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The Search for an Effective Climate Change Public Policy: Can the G-20 Countries Guide the Rest of the World?

Etkili İklim Değişikliği Kamu Politikası Arayışı: G-20 Ülkeleri Dünyanın Geri Kalanına Yol Gösterici Olabilir mi?

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Öz

İklim değişikliği tartışmaları ve buna yönelik kamu politikası oluşturma çabaları son dönemde hükümetler, sivil toplum kuruluşları, özel sektör ve uluslararası kuruluşlar gibi birçok politika aktörünün gündeminde yer almaktadır. Bu aktörler içerisinde G20 üyeleri, ekonomik ve beşeri sermaye açısından güçlü yapıları nedeniyle dünyanın geri kalanına örnek olacak bir politika üretimi merkezi olarak ele alınabilir. Bu bağlamda, G-20 ülkelerinin iklim politikası çıktıları, bu araştırma kapsamında oluşturulan politika odakları çerçevesinde içerik analizine tabii tutulmuş, ayrıca çoklu kriter analizi sonucu iklim alanında başarılı politikalar ürettiği tespit edilen ülkelerin politika odakları karşılaştırmalı olarak analiz edilmiş ve başta gelişmekte olan ülkeler olmak üzere diğer ülkelere yönelik politika transferi imkanları tartışılmıştır. Buna göre, uyum politikalarında özellikle dirençliliği artırması üzerinde çalışması gerektiği, azaltım politikalarında ise karbon bütçelerinin oluşturulması, kapsamlı bir enerji dönüşümünün planlanması, ulaştırma politikalarının enerji sektörüyle buluşturulması, kamu yararı ve şeffaflık gibi ilkelerin ön planda tutulması ve iklim değişikliğiyle mücadelede piyasa araçları ve finansal enstrümanlarının etkin kullanılması gibi unsurların önemi ortaya çıkmıştır.[3]

Anahtar Kelimeler: iklim değişikliği, iklim yasaları, iklim stratejileri, politika odakları, uyum politikaları, azaltım politikaları, karşılaştırmalı kamu politikası analizi, politika transferi, çoklu kriter analizi, çevre politikaları.

ABSTRACT

Climate change debates and policy making efforts -despite criticism of being inadequate- have recently covered the agenda of many policy actors including governments, non-governmental organizations, private sector and international organizations. Among these actors, G20 members can serve as a policy R&D center that sets an example for the rest of the world due to their strong economic and human capital. In this context, the climate policy outputs of the G20 countries were analyzed using the content analysis methodology, based on the policy orientations created within the scope of the research. The benchmark countries in the field of climate change were determined as a result of the multi-criteria analysis, and the policy patterns of these countries were comparatively analyzed. The policy transfer opportunity for other countries, especially developing countries, was discussed. Accordingly, the necessity of developing resilience in adaptation policies and the importance of establishing carbon budgets, planning a comprehensive energy transformation, integrating transportation policies with the energy sector, prioritizing principles such as public interest and transparency, and utilizing market and financial instruments effectively in mitigation policies have emerged.

Keywords: climate change, climate laws, climate strategies, policy orientations, adaptation policies, mitigation policies, comparative public policy analysis, policy transfer, multi-criteria analysis, environmental policies.

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INTRODUCTION

Climate Change is a global phenomenon that concerns states, supra-national organizations, international organizations, local governments and civil society. Although the concept of climate change, the causes and possible consequences of it have been discussed in scientific circles for a while, it is relatively new concept that has come to the agenda of the public recently.

Due to the lack of abundant public policy development of climate change and the cross-border nature of the problem, public policy development in this area is quite open to countries' cooperation, analysis of each other's policies, and various policy transfer methods through comparative public administration practices.

Within the scope of this research, the public policy outputs (climate laws and other climate related policy documents) of the G-20 countries were examined comparatively. Thus, the lessons that can be drawn from the policy outputs of relatively successful countries, the concepts that countries can take as an example from each other and the combined use of key concepts have been determined.

In this context, a total of 501 documents consisting of laws and policy documents (executive decisions and strategies) developed by G20 countries regarding climate change were analyzed with the help of determined climate policy orientation framework. The climate change policy orientations, whose framework was drawn with the help of key concepts, were evaluated under two main policy areas as climate change adaptation and mitigation. Additionally, mitigation policies divided into five policy pillars: (1) administrative/public oriented, (2) inclusive/social oriented, (3) economic/market oriented, (4) international cooperation oriented, and (5) energy-oriented policies.

Determining which countries developed more successful policies in the field of climate change is an extremely difficult issue. In this context, a multi-criteria analysis (MCA) method was developed in the research in order to identify benchmark countries. Within the framework of MCA developed for this research, criteria have been established that include (1) the progress made by countries in terms of greenhouse gas emissions, (2) sustainable energy use, (3) the contribution to the international climate change cooperation efforts, (4) steps taken in the field of environmental protection, and (5) measures to increase the adaptation capacity for climate change. These criteria are weighted differently according to the degree of importance and the countries are scored according to these criteria.

As a result of MCA; United Kingdom, Germany, Italy and Mexico determined as the relatively successful countries in the climate change policy developments and the results obtained from the policy documents of these countries were analyzed comparatively.

In this context, a policy transfer method based on comparative public policy analysis and lesson-drawing has been adopted in order to contribute to the development of public policy in the field of climate change.

By adopting this method as a guide, the policy documents of the successful G20 member states were examined, concrete explanations were sought for specific problems, institutional/structural strengths and weaknesses were determined, and in the final analysis, practical suggestions were produced to improve the decision-making process in climate change policy development.

1. The Nature of the Climate Change

Climate is the atmospheric conditions in a given place over a long period of time. The long-term collection of the atmospheric elements (and their variations) that constitutes the weather in certain time periods forms the phenomenon called climate. These atmospheric elements can be listed as solar radiation, temperature, humidity, precipitation (type, frequency and amount), atmospheric pressure and wind (speed and direction).[4]

Climate should not be oversimplified and defined just as an "average weather". Climate should include not only the average values of the atmospheric elements prevailing at different times, but also the intervals of extreme weather events, the variability of weather events and the frequency of various occurrences.

Just as one year is different from another, decades and centuries can differ significantly from one another. Climate can be considered of as the changing weather patterns for a given place and time frame, generally more than thirty years. For instance, the rise in temperature averages over many years is an indicator of climate change. (Armstrong, Krasny, & Schuldt, 2018).

In fact, our planet does not have a common "climate". Climate is a conceptualization created to intellectually describe the combined conditions of temperature and precipitation in a specific region. Climate is not something “real” that people can experience physically and cannot be sensed and measured in real time. In short, climate is not a concrete phenomenon, but an inference that can be known through statistical analysis or inductive methods (Tiefenbacher, 2020).

After the industrial revolution, the climate on a global scale has entered into change apart from the usual natural processes. There is undeniable evidence that temperatures today are 0.8-1.1 °C above pre-industrial levels and that sea levels are rising by 3 mm per year. The world is currently witnessing frequent and severe natural disasters such as droughts, floods, hurricanes, wildfires and landslides. Scientists warn that if temperatures rise by 5 °C above pre-industrial levels, 50% of animal and plant species will disappear and 30% of coastal wetlands will be flooded (Srivastav, 2019).

Over the past 100-150 years, the earth’s average surface temperature has risen by about 1.1 °C (2.0 °F). The existing rate of increase that we observed today in this period was approximately ten times greater than the average increase in temperature after the ice age. (NASA, 2016). In the last 100 years, when we divide global average surface temperatures into ten-year time periods, the average temperature of one period has always been higher than the previous. (Melillo, Richmond, & Yohe, 214).

In 2022, the global average level of carbon dioxide in the atmosphere increased to 417 ppm. Actually, this amount is rising by 2-3 ppm per year. The last time the amount of carbon dioxide accumulated in the atmosphere crossed the 400 ppm limit was a few million years ago, when the average temperature was 2° to 3°C and the sea level was ten to twenty meters higher than today (Gillespie, 2022).

On the other hand, there are also opinions suggesting that climate change may be the consequence of natural cycles in the climate regime of the planet.

Indeed, a series of natural activities can lead the climate change gradually. Changing in the planet's tilt and orbit around the sun, called Milankovitch cycles, affect how far solar radiation reaches the earth, changing the earth's climate over tens or hundreds of thousands of years. (Lee, 2010). Additionally, El Niño and La Niña ocean stream cycles affect temperatures and precipitation around the world (Lindsey, 2016).

[4] https://www.britannica.com/science/climate-meteorology

These patterns can affect the earth's climate for decades or even centuries, but their effects are much smaller than the rates of change currently measured. In a nutshell, these natural patterns do not explicate the dramatic climate change the world has faced after the beginning of the Industrial Revolution.

2. Emergence of the Climate Change Public Policies and the Policy Transfer Concept

The changing climate and how to deal with it have different answers and perspectives. Climate change policies include both reducing greenhouse gases emissions and adapting to climate-related extreme natural events. Adaptation is vital for coping with the devastating effects of climate change in the first place. However, for the survival of human civilization after 2050, mitigation policies will be equally critical to the adaptation policies implemented today.

Awareness of climate change, one of the most important problems facing the future of humanity, and the policies developed to address it are relatively new phenomena.

