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Framing Climate Change: A Comparative Study of Chinese and Brazilian Media

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Pontifícia Universidade Católica do Rio de Janeiro
Centro de Ciências Sociais
Departamento de Comunicação

Rio de Janeiro, 18 de setembro de 2025



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Orientação: Professor Arthur César de Araújo Ituassu Filho

**Tese apresentada como requisito parcial para a obtenção do
grau de Doutora em Comunicação pelo programa de Pós-
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Comunicação.**

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Abstract

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This study conducts a comparative analysis of how media in China and Brazil construct discursive frames around climate change, aiming to understand the communicative logics shaped by differing political, social, and media systems. Focusing on six representative cases—including speeches by national leaders, domestic policy announcements, and socio-ecological events—the research employs framing analysis and qualitative content classification to examine 261 online news articles in depth. The findings reveal that Chinese and Brazilian media articulate two distinct yet revealing pathways in their climate narratives. Chinese media tend to emphasize national achievement, moral leadership, and institutional strength. In contrast, Brazilian media portray climate change as a contested political terrain, where science, governance, social justice, and environmental urgency are intertwined. These differences are not merely editorial; they reflect more profound divergences in political systems, media autonomy, and climate governance cultures. Ultimately, this research underscores the importance of situating media discourse within broader political, ideological, and systemic frameworks when analyzing transnational environmental narratives. As two major developing countries increasingly assuming leadership roles in regional climate governance, China and Brazil offer valuable empirical cases that enrich global South perspectives in climate communication research.

Keywords:

Climate Communication, Framing Analysis, Comparative Media, China and Brazil, Political Systems

Resumo

Pan, Luodan; Ituassu, Arthur César de Araújo. **Enquadrando as Mudanças Climáticas: Um Estudo Comparativo da Mídia Chinesa e Brasileira.** Rio de Janeiro, 2025. 406p. Tese de Doutorado – Departamento de Comunicação Social, Pontifícia Universidade Católica do Rio de Janeiro.

Este estudo realiza uma análise comparativa de como a mídia na China e no Brasil constrói enquadramentos discursivos em torno das mudanças climáticas, com o objetivo de compreender as lógicas comunicativas moldadas por diferentes sistemas políticos, sociais e midiáticos. Focando em seis casos representativos — incluindo discursos de líderes nacionais, anúncios de políticas domésticas e eventos socioecológicos — a pesquisa emprega análise de enquadramento e classificação qualitativa de conteúdo para examinar em profundidade 261 notícias publicadas online. Os resultados revelam que a mídia chinesa e a brasileira articulam dois caminhos distintos, porém reveladores, em suas narrativas sobre o clima. A mídia chinesa tende a enfatizar conquistas nacionais, liderança moral e força institucional. Em contraste, a mídia brasileira apresenta as mudanças climáticas como um terreno político em disputa, no qual ciência, governança, justiça social e urgência ambiental se entrelaçam. Essas diferenças não são meramente editoriais; elas refletem divergências mais profundas entre os sistemas políticos, o grau de autonomia da mídia e as culturas de governança climática. Em última instância, esta pesquisa ressalta a importância de situar o discurso midiático dentro de estruturas políticas, ideológicas e sistêmicas mais amplas ao analisar narrativas ambientais transnacionais. Como dois grandes países em desenvolvimento que assumem, cada vez mais, papéis de liderança na governança climática regional, China e Brasil oferecem casos empíricos valiosos que enriquecem as perspectivas do Sul Global nas pesquisas sobre comunicação climática.

Palavras-chave:

Comunicação Climática, Análise de Enquadramento, Mídia Comparada, China e Brasil, Sistemas Políticos.

