orientation of this cluster should be relatively high, especially given the high participation of representatives from the private sector and civil society. However, the involvement of committees and academics able to produce relevant knowledge is low, and government agencies are not included at all. It is most similar to cluster 1, but lacks a well-developed problem orientation. Remarkably, encompassing almost 35 percent of the dataset, this cluster is the largest one and includes, among other coordinating bodies, the Israeli Inter-ministerial Steering Committee for GHG Emissions Reductions and the National Climate Change Committee in Lithuania. Other coordination bodies in this group can be found in Brazil, Colombia, the Czech Republic, France, Germany, Greece, India, Italy, Poland, Spain, and Turkey.

The coordination bodies included in *cluster 5* are likely to give way to a *political design space* since the head of government features prominently in them and coordination takes places at the cabinet level and in a hierarchical fashion. However, the role of knowledge is

very limited and external stakeholders or government agencies are hardly involved at all, suggesting that the political orientation dominates the coordination process. We therefore expect these coordination bodies to possess the political capital to coordinate effectively by overriding sectoral interests, while their technical capacity to find coherent policy solutions should be limited. Around 31 percent of the national institutional arrangements can be assigned to this cluster. Examples include the German Climate Cabinet, the Climate Change Mitigation Group in Colombia, and the National Government Adaptation Committee in South Korea. Other institutions belonging to this cluster can be found in Belgium, Brazil, Chile, Finland, France, Japan, Netherlands, Slovakia, South Africa, and the United States.

Figure 2 provides a dynamic impression of how the number of countries belonging to the five clusters has evolved between 1990 and 2020. We can see that the curves for clusters 4 and 5 are particularly steep and still rising, whereas the curves for the other clusters are less steep and have leveled off.

Overall, our findings show that only a small share of the coordination arrangements in place possess characteristics likely to result in an optimal design space. Around 66 percent (clusters 4 and 5) of the institutional arrangements are characterized by a strong political orientation and a limited role for actors that could provide support to address the underlying policy problems. We thus find that institutional arrangements for the horizontal coordination of climate policies are characterized by limitations and are likely to facilitate policy design that faces difficulties in achieving the horizontal coordination of climate policies.

As explained in the previous section, when examining institutional arrangements for the horizontal coordination of climate policy, it is useful to differentiate between arrangements for the mitigation of climate change, adaptation to it, and arrangements which address both. Table 5 presents the findings of the cluster analysis broken down by these three types of arrangements.

We can infer from the table that the political orientation dominates the types of coordination bodies that are tasked with the horizontal coordination of mitigation policies or when adaptation and mitigation are coordinated jointly. In contrast, coordination bodies that focus exclusively on adaptation exhibit greater variation in the orientation of the
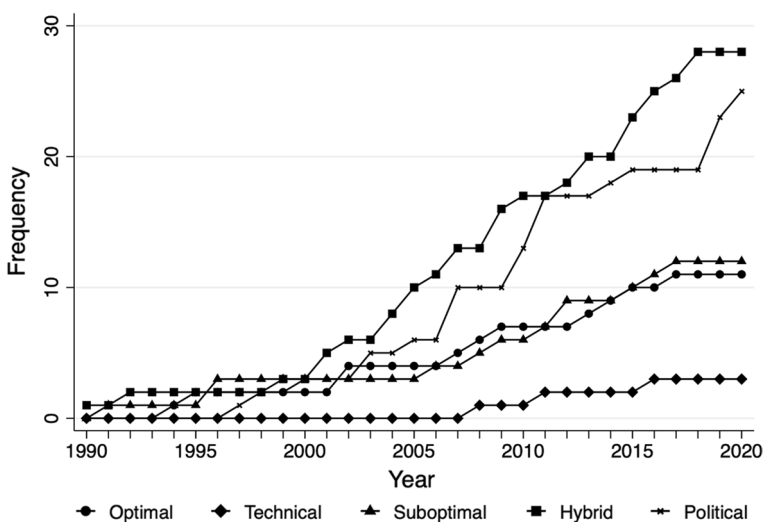

Fig. 2 Absolute frequencies of each cluster over time

Table 5 Clusters by climate policy focus

	Cluster 1 (Optimal)	Cluster 2 (Technical)	Cluster 3 (Sub-optimal)	Cluster 4 (Hybrid)	Cluster 5 (Political)
Adaptation (n = 15)	4 (26.67%)	3 (20.00%)	2 (13.33%)	4 (26.67%)	2 (13.33%)
Mitigation (n = 23)	2 (8.70%)	–	3 (13.04%)	10 (43.48%)	8 (34.78%)
Adaptation and mitigation (n = 43)	6 (13.64%)	–	7 (15.91%)	15 (34.09%)	16 (36.36%)

corresponding institutional arrangements. A high share of arrangements is likely to provide an *optimal design space*, whereas a much lower share of arrangements is likely to give way to a *political design space*.