It was only in the late 1970s that climate change concerns were expressed by the World Meteorological Organization (WMO) that human activities - especially carbon dioxide emissions - could cause the significant warming in the atmosphere.[5]

Afterwards, in 1988, WMO and the United Nations Environment Program (UNEP) established the International Panel on Climate Change (IPCC) to research and report on scientific evidence for climate change. Since then, the regularly published IPCC reports have become an important source in international climate change negotiations and policy making. The first assessment report (IPCC, 1990) published by the IPCC drafted the United Nations Framework Convention on Climate Change (UNFCCC) in 1991.

The UNFCCC entered into force on 21 March 1994 and the attempts to conduct climate change mitigation policies in the international arena reached its peak at the Conference of the Parties held in Kyoto, Japan in 1997. The Kyoto Protocol makes the United Nations Framework Convention on Climate Change operational by ensuring that developed countries commit to limiting their greenhouse gas (GHG) emissions. However, some countries (especially the USA and Australia) later be reluctant to ratify the Kyoto agreement, arguing that developing countries should also limit their emissions.

On the other hand, since the second half of the 2000s, the reality of climate change and its threat to humanity has increasingly been acknowledged by the public.

Widespread scientific evidence of climate change and its effects, increased media representation, growing public awareness and concern about unusual weather events and politic changes played an important role for the enhanced consciousness regarding the climate change.

However, despite widespread recognition that significant emission reductions are needed, national governments have been hesitating to accept their share of reductions in global greenhouse gas emissions.

Governments (and most importantly, their voters) are not willing to bear the cost of mitigation policies such as rising energy costs, investment in new technology and infrastructure, and lifestyle changes.

Since the human activities have been causing the climate change, social sciences play an important role in mitigating its harmful effects. As Stehr observes (Stehr, 2016), “climate change should be seen primarily not as an environmental or economic problem, but as a problem of the political manageability of modern societies”.

[5] https://public.wmo.int/en/our-mandate/climate

However, the range of political options for states in addressing global climate change is more complex than anticipated by many futurists. Solutions are not limited to finding new technologies (such as cleaner energy sources) to replace old technologies or seeking new ways to balance or mitigate the effects of global climate change.

Instead, it is necessary to delve into the matter, find new political visions and structures to support new economic systems and production patters that are less harmful to the environment (Stern, 2009).

These visions and structures must be established collectively. This is very difficult to achieve because consensus must be based on agreements among hundreds of different stakeholders. Additionally, actions need to be consistent with the needs of rapid economic development (Beth & Stuart, 2013).

The effects of global climate change are a reality that very few political actors are ready to accept. Inadequate reactions to climate change impacts are often related to a lack of political will and different risk assessments by policy makers.

While governments avoid imposing binding climate change regulations on their citizens, there is a need for governments to apply more unconventional methodologies than expected to cope with the adverse effects of climate change.

Non-state actors, on the other hand, have the ability to act more flexible, but these institutions can only develop a policy compatible with the political community, and most of their actions depend on the approval of sovereign states (Hoffman, 1997).

On the other hand, ecological interdependence among states in the 21st century represents an even more important development than collective security. States cannot protect only their own country's interests independently. Modern ecological interdependence binds even the largest, most powerful nations together (Biermann & Dingwerth, 2004, p. 6).

Thus, climate change policies developed by states do not only affect their own territories. In accordance with the principle of ecological interdependence, the political output developed by each state also affects other states on a global scale as well.

In particular, states with strong governance and high human and economic capacity can be considered as a policy laboratory in the field of climate change. Considering the differences between countries, the policy outputs produced by developed states and the policy concepts they build up can be transferred to other countries, mainly to the developing world.

Every country has problems, and each thinks their problems are unique. However, problems specific to a single country are actually anomalies. Countries normally face common problems. To address these common problems, local, regional and national policy makers monitor how their colleagues in other countries are responding to them (Rose R. , 1991).

Given the complexity of optimal public policy formulation and policy makers' tendency to avoid risk, policy transfer is increasingly becoming a "rational choice" for policy makers (Davies, Nutley, & Smith, 2000).

Within this framework, various forms of policy transfer methods, such as grouping (Ikenberry J. , 1990), convergence (Bennett, 1991) diffusion (Majone, 1991) emulation (Howlett, 2000), policy learning (May, 1992), social learning (Hall, 1993), and lesson drawing (Rose R. , 2005) have been described in a large interdisciplinary literature.

Although many concepts have been put forward in the literature regarding the policy transfer, the most accepted (Evans & Davies, 1999) is the “policy diffusion”, “policy convergence” and “lesson drawing” concepts. While the policy diffusion is defined as the adaption of successful policies by other

actors one by one; policy convergence is defined as a tendency to create similarities in structures, processes and performances in the policy development.

The effect of institutional theory, which is an organization theory, on the processes of "policy diffusion" and "policy convergence" are important. The action or policy sets carried out by various actors to create a concrete external reality outside themselves through mutual interaction, can be defined as a process Isomorphism (Berger & Luckmann, 1967).

Another major policy transfer concept -and the one that is adopted in this research- is the lesson-drawing process. In this methodology, the question is about in which circumstances a successful policy that implement in one place can be also implemented in somewhere else (Sobacı, 2009).

In this context, it will be a meaningful effort to discover certain policy concepts -patterns- by analyzing the policy outputs of developed countries on climate change in order to create a lesson-drawing policy transfer opportunity for developing world. For the very reason, the G-20 countries, which have an important impact on the global political economy and have advanced economic, financial and human capital, have been selected for this research.

3. Climate Change Policy Laboratory: G-20 countries

It is a widespread belief in the literature that climate change will have more severe and earlier direct impacts on the environment and welfare in the developing countries, namely tropical and subtropical regions.

However, developed countries are affected by climate change as well. Europe, Australia, South America, Asia and the United States are recently experiencing the negative impact of climate change such as heat waves and several water issues.

The costs of managing climate change are not expected to be particularly difficult for developed countries over the next three decades. However, negative effects of climate change on the low-income groups in the developed countries will eventually raise social problems such as welfare and fair economic distribution (Walker & Burningham, 2011).

The situation is different for the poorer developing countries. In the words of Desmond Tutu, "Rich countries can use vast financial and technological resources to protect themselves against climate change, at least in the short term. But as climate change is destroying livelihoods, displacing people and undermining entire social and economic systems, a country - no matter how rich or powerful - will not be immune to the consequences of climate change forever. In the long run, the problems of the poor will come to the door of the rich" (Tutu, 2019).

In this context, G20 countries have a historical responsibility to play a leading role in policy making for climate change with their advanced human and economic capital. As an illustration, this responsibility was also reflected in the Kyoto Protocol, which separates developing and developed countries in different lists, and put developed countries under the obligation to reduce their greenhouse gas emissions.

Climate change is not a problem that has emerged in recent years. On the contrary, it is a phenomenon that emerged much earlier as a result of the wrong development policies implemented by Western countries during periods of industrial growth.

Developed countries owe their rapid economic growth to their reckless consumption of world resources. The negative environmental externalities caused by these countries have not only impacted to their domestic environment but also have led to consequences that threaten the global environmental balance, such as the depletion of the ozone layer, the accumulation of greenhouse gases in the atmosphere, and finally, the increase in global temperature.

For this reason, it would be unfair that the developed countries will be responsible only within their own borders for the elimination of environmental problems and the negative effects of climate change. The responsibilities of these countries on the environment should be on a global scale.

This understanding finds a response “at least discursively” in the G20 platform. G20 countries recognize that climate change is one of the greatest threats to both the world economy and the humanity. Therefore, the issue of climate change has been on the agenda of the G20 since its first high-level meeting in 2008.

The G20 has proven to be a constructive forum for international dialogue, and this platform uniquely has a strong composition of members representing 85% of the world economy, enabling effective climate diplomacy. On the other hand, G20 countries, which are responsible for 80% of total greenhouse gas emissions, are also the usual suspects responsible for climate changing.

The analyzes show that the net zero commitment of all G20 states will be the most important determinant in the Paris alignment that limit the maximum temperature increase to 2 degrees, and the success of the G20 members is the only way the world can meet the target (Fyson, Geiges, Gidden, Srouji, & Schumer, 2021).

Considering that the G20 has positioned itself as the "steering committee" of the global economy in the last decade, it can be stated that G20 has a comparative advantage over other institutions in adressing the "tragedy of public goods" in the climate change policy development (Cooper, 2010).

In practice, energy policies were the first step taken by the G20 in developing institutional climate change policies. When the G20 proposed phasing out the inefficient fossil fuel subsidies at the 2009 Pittsburgh Summit, this approach was interpreted as a relatively early interest and leadership in global climate change governance (G20, 2009).

However, although some states have taken positive steps, this initiative has not been successful, and no concrete change has been achieved in the fossil fuel subsidies of the G20 countries (IISD; ODI; Oil Change, 2020) In contrast, the G20's fossil fuel subsidies are estimated to have reached US$3.3 trillion in total since the signing of the Paris Agreement in 2015 (BloombergNEF, 2021).

In addition, the United Nations Environment Program (UNEP) reports that nearly all G20 members were off course in achieving their emission reduction targets, despite having the technological and economic capacity to do so (UNEP, 2009).