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1. Introduction

1.1 Research Rationale and Framework

On an early morning in September 2024, a heavy gray haze blanketed the Amazon. Fires spread from the depths of the rainforest, devouring vast stretches of primary forest, while the air carried the acrid scent of charred wood and the distant roar of emergency helicopters. Hundreds of kilometers away, city residents witnessed the scale of the disaster through short videos on social media: flames illuminated the night sky, Indigenous villages evacuated through the smoke, and the charred riverbanks were littered with the bodies of animals. Brazil's national media quickly converged on the story, with headlines saturated with the language of crisis, accountability, and urgent calls for action. International outlets, in turn, used the event to scrutinize the Brazilian government's climate policies and its commitments to protecting the Amazon.

Around the same time, on the other side of the world, a newsroom in Beijing was pushing another climate-related headline: China's wind and solar power capacity under the 14th Five-Year Plan had surpassed 1.2 billion kilowatts, achieving its target six years ahead of schedule. In the news footage, massive wind turbines turned slowly against a clear blue sky. Domestic media coverage emphasized keywords such as "global leadership" and "green transition." The story quickly occupied online platforms, framed as a symbol of both national development and international responsibility.

Although these two scenes unfolded half a globe apart, they reveal two distinct narrative logics in climate communication: on one side, sudden ecological disaster and public accountability; on the other, institutional achievement, national branding, and strategic communication. It is within this intersection of global issues and localized narratives that the present study situates its cross-national comparison of climate news coverage in China and Brazil. These emblematic events not only illustrate the differing narrative logics of climate communication in each country but also underscore the necessity of cross-national comparison: only by understanding such narrative divergences can we grasp the communicative dynamics and social impacts of climate discourse in the Global South.

This dissertation situates itself within the field of social communication studies, with a specific focus on climate change. More precisely, it examines cross-national media comparisons, news content, and the application of media framing theory. It explores how media in different national contexts construct narratives around climate change. By analyzing the narrative characteristics of diverse media outlets and situating them within their respective cultural, political, economic, and climatic contexts, this research seeks to understand how media in different countries bring a scientific issue into the arena of public discussion and how the discursive framing of climate change evolves in today's dynamic international political environment.

Climate change has emerged as one of the most global and complex public issues of the 21st century. It is not only a scientific matter but also deeply intertwined with political decision-making, economic development, social governance, and everyday life. From the perspective of the history of science, modern climate science can be traced to early 19th-century research on the greenhouse effect (Dessler, 2011), and in the second half of the 20th century it increasingly identified human activity as a critical driver of the climate system. The establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988 marked the transition of climate issues from scholarly debate to the arena of global governance and policy negotiation. However, as Latour (1987) observed, scientific consensus does not automatically translate into societal or policy consensus. The public communication and social reception of climate change are shaped and constrained by an interplay of political, economic, and cultural factors.

Within social communication research, Environmental Journalism and Climate Communication have emerged as highly intersecting research frontiers. Environmental journalism not only fulfills the roles of information dissemination and social oversight but also serves as a vehicle for national governance logic and international image construction. Climate communication embodies the triple intersection of science, politics, and communication: it must convey scientific knowledge to the public while balancing between international political agendas and domestic social priorities. Framing Theory research demonstrates that media, by selectively presenting, emphasizing, and interpreting information, profoundly shape public risk perceptions, emotional responses, and policy preferences

regarding climate change (Entman, 1993; Lecheler & de Vreese, 2018). For example, the lexical choice between “climate change” and “global warming” can evoke distinct emotional reactions and policy associations (Schuldt et al., 2011).

The communication practices of the Global South offer a distinctive lens for studying climate communication. China and Brazil, as emerging economies and significant actors in international climate governance, exhibit both commonalities and notable differences in their climate communication. Their common ground lies in the need to balance economic development with international responsibility while cultivating public understanding and policy legitimacy domestically. Their divergence, however, stems from differences in political systems, sociocultural environments, and media ecologies. China’s media system is deeply embedded within the Party-state structure, whereas Brazil has developed a pluralistic news ecosystem shaped by the parallel trajectories of democratization and commercialization.