These differences provide some evidence for different problem perceptions of adaptation and mitigation policies and suggest that the institutional arrangements in place for coordinating mitigation policies are seen as the responsibility of political actors; they also show that coordination takes place in a top-down fashion. In contrast, arrangements in place for climate change adaptation give more prominence to external knowledge and the involvement of knowledge actors. This finding aligns with the literature (see, e.g., Biesbroek, 2021) and extends it, since most existent research has focused on the formulation of mitigation policies versus adaptation policies only (e.g., Chen et al., 2021).

In this regard, we could show that the coordination body responsible for the horizontal coordination of policies for climate change mitigation differs from the one responsible for the horizontal coordination of policies for climate change adaptation, and that these differences can be expected to lead to different types of policy design spaces. We expect the political orientation to dominate for mitigation policies, while for adaptation policies we expect a combination of both – an arrangement that has the potential of providing an optimal design space. These differences appear plausible considering that climate change mitigation requires an investment in the future that entails higher political costs (see Levin et al., 2012; Jordan et al., 2022), whereas adaptation to climate change is characterized by a lower degree of uncertainty and is more prone to incur political costs for non-action (see Biesbroek, 2021).

Discussion

The empirical findings presented above offer three important insights. First, the conceptual model put forth by Chindarkar, Howlett, and Ramesh (2017) can indeed be used to categorize institutional arrangements for the horizontal coordination of climate policy. This finding contributes to the literature on policy design as it demonstrates the existence of empirically robust patterns, which are worth being studied in detail by future research.

Second, the empirical insights suggest that national governments are willing to experiment with coordination bodies with different characteristics, which offers a fresh perspective on the literature on institutional change. This very influential literature has shown that institutions tend to resist change and that if change happens, it takes place incrementally (see, e.g., Béland et al., 2020). Here we could show that institutional change can be more far-reaching than the pertinent literature would have one expect.

In this regard, the above analysis revealed Germany as an intriguing case, since the coordination bodies which were in place in the country between 1990 and 2020 could be assigned to four of the five clusters. For example, its Interdepartmental Working Group on Adaptation, established in 2008, represents an optimal design space, as it involved the head of government and was supported by a state agency and the environmental protection agency. The Network on Vulnerability, established in 2011, exhibits features of a technical design space, as it lacked the involvement of the head of state yet benefitted from the inclusion of networks of scientists. The Inter-Departmental Working Group on CO_2 Reduction, established in 1990, is a hybrid model involving coordination at a relatively high political level but without input from the head of government. The coordination process is steered by the Federal Ministry of the Environment without notable involvement of government agencies or other stakeholders. The Climate Cabinet, installed in 2019, falls into the category of political design space, as it is led by the head of state but lacks the involvement of technical state agencies.

Overall, the observed temporal variation in the German case and beyond suggests that governments are willing to assess the performance of the institutional arrangements they create. What lies outside the purview of this study is whether these changes happened because of policy-oriented learning (see, e.g., Dunlop & Radaelli, 2020) or political reasons such as changes in government, as suggested by research on ministerial portfolio design, for example (see, e.g., Sieberer et al., 2021). Biesbroek's (2021) literature review on policy integration for climate policy adaptation discusses several factors which could explain the changes made to the institutional arrangements.

The third insight concerns the increasing dominance of the political orientation in coordination bodies, especially those responsible for coordinating policies on the mitigation of climate change. This observation can be interpreted in two ways. The first is that trends toward including the highest level of government in coordinating bodies could indicate that climate change has become increasingly salient over time (see, e.g., Bromley-Trujillo & Poe, 2020). With climate policy, it is important to note that salience is not limited to the national context but can also result from international climate cooperation. A second interpretation is that climate policies are largely symbolic, as argued, for example, by Bache et al. (2015). This interpretation seems reasonable considering the literature on the horizontal coordination of climate policies, which has shown that their actual implementation falls short (see, e.g., Rayner et al., 2021). While we cannot offer explanations for why national governments increasingly strengthen the political orientation of coordination bodies, we wish to flag this finding and invite future research to address it.