Despite recognizing the importance of mitigation and adaption policies of climate change, the G20 has often failed to link climate policies to financial circles and the domestic policies of member states (Johnstone, 2021). However, the failure of the G-20 to develop global climate governance does not diminish the importance of the climate change policies developed internally by these countries..

During this research, the public policies of each of the G-20 countries regarding climate change were analyzed, common points and differences were determined, and relatively successful policy areas were revealed in order to increase the quality of policies to be developed on a global scale.

Table 1: Climate Change Related Policy Documents of the G20 Countries

Country	Law	Policy Paper/Executive Order	NDC	Total
Argentina	9	5	1	15
Australia	11	13	1	25
Brazil	17	29	1	47
Canada	7	14	1	22
China	7	21	1	29
France	14	36	1	51
Germany	20	19	1	40
India	7	13	1	21
Italy	12	13	1	26
Japan	19	15	1	35
Mexico	9	10	1	20
Russia	2	10	1	13
South Africa	9	10	1	20
South Korea	26	5	1	32
Saudi Arabia	0	2	1	3
Turkey	10	10	1	21
United Kingdom	18	32	1	51
USA	14	15	1	30
TOTAL	**211**	**272**	**18**	**501**

Source: LSE Grantham Research Institute on Climate Change

In this framework, a total of 501 policy documents of G20 countries were examined, including 211 climate-related laws, 272 executive decisions or strategy documents, and 18 NDC documents.

A total of eighteen, G20 member countries were included in the research, with the exception of the European Union, which is a member of the G-20, but a supranational organization, and Indonesia, whose policy documents are not available in the right format.

The policy documents included in the study were collected from the climate laws database[6], a joint work of LSE and Grantham Research Institute, and all directly climate-related laws, executive decisions

[6] (https://climate-laws.org/)

and strategy documents are included in the research. General laws and strategies such as budget laws or development plans (even if they include climate-related issues) are excluded.

Some of the policy documents analyzed within the scope of the research include climate strategies, environmental laws, renewable energy and energy efficiency laws, disaster management laws, public transportation strategies.

Accordingly, the policy documents developed by the public authorities in the G20 countries were comparatively assessed, the policy patterns that emerged in benchmark countries were determined, and the possibilities of policy transfer and policy advises on these patterns were discussed.

Within the framework of the research, content analysis was used as a methodology to analyze the policy documents of the G20 countries as a methodology, and Multi Criteria Analysis (MCA) was used to identify the benchmark countries. Policy orientations were designed by grouping the climate change concepts and practices in the literature in order to create a framework to analyze the policy documents of G20 countries.

In this framework, the laws and policy documents created by the G20 countries were collected in a database and content analysis was carried out using keywords representing different policy approaches.

During the research, climate policy orientations, determined with the help of key words, were evaluated under two main focuses as “mitigation” and “adaptation” policies. Afterwards, the mitigation policies, conducted by the G20 countries, has been evaluated under a total of five policy orientations: (1) administrative/public oriented policies, (2) inclusive/social oriented policies, (3) economic/market-oriented policies (4) international cooperation oriented policies and (5) energy oriented policies.

These policy orientations were identified as the main climate change policy areas and 20 keywords were chosen to describe each of these policy orientations. The keywords have been selected through a diligent review of the literature, and include the key climate-related components, as well as the inherent elements of the policy itself.

Some keywords that serve the similar goal were grouped and coded as a single keyword. For example, sustainable development, green development, sustainable growth and green growth are coded under a single keyword.

Table 2: Keywords of Climate Change Policy Orientations

ADAPTATION POLICIES	
	risk management/risk assessment/risk analysis - land use planning - proactive - adaptive capacity - adaptation strategy - capacity building - strategic planning - early warning systems - impact assessment - transformation - resilience - projection - scenario - climate impact - green transition - environmental monitoring - climate adaptation - waste management - water management - disaster management
MITIGATION POLICIES	
Administrative / Public Oriented	governance - transparency - accountability - local government/municipality - prohibit/ban/not allowed - reform - restrict - human resource - public policy - regulate- public administration - audit/supervision - public interest - carbon footprint - climate law/environmental law - greenhouse gas removal - net zero emissions - decarbonization- carbon neutrality/climate neutrality/carbon neutral/climate neutral - protected area/reserve area/nature reserve/ biosphere reserve/wildlife refuge/ conservation area/nature preserve

Inclusive/Social Oriented	indigenous people /community /group - civil society/activist - human rights - gender - poverty - democracy - wellbeing - social inclusion - prosperity / wealth- Ethnic/Minorities/Racial/Discrimination/Disadvantaged - Equality/inequality- Public/Equal/Active/Broad/Ensuring/Increasing Participation - Public awareness - Labour - Climate/environmental justice - Green society/community/Low carbon society - green skill/job - socio-environmental - affected/Vulnerable people/community/population/group- food security - displacement
Economic/Market Oriented	Green/Low carbon/Decarbonized economy - sustainable finance/green finance - bioeconomy/circular economy - sustainable/Green growth sustainable development/Green development - green industries/infrastructure/business - agribusiness - technology transfer- feasible/feasibility - competitiveness - subsidy - commodity - entrepreneur - private sector - carbon budget/emission budget/emission quota -carbon offset - Emission trading system ETS , Carbon pricing, CO2 pricing, cap and trade (CAT) carbon/emission trade - climate fund/green fund/environment fund - green bond/climate bond - carbon tax / carbon levy / climate change levy - carbon market/ carbon credit
International Cooperation Oriented	Development bank/International Financial Institutions - G20 - diplomacy - treaty - summit - seminar - conference - United Nations - International organizations - International community/partners - International collaboration/cooperation - Memorandum - Donor - COP - UNFCCC - Kyoto - IPCC - NDC - Paris Agreement - International Energy Agency, OECD, C40
Energy Oriented	biomass/biofuels - green building - energy transition - renewable energy - energy efficiency energy security - wind - solar - public transport - bicycle/cycling - electric car/vehicle - hydrocarbon/fossil fuels/natural gas/oil - aviation - insulation - phase out -geothermal - hydrogen - nuclear - tidal - carbon capture

Source: Erdogan, E. (2023)

Additionally, determining which countries have more successful climate change policies is an extremely difficult issue. At this point, considering the economic and human capacities of developed economies, it may be unfair to claim that the most developed countries have implemented more successful climate policies based solely on some absolute values and stats.

In this study, the concept of relative improvement was taken into account while determining the successful performances. In order to measure the effectiveness of policies in addressing the climate change, it would be a more reasonable to observe change rates rather than absolute values in order to detect performance improvements.

In this framework, a multi-criteria analysis (MCA) methodology has been developed to evaluate countries in the field of climate change performance.

When scoring the countries based on the different performance criteria, a scoring scale ranging from 1 to 6 has been determined to enable comparison. Accordingly, a score of 1 represents the worst performance, while a score of 6 represents the best performance. Within each criterion and its sub-criteria, countries are scored based on their levels of success using data obtained from quantitative sources.

The MCA framework includes the following criteria: (1) Greenhouse Gas Emissions, (2) Sustainable Energy Usage, (3) Contribution to International Climate Change Efforts, (4) Environmental Protection and (5) Climate Change Adaptation Capacity Building.

While France ranks fourth among the top 5 countries, including the three most successful countries from Europe was considered sufficient. In addition, it was more meaningful to examine Mexico, the 5th most successful in G20 and the best performance outside of Europe, as an example that especially

developing countries can emulate more. Therefore, the benchmark countries identified as a result of MCA are the United Kingdom, Germany, Italy and Mexico.

Table 3: Multi Criteria Analysis (MCA) Results

Summary Analysis	Weighting	ARG	AUS	BRA	CAN	CHN	FRA	GER	IND	ITA	JAP	MEX	RUS	S.AFR	S. KOR	S.ARA	TUR	UK	USA
Greenhouse Gas Emissions	40%	3.15	4.08	2.30	3.53	1.80	4.93	5.33	1.58	5.78	3.88	5.00	1.93	4.13	2.93	1.65	1.58	5.98	3.50
Contributions to International Climate Change Efforts	15%	4.38	4.00	4.08	3.83	3.63	3.50	3.50	4.50	3.58	3.83	4.79	1.88	3.79	3.04	2.33	2.63	4.54	3.38
Sustainable Energy Usage	25%	1.50	3.73	2.43	2.90	3.40	4.80	5.33	2.53	4.77	4.47	3.50	2.20	3.30	3.70	1.90	2.83	5.87	4.30
Climate Change Adaptation Capacity Building	10%	3.57	3.67	3.77	4.17	4.07	4.67	4.90	3.30	4.70	3.87	4.57	3.40	4.60	2.97	3.77	3.20	5.23	4.90
Environmental Protection	10%	3.25	4.60	4.00	4.00	2.80	5.40	3.80	1.40	4.40	3.20	3.50	3.20	3.60	3.20	3.75	2.80	4.40	3.20
	100%	**2.97**	**3.99**	**2.92**	**3.53**	**2.80**	**4.70**	**4.86**	**2.41**	**4.95**	**3.95**	**4.40**	**2.26**	**3.86**	**3.17**	**2.24**	**2.33**	**5.50**	**3.79**