Scholars have highlighted that climate communication in Global South countries manifests distinct features and challenges under the conditions of digitalization and globalization. The digital media environment has reshaped political communication and the structure of public opinion: social media and online platforms not only transform the circulation of information but also intensify the fragmentation and polarization of the public sphere (Bennett & Pfetsch, 2018; Ituassu & Guerrero, 2024; Tavares et al., 2024). In the Brazilian context, researchers have noted that the interaction between digital communication and political culture produces “hybrid cultures” (Canclini, 1995), reflecting a deep entanglement between global technological logics and local political-cultural contexts (Ituassu et al., 2023; Pfetsch, 2020).

Brazilian environmental journalism has evolved within the historical processes of democratization and commercialization, resulting in a communication ecology where event-driven reporting coexists with elite discourse (Albuquerque & Pinto, 2020; Loose & Carvalho, 2023; Tourinho Girardi et al., 2018). Additionally, academic communities, environmental organizations, and alternative media have long cultivated diverse discursive resources for environmental issues (Beling Loose, 2025; Costa Bueno, 2013; Sarmiento, 2019). However, they also face structural

challenges, including the dominance of commercial media, fragmented coverage, and fluctuating levels of public attention (Gern & Lima, 2018).

In China, the state's dominance and regulatory control extend into the digital domain (Repnikova & Fang, 2019). Media serve as instruments for disseminating state-approved values and moral norms, advancing economic development, and fostering social transformation and collective action (Guo et al., 2023; Zhao, 2011; Ahlers & Shen, 2018). These dynamics illustrate that climate communication in the Global South generates divergent discursive constructions across countries, depending on their national conditions and media ecosystems.

From the perspectives of society, politics, and economy, the complexity of climate communication also lies in the tension between globalization and localization. On the one hand, climate change, as a global issue, requires the promotion of worldwide action through international organizations—such as the UNFCCC and the IPCC—and multilateral negotiations.

On the other hand, domestic climate communication must align with local political, economic, and cultural logics; otherwise, it becomes difficult to achieve effective public mobilization and policy implementation. Despite the increasing trend of journalism crossing borders to align with the global media agenda, especially on emerging global issues such as climate change, research still points out that contemporary news practices are “specialized in specific local contexts” (Vu et al., 2019). Existing studies indicate that the ways in which news media report on climate change vary across countries, shaped by factors such as the level of economic development, the severity of climate challenges, and governance structures (Vu et al., 2019). Framing theorists have argued that multiple factors—including bias, culture, and ideology—influence how frames are constructed, thereby shaping news information (Entman, 2007). It is also well established that media in different countries may frame the same issue in markedly different ways (Akhavan-Majid & Ramaprasad, 1998).

From a macro perspective, the social communication of climate change has transcended the boundaries of any single discipline, evolving into a complex issue at the intersection of science, politics, economy, and communication. For the field of social communication, this encompasses not only the application of news framing theory in cross-cultural and cross-institutional contexts but also the

analysis of how Global South countries construct discourse and respond institutionally within the broader landscape of international climate communication. Examining climate news coverage in China and Brazil thus contributes to understanding the localization logics of global issues while offering both theoretical and practical value to social communication studies, cross-cultural communication, and global climate governance.

The escalating global climate crisis has made understanding how news media construct climate issues an essential direction in social communication and climate communication research. From the dissemination of scientific knowledge to policy advocacy and social mobilization, media framing plays an indispensable role in the localization of climate issues. However, existing academic studies still exhibit gaps in geographic coverage and theoretical development, providing both an academic entry point and practical significance for this research.