Table 6 in Appendix presents data from the Climate Change Performance Index (CCPI) (Burck et al., 2020). It reports the overall score (which combines GHG emissions with renewable energy production, energy use, and climate policy) and the score for climate policy more specifically (see Table 7 for a more poignant presentation of climate policy performance). Countries in which optimal (e.g., Switzerland) or technical (e.g., United Kingdom) design spaces exist demonstrate a better performance in terms of climate action. However, notable exceptions exist, with Russia, Turkey, and the United States exhibiting low performance scores despite being identified as having an optimal policy design space. The performance of the countries with a political design space, such as South Korea or Japan, is moderate, whereas many countries with hybrid (e.g., Austria) or sub-optimal (e.g., Greece) design spaces score lower than the countries falling into the other categories.

These findings need to be interpreted with caution. First, and most importantly, since many countries have more than one design space, we could not compute correlation coefficients or association measures, which lowers the robustness of the above picture. Our analysis is purely descriptive and illustrative. Second, we found deviations between features of the policy design

space and the countries' performance concerning climate action for all clusters. For example, the performance of the Netherlands is good despite its political design space. The same goes for Chile, which hosts both political and sub-optimal design spaces.

Still, there is some indication overall that the countries with an optimal design space perform better in terms of climate policy outputs (see the CCPI score for climate policy) and outcomes (see the CCPI score for overall performance). However, this finding needs to be corroborated with a more systematic analysis.

We contend that numerous factors require consideration when explaining climate policy outputs and outcomes, with policy design spaces being only one of them. In presidential systems especially, the effectiveness of coordination bodies may hinge on the political ambitions of the head of government. For example, with Jair Bolsonaro's election in 2018, membership in the Brazilian Inter-ministerial Committee on Climate Change was reduced from 17 to only eight agencies and the President's Chief of Staff was tasked with steering it, which significantly weakened the institution (Climate Action Tracker, 2022). As another consequence of President Bolsonaro's climate policy agenda, the Committee convened only twice during his first year in office (Hochstetler, 2021). This suggests that we need to theorize under what conditions a given policy space produces certain policy outputs and outcomes.

Despite these limitations, institutional arrangements as studied here can potentially provide a more complete explanation of climate policy outputs and outcomes. For example, Fankhauser et al. (2015) show that the passage of climate laws is stimulated by the existence of a strategic flagship law, which defines a country's overall direction in climate action. Such flagship laws are typically wide-ranging and cover several sectors. Our data can potentially explain why and when such a flagship law was adopted, since we would hypothesize that it is easier to adopt it with institutional arrangements that facilitate optimal policy design. Alternatively, it is possible that the institutional arrangements changed as a consequence of the flagship law. From that perspective, the institutional arrangements should be regarded as an additional impact of flagship laws. Both perspectives appear plausible at first glance and are worth being explored in detail.

Conclusion

Research on the horizontal coordination of policies increasingly views the degree to which cross-sectoral policy integration can be achieved as dependent on the process of policy-making (Candel & Biesbroek, 2016) and the politics therein (Candel, 2019). The importance of the political dimension has been acknowledged earlier and more explicitly by research on policy design. Although this field of inquiry had existed for a while, it was re-discovered fairly recently (Howlett, 2014) and has since become an influential analytical perspective in policy studies (see, e.g., Capano & Pavan, 2019; Chindarkar, Howlett, and Ramesh 2017; Howlett & Mukherjee, 2014, 2018; Howlett et al., 2015).

In this study, we drew on the contemporary literature on policy design to improve our understanding of the horizontal coordination of climate policy. Instead of focusing on the policy formulation process itself, we focused on the institutional arrangements in place in 44 countries and assessed to what extent these follow a predominantly political or problem orientation, or a mix of both. This article hereby speaks to research that has adopted an institutionalist perspective on the analysis of horizontal policy coordination (see, e.g., Trein & Maggetti, 2020; Trein et al., 2019).

Our analysis revealed that all countries included in the sample, except for Luxembourg, have adopted coordinating bodies on climate change. Some countries, among them Germany, even experimented with the design of such institutional arrangements during the

observation period. Other countries, such as Russia, have established a coordinating body and abstained from changing it.

The institutional arrangements exhibited a sufficient number of similarities for us to assign them to five clusters. Four of the five clusters correspond to the characteristics of the ideal–typical design spaces identified by Chindarkar, Howlett, and Ramesh (2017), for they focus predominantly on the intentions of governments when enacting policies rather than on the institutional arrangements. Two-thirds of the coordinating bodies placed stronger emphasis on political considerations than problem considerations. The fifth type deviates from the original formulation and can be regarded as a hybrid system, yet with a strong political component.