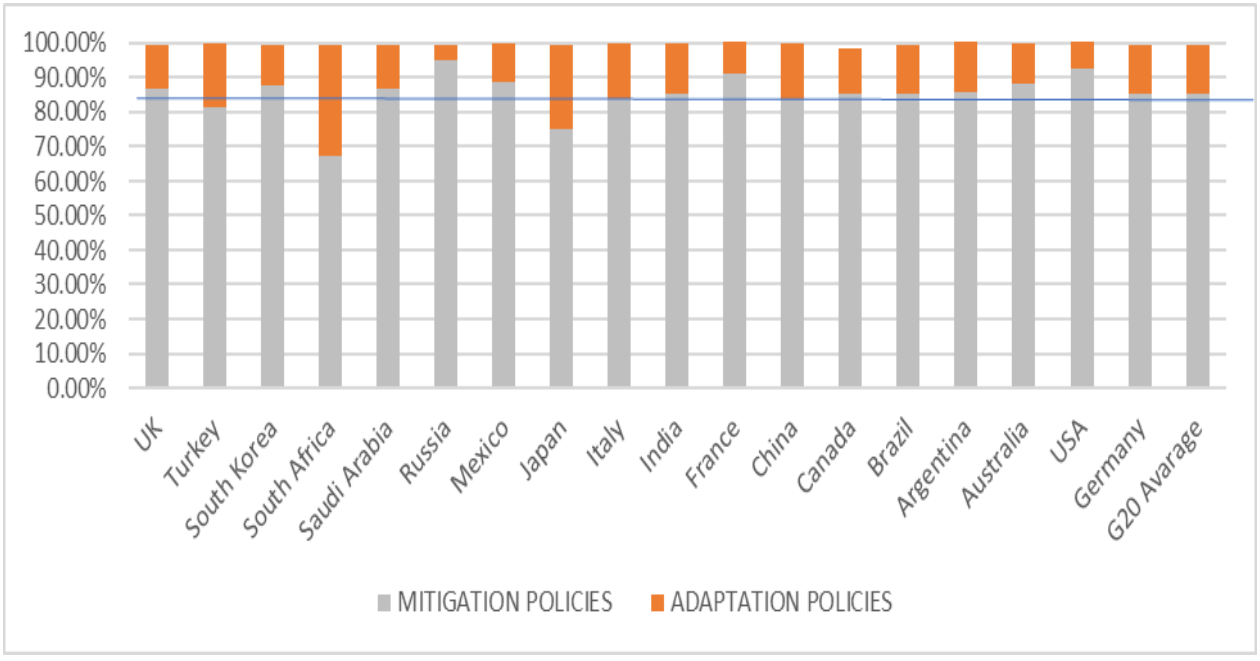
Source: Erdogan, E. (2023)

4. Where There's a Will, There's a Way

The content analysis of the policy documents of the G20 countries based on policy orientation is summarized below.

Accordingly, G20 countries attach relatively different importance to their adaptation policies. However, the main reason that adaptation policies being generally lower than mitigation policies within the framework of the research is related to the overall design of the research.

Figure 1 : Adaptation and Mitigation Policies



In the research, 20 keywords were coded for adaptation policies, while 5 sub-headings were determined for mitigation policies, resulting in a total of 100 selected keywords.

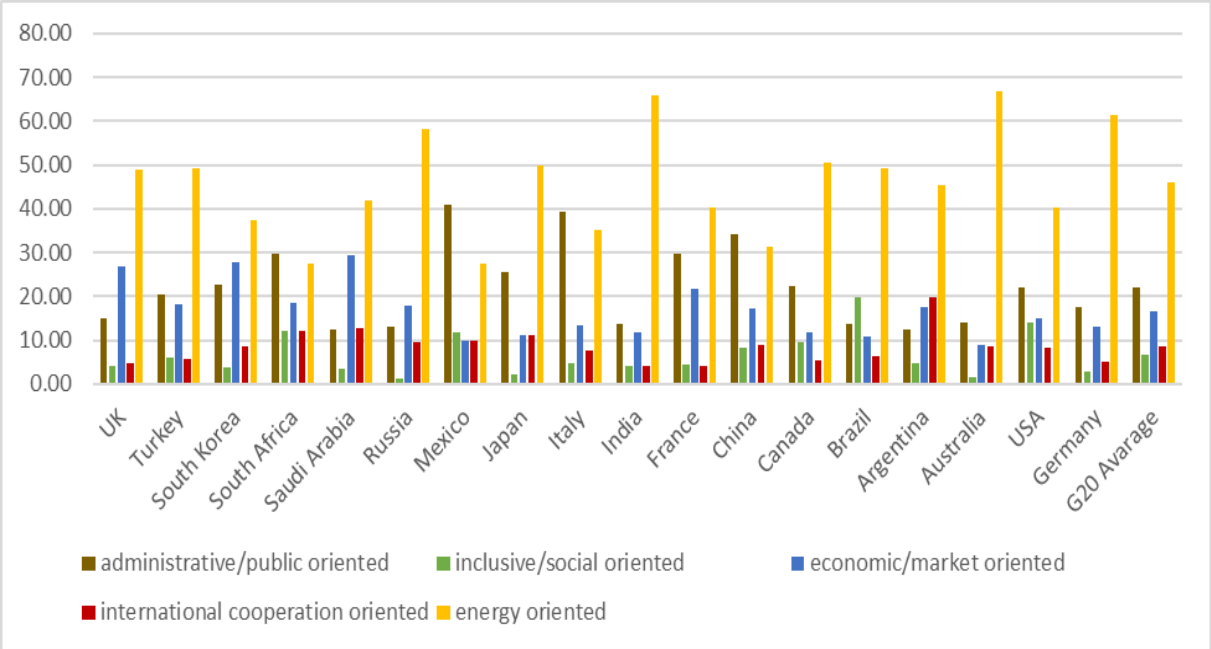
In other words, if any country has more than 16% of the total keywords coded in the adaptation policies, it means that this country focuses more on the adaptation policy rather than mitigation in the climate change policies.

Herein, among the coded areas, South Africa (32%), Japan (24%) come to the fore as the countries that prioritize adaptation policies within their climate change documents. “Disaster management” and “resilience” terms stand out in adaptation policies of South Africa and Japan.

The important nuance here is that the common feature of these two countries is being among the countries most vulnerable to natural disasters and extreme weather events as a result of climate change.

The USA and Russia, which are also among the countries where natural disasters are most experienced, have very limited policy-making practices in the field of adaptation despite their economic capacities

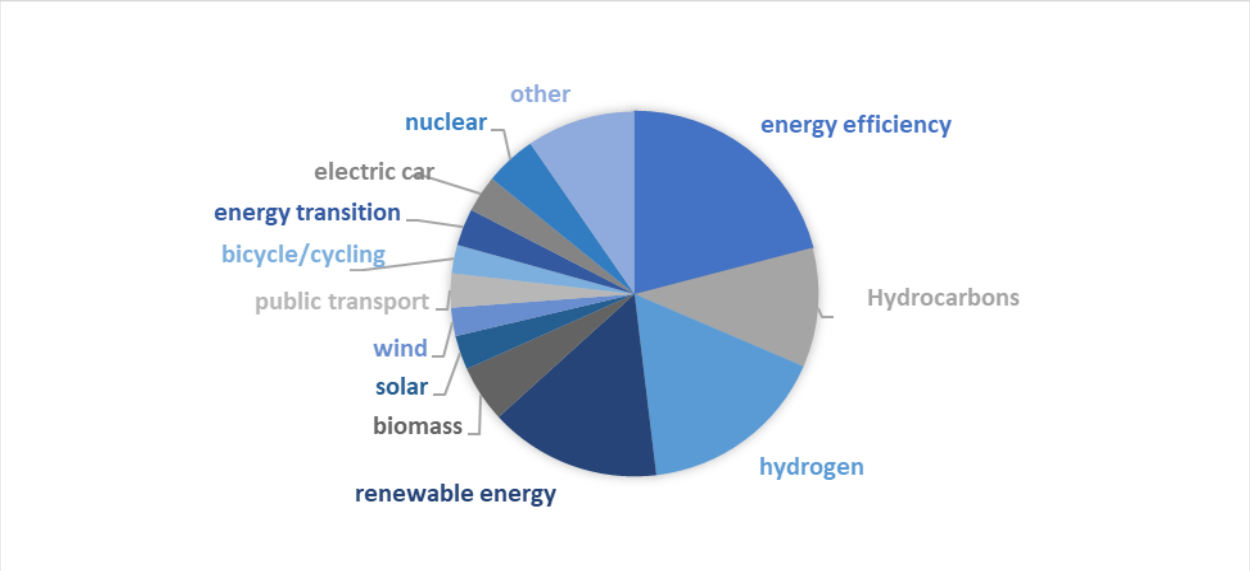
Figure 2:Mitigation Policies



When we elaborate on the climate change mitigation policies of the G-20 countries, we observe the overwhelming superiority of the energy-oriented policy concept. For the G20 countries, as for the rest of the world, the actions to be taken in energy policies are considered to be the front line of the climate change mitigation policies. The ratio of the keywords coded under the energy-oriented mitigation policy was 39%.

Russia, India, Australia and Germany give more weight to the energy field than other G2O members. Renewable energy and energy efficiency policies constitute the majority of energy policies of G20 countries. While energy efficiency ranks first with a weight of 32% for Russia, a more balanced energy policy is observed in Germany.