Existing studies on climate communication and framing have predominantly focused on developed countries in Europe and North America (Badullovich et al., 2020; Guenther et al., 2023). A substantial body of empirical research has analyzed how news media in the United States, the United Kingdom, Germany, and other nations report and frame topics such as “global warming” and “climate change” (Benjamin et al., 2017; Schuldt et al., 2017; Soutter & Möttus, 2020). These studies have revealed patterns of ideological polarization, partisan communication, and policy contestation in climate coverage. Yet, their conclusions are difficult to directly apply to Global South contexts. On the one hand, developing countries differ significantly from Western nations in terms of political institutions, media markets, socio-cultural conditions, and exposure to climate risks. On the other hand, Global South countries play increasingly critical roles in international climate governance, but systematic research is still lacking on how their domestic communication logics affect international commitments and the implementation of climate policies.

Notably, cross-national framing studies exhibit two main characteristics. First, most comparative research focuses on differences in information output—such as the volume of media coverage and thematic distributions—while offering limited empirical analysis of how socio-economic, political, and cultural contextual variables influence frame selection and communicative effects. Second, systematic

comparisons among developing countries remain scarce. China and Brazil, as two major representatives of the Global South, both hold significant discursive power in the international climate agenda. Yet, how media in these two countries reconstruct this global issue within their domestic social contexts remains underexplored.

At the theoretical level, this research extends framing theory and climate communication studies in three ways. First, it provides empirical validation in non-Western contexts. Classical framing studies have largely been grounded in Western media environments, typically within free-market media systems and pluralistic public spheres. In contrast, China and Brazil present distinct media ecologies: China is characterized by a party-state-dominated, centralized media system, whereas Brazil exemplifies a commercialized and pluralistic media ecosystem. By conducting a cross-national comparison, this study examines the applicability and boundaries of framing theory in non-Western, Global South contexts.

Second, the study highlights contextual variables and the logic of frame localization. In a media environment shaped by the interplay of digitalization and globalization, the cross-national communication of climate issues is not only constrained by scientific consensus but also embedded within the political, cultural, and affective structures unique to each society. This research treats institutional and cultural factors as potential moderating variables, analyzing how they shape frame selection and narrative construction.

Third, this study proposes a conceptual lens of global issue localization in media communication. Climate change, as a global issue, is often dominated by Western narratives and policy designs. When introduced into non-Western countries, it frequently undergoes a process of re-contextualization or localized communication, wherein media embed global issues into domestic political, economic, and cultural narratives. By analyzing six representative climate events, this study reveals how Chinese and Brazilian media transform global climate discourses into national narratives and social agendas. This analysis offers a new theoretical pathway for understanding how Global South countries develop discursive strategies within international climate communication.

From a practical perspective, this research offers valuable insights for journalists, policymakers, and public communicators alike. By revealing both the

narrative differences and shared themes in Chinese and Brazilian media coverage of climate issues, the study can help news organizations optimize their reporting strategies within local contexts. Media serve as a critical bridge between policy and the public. Understanding how media translate global issues into local narratives facilitates the development of more targeted public communication strategies by policymaking bodies.

Moreover, this study provides a comparative perspective on climate communication in China and Brazil, which may serve as a reference for other developing countries seeking to enhance climate communication and engage in international climate discourse. By demonstrating the logic of localized communication for global issues, the research contributes to the formation of a more influential discursive system for Global South countries in international climate debates. Revealing the diverse localization pathways of global issues across national contexts not only enriches the theoretical understanding of cross-cultural climate communication but also offers practical implications for strategic engagement of Global South countries in international climate discourse.

In conclusion, this study not only enriches existing academic research but also seeks to provide new perspectives for climate communication studies in the Global South, both theoretically and practically. By combining framing theory with a cross-national comparison between China and Brazil, the dissertation demonstrates how global issues are reinterpreted under different institutional and cultural conditions, offering significant contributions to social communication, cross-cultural communication, and global climate governance.