In fact, only around 14 percent of the observations demonstrated a combination of political and technical considerations that would allow for the emergence of an "optimal" design space in the terminology and reasoning of Chindarkar, Howlett, and Ramesh (2017). Our findings align with the pertinent literature, which has stressed deficits in the coordination of climate policies with other sectoral policies in advanced market democracies as well as in transition and developing countries (von Lüpke & Well, 2020). Further, we could show that possessing an optimal policy space is not a sufficient condition for adopting and implementing ambitious climate policies.

We invite future research to regard the findings presented in this analysis as the starting point for further investigations. For example, empirical research is needed to better understand why certain types of institutional arrangements emerge. Potential explanatory variables are whether countries are embedded in defective democracies or even authoritarian regimes (Jordan et al., 2022). And even if they are democracies, it could matter whether they are majoritarian or consensus democracies (Lijphart, 1999). Likewise, there could be systematic differences between parliamentary, semi-parliamentary, and presidential systems (Jordan et al., 2022). Another promising theoretical perspective for explaining cross-country variation in the institutional arrangements for the horizontal coordination of climate policy is offered by administrative traditions (Biesbroek et al., 2018).

As some countries exhibited a disconnection between the composition of their national coordination bodies for climate policy and their climate policy performance, this area stands out as another avenue for future research. To address this question properly, we invite both theoretical and empirical work to carefully review the extensive literature on the relationship between institutions and policymaking and/or policy performance (e.g., Clulow, 2019; Jordan et al., 2022). In-depth case studies in the fashion of Hustedt (2014) especially could help us to broaden our understanding of the conditions under which a well-composed coordination body will lead to more ambitious climate policies. Such studies could also enrich our knowledge on the inner workings of coordination bodies, including questions about how regularly they convene (if at all), whether they follow a collaborative approach or one that is steered mainly by a central agency, and if and how their decisions are put into practice. This study has provided the broad empirical picture on which future, more fine-grained studies can build.

Appendix

See Tables 6, 7.

Table 6 Classification according to the Climate Change Performance Index (CCPI) 2021

Country	CCPI Overall Rank	CCPI Climate Policy	Policy Design Space				
			Optimal	Sub-optimal	Technical	Political	Hybrid
Australia	1	1					
Austria	2	3		X			
Belgium	2	2	X			X	
Brazil	3	1				X	X
Canada	1	3					
Chile	4	3		X		X	
China	2	4					
Czech Republic	1	1					X
Denmark	4	4					
Estonia	2	4	X				
Finland	4	4				X	
France	3	3				X	X
Germany	3	4	X		X	X	X
Greece	2	2		X			X
Hungary	1	1					
India	4	4	X				X
Indonesia	3	3					
Ireland	2	2		X			
Italy	3	3		X			X
Japan	2	1				X	
Korea	1	3				X	
Latvia	4	4					
Lithuania	4	4					X
Luxembourg	3	4					
Mexico	2	2					
Netherlands	3	4	X			X	
New Zealand	3	3					
Norway	4	4					
Poland	1	2					X
Portugal	4	4					
Russia	1	1	X				
Slovak Republic	3	3				X	
Slovenia	1	1					
South Africa	2	3				X	
Spain	2	3		X			X
Sweden	4	4			X		
Switzerland	4	3	X		X		
Turkey	2	1	X				X
UK	4	4		X		X	
USA	1	1	X	X			

The data are taken from Burck et al. (2021). CCPI Overall Rank is an aggregate measures that takes into account GHG emissions (40%), renewable energy (20%), energy use (20%), and climate policy (20%); it ranges from 1 (=very poor) to 4 (=high). CCPI climate policy is an assessment of the climate policies in a country; it ranges from 1 (=very poor) to 4 (=high). X indicates the existence of one of the five design spaces identified through the k-clustering method. Columbia, Costa Rica, and Israel are omitted from the

Table 6 (continued)

table because they are not covered by the CCPI

Table 7 Countries by overall climate performance

Climate performance	Countries
High	Chile; Denmark; Finland; India; Latvia; Lithuania; Norway; Portugal; Sweden; Switzerland; UK
Medium	Brazil; France; Germany; Indonesia; Italy; Luxembourg; Netherlands; New Zealand; Slovak Republic
Low	Austria; Belgium; China; Estonia; Greece; Ireland; Japan; Mexico; South Africa; Spain; Turkey
Very low	Australia; Canada; Czech Republic; Hungary; Korea; Poland; Russian Federation; Slovenia; USA

The data are taken from Burck et al. (2021). Columbia, Costa Rica, and Israel are omitted from the table because they are not covered by the CCPI

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