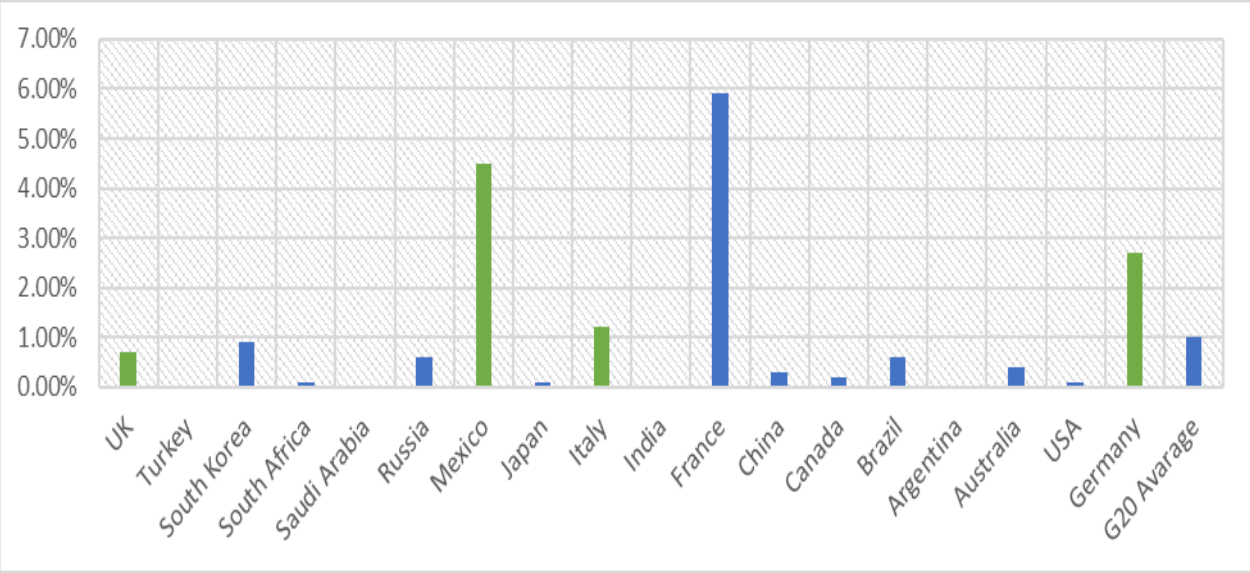
Figure 3: Keywords of Energy Oriented Mitigation Policies of G20 Members Policy Documents



In Germany, the energy efficiency keyword ranks first with 12%, followed by renewable energy with 9%. In India, on the other hand, renewable energy ranked first with 16.80%. Interestingly, Australia cited hydrogen most in energy-oriented policies with 18%.

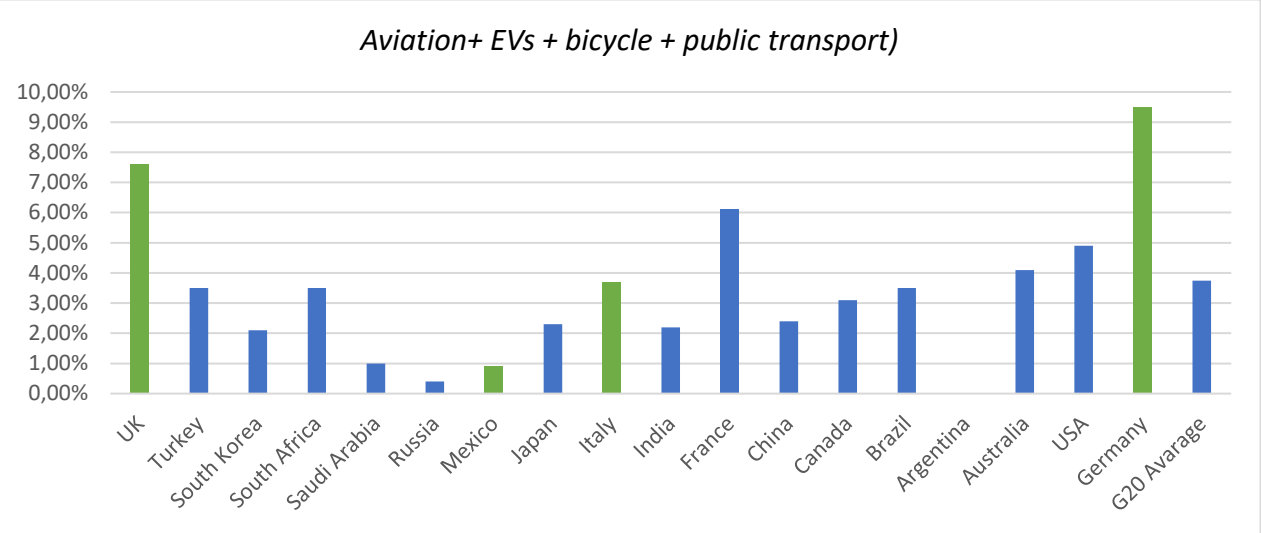
The energy-oriented mitigation policies of benchmark countries have two distinctive features. The first is that benchmark countries (particularly Mexico and Germany) heavily refer to the concept of "energy transition", which reflects a more holistic energy policy rather than just renewable energy investments, in policy documents.

Figure 4: Energy Transition Keyword



Secondly, the combination of energy policies with transport issues has a successful effect on the climate policy performance of these countries. Therefore, transport related keywords (aviation, electric vehicles, bicycle and public transport) in energy-oriented mitigation policies highly referred in the policy documents of benchmark countries.

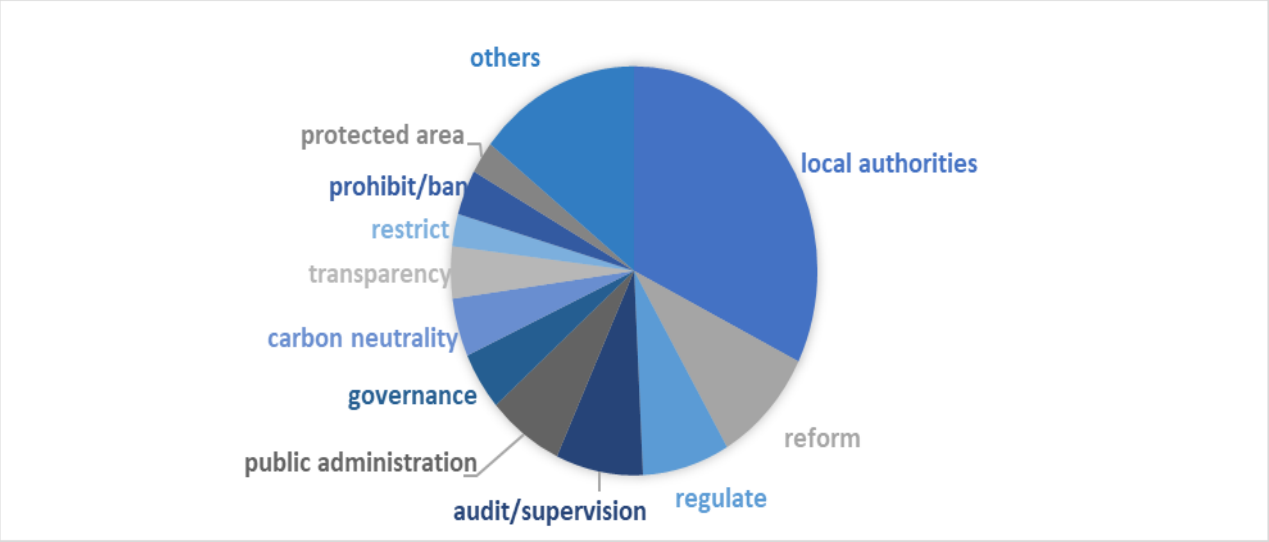
Figure 5 : Transport related keywords in energy-oriented climate policies (aviation, EVs, bicycle, public transport)



The second most emphasized policy in the G20 climate documents is the administrative/public oriented climate policies. The weight of the administrative/public oriented mitigation policy is 19.50% among the total coded areas.

In the South Africa, Mexico, Italy and China, administrative/public oriented mitigation policies are ranked first ahead of energy-oriented policies. Thus, the main mitigation policy concept for these countries is in administrative/public.