This study adopts a social communication perspective to conduct a cross-national comparison of climate change news coverage, aiming to understand the communication logics and discursive constructions of global issues within different institutional and cultural contexts. As one of the most important global public issues of the 21st century, climate change is not only a matter of environmental concern but also a media-mediated phenomenon: its representation in the news influences public risk perception and policy attitudes, while simultaneously reflecting a country's role in global climate governance and its capacity for social mobilization. By systematically analyzing climate news coverage in China and Brazil, this research seeks to uncover how media construct narratives at the intersection of

scientific knowledge, national policy, and sociocultural context, and to explore the logic of localized communication for global issues.

The general objective of this study is to systematically analyze the framing logics and localized expressions of climate news coverage in China and Brazil from a cross-institutional and cross-cultural social communication perspective, revealing how global climate issues are reframed in the media narratives of non-Western countries, and examining the implications of this reframing for public communication and international climate discourse.

This objective informs the entire research design, responding both to the academic need for climate communication studies in the Global South and providing a new analytical pathway for understanding the interaction between media, global issues, and domestic politics.

Building upon the general objective, this study establishes the following four specific objectives. To systematically review the academic development of climate communication and news framing theory, integrating research in the Global South context, and to analyze the key features of China and Brazil in terms of climate policy, media systems, and sociocultural contexts, thereby providing a theoretical and institutional foundation for cross-national comparison; To conduct qualitative content analysis of news coverage on six representative domestic climate-related events, identifying the similarities and differences in frame types, sentiment selection, and narrative structures between the two countries, and uncovering the underlying communication logics; To analyze the influence of contextual variables—including political institutions, media ecologies, sociocultural factors, and event characteristics—on frame construction and discursive strategies, and to explain why differentiated narratives emerge in climate reporting across countries; To propose the logic of re-contextualization and localization in the communication of global climate issues in non-Western countries through cross-national comparison, and to discuss how this logic influences national image-building, policy communication, and public mobilization, while providing practical insights for Global South countries to engage more effectively in international climate discourse.

This study adopts a social communication perspective to focus on how media in China and Brazil report on climate change, aiming to reveal the localization logic

and framing characteristics of global issues within different institutional and cultural contexts. To address the dissertation questions proposed in this research, a systematic plan has been developed in terms of research objects, data and sample selection, and methodological design.

The objects of analysis in this study are online news reports on domestic climate-related events in China and Brazil. Selecting these two countries as research targets carries dual significance. On the one hand, both China and Brazil are important representatives of the Global South, playing increasingly influential roles in global climate governance while facing the dual pressures of economic development and environmental protection domestically. On the other hand, the two countries exhibit significant differences in political institutions, media ecologies, and sociocultural contexts, providing ideal conditions for cross-national comparative research.

To achieve the dissertation objectives, this study focuses on six representative domestic climate-related events, covering three categories of issue types: International climate speeches by national leaders, such as Brazilian President Lula's climate speech at the United Nations General Assembly and Chinese President Xi Jinping's speech at the Leaders' Summit on Climate; National policy and strategic plan announcements, such as the release of Brazil's new National Climate Plan (Plano Clima) and China's early achievement of the 14th Five-Year wind and solar energy installation target; Domestic socio-environmental climate events, such as the 2024 forest fires in Brazil and the release of China's Green Book on Climate Change.

These cases combine international and domestic dimensions as well as policy-driven and socially oriented aspects, allowing the study to capture the narrative structures and communication logics of climate issues in the news media of both countries.

To obtain a representative research sample, this study utilized Google News and Baidu News as the primary retrieval platforms, systematically collecting online news articles related to the six selected events. The initial search yielded 602 news reports, covering the mainstream online media of China and Brazil, including party-run media, institutional media, commercial media, specialized media, and other media types.

During the data curation process, strict sample selection criteria were applied: The news content must directly relate to the selected climate events; The report must include a clear climate or environmental framing, excluding pure transcripts of leadership speeches or unedited syndicated content; The source must be accessible and verifiable.

After screening and de-duplication, a total of 261 news reports were selected as the core sample for qualitative content analysis. The sample covers three events from China and three from Brazil, encompassing policy release and implementation, social impacts, and international leadership speeches, thus providing a solid textual foundation for subsequent cross-national comparative analysis.