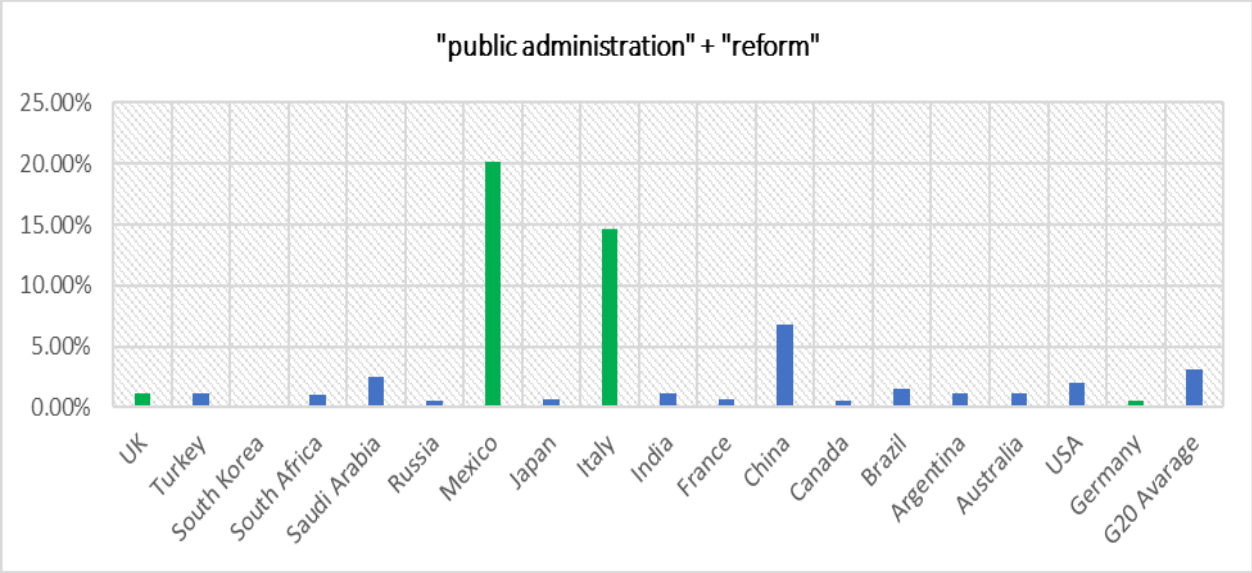
Figure 6: Keywords of Administrative/Public Oriented Mitigation Policies of G20 Members



In administrative/public oriented policies, “local governments” in South Africa, “public administration” and “reform” in Mexico and Italy, and the “audit” keyword in China come to the fore.

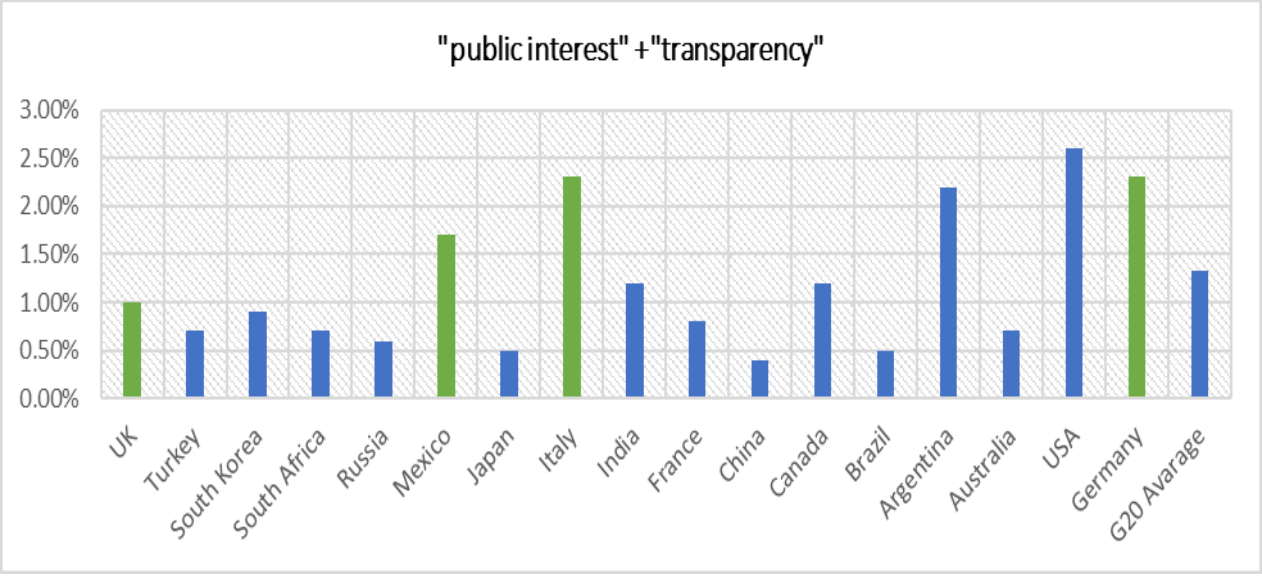
What is interesting at this point is that when we analyze the concepts of public administration and reform together, Italy and Mexico have an overwhelming superiority among the G20 countries. Considering that both countries are among the benchmark countries, it can be said that reformist approach in public administration can have a positive effect on the success in climate policies.

Figure 7: "Public Administration" and "Reform" Keywords Together



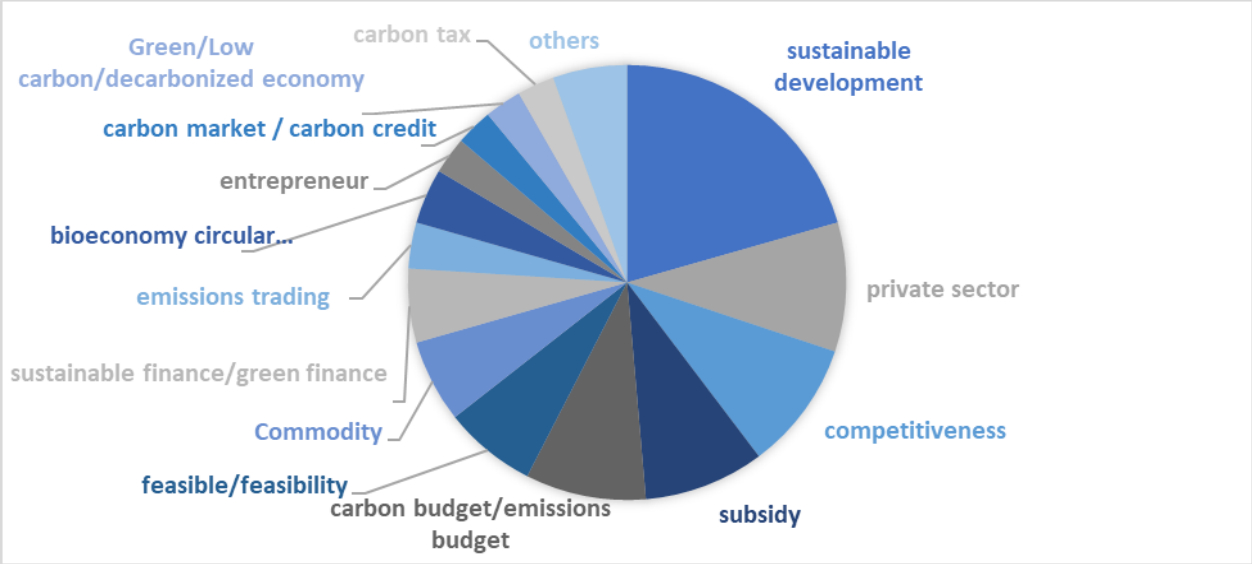
In addition, as an important concepts of the new public administration approach, "public interest" and "transparency" keywords are detected as a common feature of benchmark countries' administrative/public oriented climate policies as well.

Figure 8: "public interest" and "transparency" keywords together



In the analysis of climate change policy documents, economy/market-oriented policies are ranked third with 14.60%. The prominent countries in this policy concept are France, the United Kingdom and South Korea. Only in South Korea and the United Kingdom economy/market-oriented mitigation policies rank second after energy-oriented policies.

Figure 9: Keywords of Economy/Market Oriented Mitigation Policies of G20 Countries



The fact that these countries give more weight to economic/market-oriented policies rather than administrative/public oriented policies can be interpreted as their tendency of finding flexible market-based solutions for the climate issues rather than being stuck in the complex bureaucratic cycles in the policy development processes.

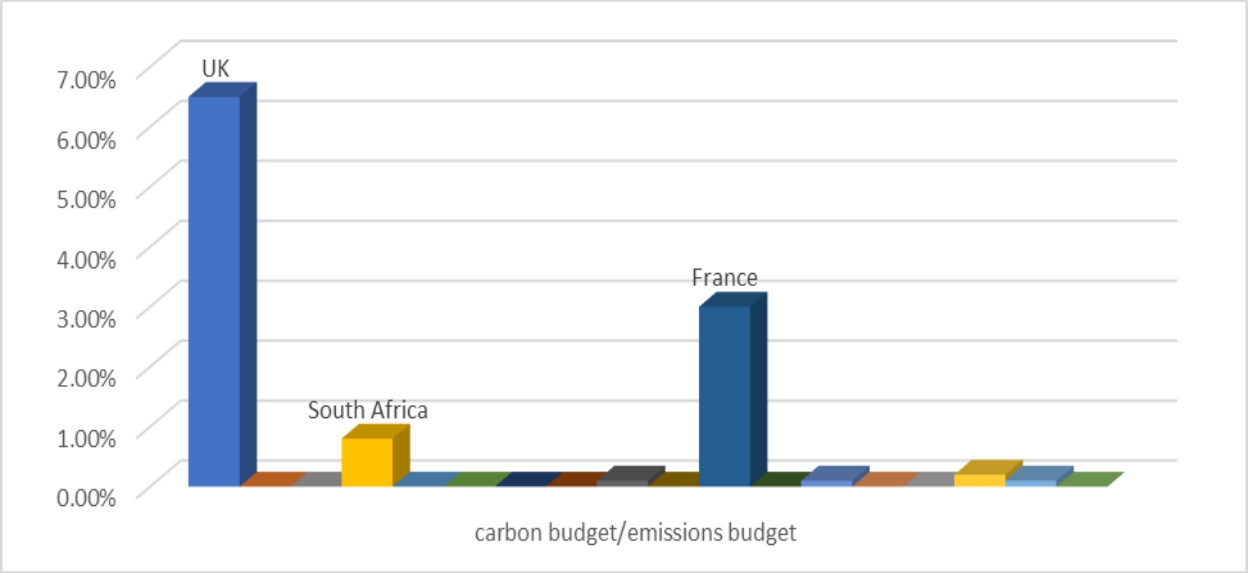
Adopting a market-based approach rather than bureaucratic practices for the UK is a policy that is compatible with the historical background of British public administration. However, in France, where the bureaucracy is historically dominant power in the public policies, the higher usage of market-oriented climate policies shows that France follows a different attitude from its own traditional public administration approach in the field of climate change.

On the other hand, the fact that the United Kingdom and France have implemented relatively successful climate policies compared to other G-20 countries enhance the argument that the market-oriented policy approach is more functional option in the climate change policies.

In this policy concept, “carbon/emission budget” is the prominent term in the UK, while the concept of “green development” has been coded numerous times in the policy documents of France. The concept of carbon budget is almost never mentioned in the economy/market-oriented mitigation policies of other G20 countries.

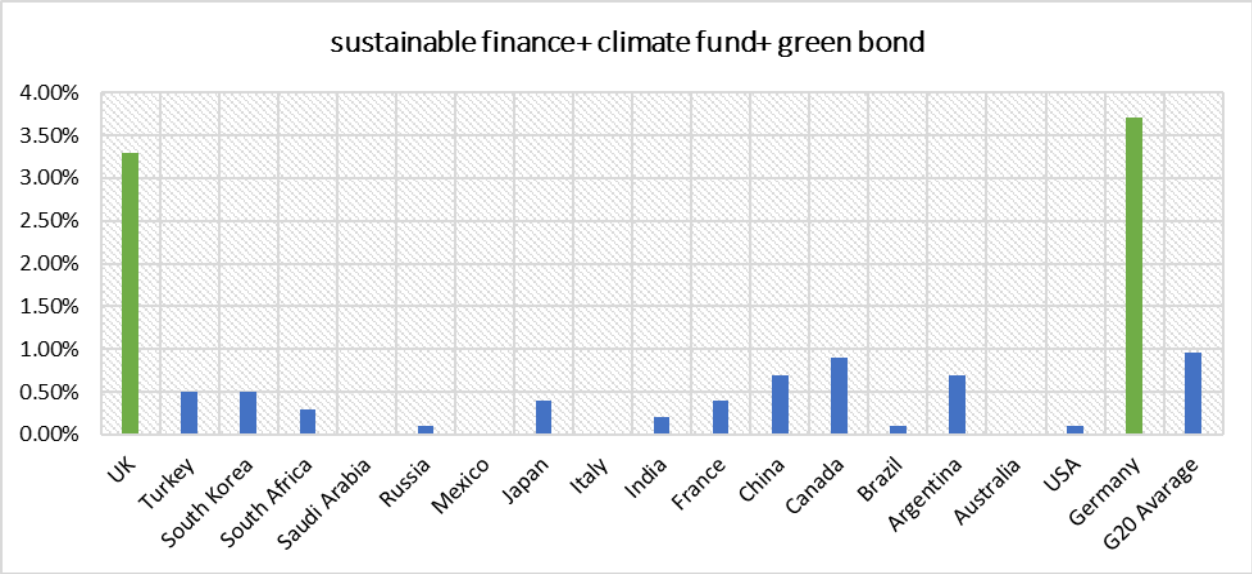
The exception to this is the United Kingdom and France, and to some extent, South Africa. The fact that the United Kingdom and France are among the successful countries reveals the importance of determining carbon budgets in climate change policy development.

Figure 10 : Carbon Budget/Emission Budget Keyword



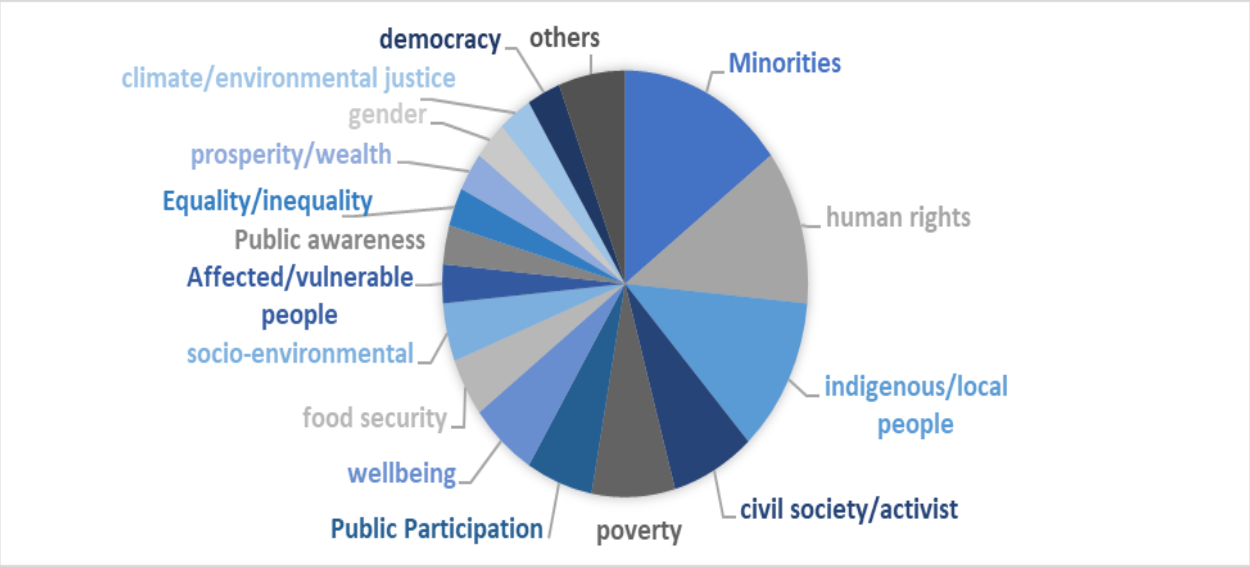
In economic/market-oriented mitigation policies, financial tools identified an important effect on success. Germany and United Kingdom have extensively used green finance related keywords such as sustainable finance, climate fund, green bond in their policy documents which can be evaluated a part of their success.

Figure 11: `Sustainable finance`, `climate fund`, `green bond` keywords together



Inclusive/social oriented mitigation policies represent one of the least coded areas in G20 climate policies with 6.80%. The exceptions to this tendency are Mexico, Brazil, the USA, Canada and South Africa. American continent is more successful in creating social policies for climate change. The leftist view, which is active in the political arena for a long-term in Latin American countries, and the democracy concepts, one of the founding principles of the USA, can be driven factor for this result.

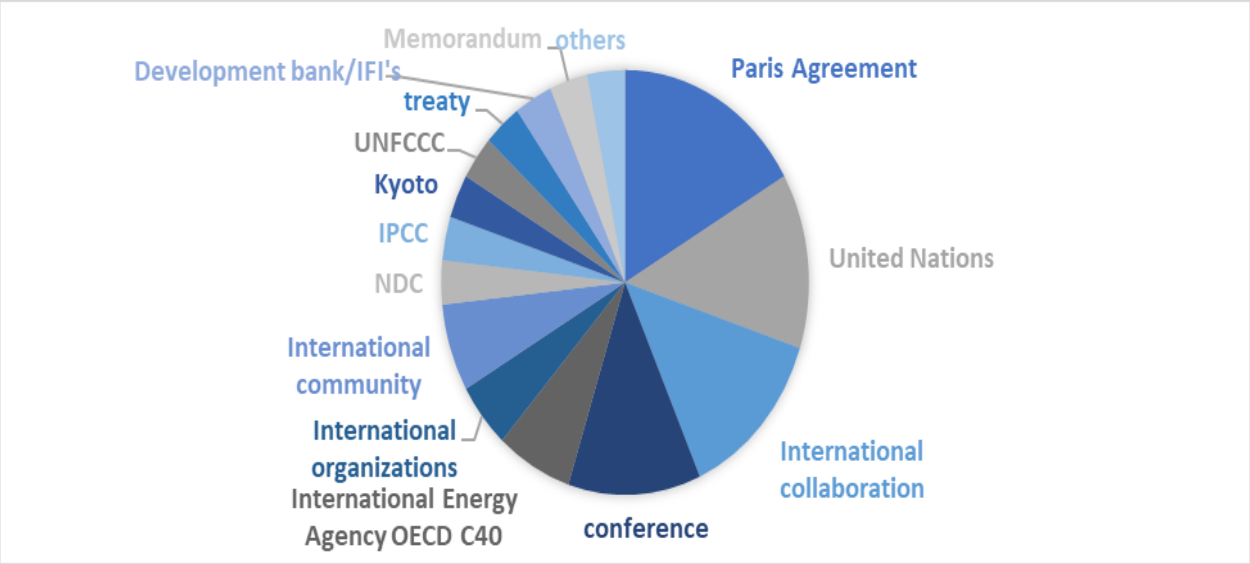
Figure 12: Keywords of Inclusive/Social Oriented Mitigation Policies of G20 Countries



The prominent keywords in the inclusive/social oriented mitigation policies of these countries are "wellbeing" for Mexico, "human rights" for Brazil, "discrimination" for the USA and "gender" for Canada. Although countries such as South Africa, Canada, Brazil and the USA have focused in inclusive/social oriented policies, along with Mexico, administrative/public policies in other countries have not been included as much as in Mexico. This suggests that social/inclusive policies will only yield positive results when they are used together with administrative/public policies.

Although many initiatives and platforms operate effectively in the climate change policy development in international arena, this is not the case for the countries domestic policy development processes. The international cooperation-oriented mitigation policy is another area that lags behind in the climate policies of the G20 countries, such as inclusive/social policies, and it has a weight of only 6 % in the total coded areas. Argentina stands out as exceptions to this trend.

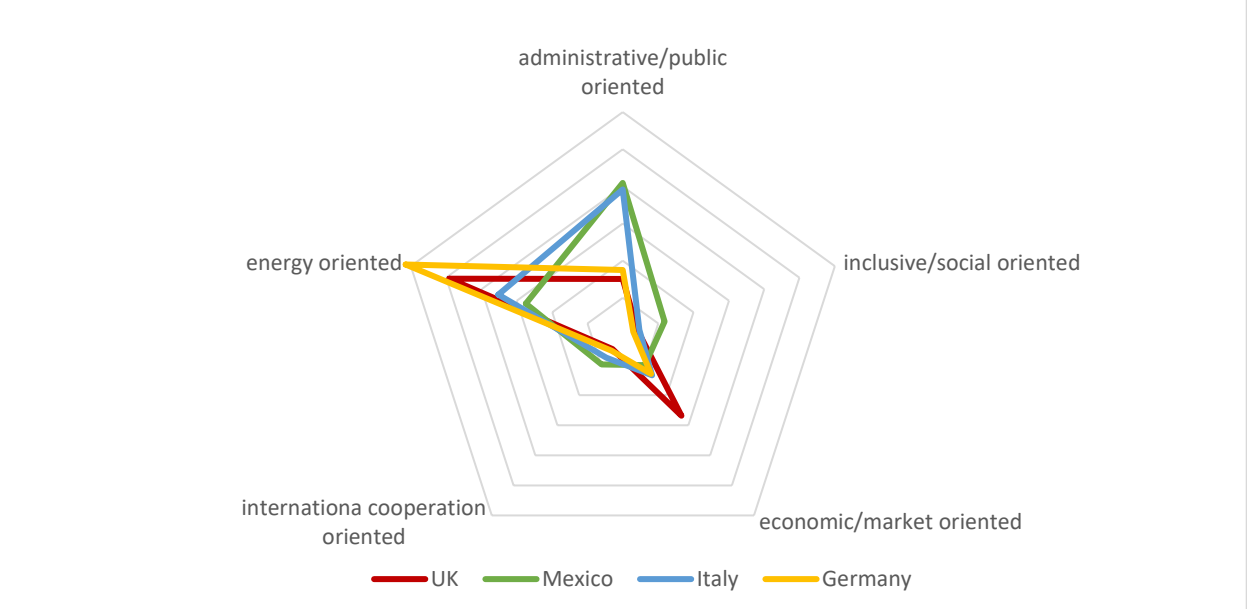
Figure 13:Keywords of International Cooperation Oriented Mitigation Policies of G20 Countries



Argentina is the only country that international cooperation-oriented mitigation policies are ranked second after the energy-oriented mitigation policies. The most emphasized keywords in the international oriented mitigation policies of Argentina are the "Paris Agreement" "the United Nations", "IPCC" and "International Cooperation".

When we delve into the benchmark countries among the G20 members, two main patterns in mitigation policy compositions, which are shaped according to the needs of the country, draw attention

Figure 14 : Climate Change Mitigation Policy Patterns of Successful G20 Countries



At this point, the examples of the United Kingdom and Germany, which resemble a triangle extending from one end to energy-oriented mitigation policies and the other to economy/market-oriented policies, draw attention in the chart. These countries preferred to create a mitigation policy composition that is more result-oriented and focused practical solutions, rather than concentrating on tangled administrative, inclusive/social or international cooperation concepts in their climate change mitigation policies.

The economic power, effective private sector structure and human capacity of the United Kingdom and Germany are at a level to implement ambitious climate policies that can rapidly transform traditional structures.

Among these countries, Germany focuses more on energy-oriented mitigation policies, while the United Kingdom tends towards more economy/market-oriented policies.

The fact that a climate policy structure that encourages the private sector, not the public, to take the lead in climate change mitigation policies in the United Kingdom and Germany is a common feature.

On the other hand, the way of the UK and Germany is not the only path that leads to the success in the field of climate change policy development. Another successful pattern is a more balanced mitigation policy composition put forward by Italy and Mexico.

The most important point of this pattern, which resembles a pentagon rather than a triangle formation, is the administrative/public oriented mitigation policies. In these countries mitigation policies have been designed with the resources and regulatory power of the public administration rather than the private sector.

On the other hand, a remarkable point is that Mexico, unlike all these successful country examples, has significantly involve social content in its mitigation policy documents.

Herein, the socio-economic structure of Mexico, which differs from other successful European counterparts, can be emphasized. While Mexico's economic and human capacity lags behind European

examples, its large population and the vulnerable social structure have urged the country to focus more on the social effects of climate change.

With these socio-economic characteristics, Mexico's success story can be inspiring for the developing countries. Social terms such as “wellbeing” “local people” “human rights” “gender” “poverty” “equality” took an important place in Mexico's inclusive/social oriented climate policies.

CONCLUSION

Successful country examples cannot provide a single policy map for the rest of the world. Commonly accepted ready-made recipes will not coincide with the different political, economic and social realities of different countries. However, a policy transfer opportunity can still be derived from benchmark countries. The policy outputs of the benchmark countries of the G-20 in the climate change provide some clues for the rest of the world, especially for the developing countries.

The clues for the developing countries obtained from the policy laboratory of the G20 countries can be summarized as;

- Decision makers of developing countries should consider more adaptation policies directly effective on the climate change. Keywords such as "resilience", "adaptation to climate change", "climate impact" and "green transformation" are vital for the policy development. In this regard, lesson can be drawn from the outputs of Italy's adaptation policies, especially in the field of resilience.

- The UK is the top country in our MCA analysis, which means that the country is following relatively the best policies in the field of climate change. We identify the concept of “Carbon Budgets” as the biggest reason behind this success. Carbon budgets are determined by the UK public authority and include all sectors of the economy for certain periods, along with various market mechanisms that support the implementation of this policy.

  In addition, the United Kingdom established an independent audit mechanism to control the implementation of government actions regarding the carbon budgets and provide recommendations for the necessary steps in this regard.

- Another lesson-drawing point that can be emphasized is to ensure that the concepts of public administration and reform are adequately included in climate-related policy documents. It has been seen in the examples of Italy and Mexico that a reformist public administration approach has yielded effective results in climate change policies.

- Energy oriented mitigation policy is one of the most important pillars of climate change public policies. However, taking steps without planning a comprehensive transformation in this area will not yield sufficient results.

  The key concept of "energy transformation," which is highly emphasized in the policy documents of successful countries such as Germany, Mexico, and Italy, is an extremely important and overlooked issue in terms of energy policies. In nutshell, only a comprehensive transformation in the energy policies could bring success to the developing countries.

  In addition, key concepts in the field of transportation have been used extensively in the energy policies of benchmark countries. This means that policies produced at the intersection of the transportation and energy fields will yield positive results in terms of climate performance

- The intensity of regulations in the field of green finance is another outcome reflected in the climate policy documents of successful countries. Particularly, the role of financial instruments such as "carbon fund", "sustainable finance", "climate bond" in mitigation policies has been evaluated as a factor that contribute to success.

- In the Germany, Italy and Mexico, the prominent keywords of new public administration approach such as “public interest” and “transparency” are referenced many times in the policy documents. The benefit of this approach should not be ignored in the policy documents that will be produced by developing countries in the field of climate change.

- Mexico impressed in inclusive/socially oriented climate policies. The major lesson-drawing point that Mexico offers in this area is that “Inclusive/Social” oriented mitigation policies only yield successful results when used together with “administrative/public” oriented mitigation policies. This clearly demonstrates the importance of the regulatory power of the public authorities for inclusive/social oriented mitigation policies.

- Last but not the least, we identified two different paths for the successful mitigation policies. One is represented by Germany and the UK, where economic/market-oriented and energy-oriented policies dominate. The other is represented by Mexico and Italy, where administrative/public policies are crucial for the success of mitigation policies. Developing countries should consider the structure of their public and private sectors and the capacity of the country in order to replicate policies from these different paths.

In the end, it is a fact that successful G20 countries cannot provide a single map to find the "best climate policy" that will eliminate all the negative effects of climate change policy development on economic growth in the developing world. However, for each country to create its own policy map, there are some worthwhile clues to be obtained from the policy outputs of the successful G20 countries, and this is valuable enough for the rest of the world to closely follow G20 members' climate policies in the future.

Compliance with Ethical Standard

Conflict of Interests: *There is no conflict of interest between the authors or any third party individuals or institutions.*

Ethics Committee Approval: *Ethics committee approval is not required for this study.*

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