This study adopts a combined methodological approach of Qualitative Content Analysis and Case Study to gain an in-depth understanding of the framing logic and discursive characteristics of climate reporting in Chinese and Brazilian media.

A Framing Analysis is employed, incorporating Issue-Specific Frames and Generic Frames as the two primary analytical dimensions, in order to identify the thematic representation, narrative pathways, and value orientations embedded in news coverage. This is further complemented by a Sentiment Analysis, which evaluates the direction of reporting (positive, neutral, or critical) to uncover the potential implications of media discourse for public perception and policy communication.

The study takes six representative climate-related events as the units of analysis. By comparing the background, media coverage, and framing characteristics of each case, it extracts both the differences and commonalities in the institutional logic, communication styles, and social functions of media in China and Brazil. The case study approach not only strengthens the interpretive power of the cross-national comparison but also helps bridge the macro-level research questions with concrete journalistic practices.

By analyzing climate news reporting from China and Brazil within a unified research framework, this study reveals the process of re-contextualization of global issues in diverse national settings, thereby providing systematic academic insights into the discursive construction of climate communication in the Global South.

1.2 Research Questions

Accordingly, this dissertation proposes the following three core research questions:

(1) What framing changes have the media undergone during the development process in these two countries?

This study first examines the evolutionary trajectory of climate news in China and Brazil, aiming to reveal the changes in issue framing, thematic selection, and sentiment styles across media in each country, and to analyze how these transformations reflect their respective political, social, and institutional contexts.

(2) What are the differences between state-owned and commercial media in reporting on climate change?

The research then compares the reporting logic and discursive practices of different types of media, analyzing their functions in policy communication and national image-building, as well as their roles in diversified expression and public oversight.

(3) As developing countries, what factors influence media reporting on climate change in China and Brazil?

Finally, this study explores how contextual factors—including political systems, media ecosystems, economic development, sociocultural conditions, and event types—collectively shape the framing choices and narrative pathways in climate news reporting, thereby revealing the deeper logic of global issue communication in non-Western contexts.

By addressing these three research questions, this dissertation provides a systematic analytical framework for understanding the climate communication practices of Global South countries and offers empirical foundations for both cross-national media comparisons and policy-oriented communication strategies.

1.3 Summary of the dissertation

This study is organized into six chapters, following a logical sequence that progresses from macro-level context to theoretical analysis, and then to empirical

research and integrative conclusions, with the aim of comprehensively revealing the reporting characteristics, framing logic, and communication mechanisms of climate change coverage in Chinese and Brazilian news media.

Firstly, Chapter 2 traces the historical evolution of climate change from scientific discovery to a central topic in international governance, integrating Kuhn's theory of scientific revolutions and Latour's actor-network theory to analyze the knowledge construction and social communication processes of climate science. The chapter also systematically reviews the academic development of climate communication within the field of social communication, and provides a comparative analysis of the policy and sociocultural contexts of climate issues in China and Brazil. This serves as the historical and theoretical foundation for cross-national comparative research.

Chapter 3 focuses on Environmental Journalism, providing a systematic review of the developmental trajectories, institutional logics, and reporting characteristics of environmental journalism in both countries. It is structured into two main sections—Chinese environmental journalism and Brazilian environmental journalism—covering media systems, journalistic norms, reporting styles, and social functions. By analyzing institutional and content dimensions, this chapter establishes the communication and media-system basis for subsequent cross-national comparisons of climate news.

Chapter 4 provides an in-depth review of Framing Theory and its interdisciplinary evolution in climate communication studies, tracing its roots in sociology and psychology and summarizing key concepts, frame types, and methodological approaches. It discusses the linguistic nuances of core terms such as climate change and global warming and their potential framing effects, while situating the discussion within the context of digitalization and political polarization. The chapter highlights the applicability and reconsideration of framing theory in Global South and cross-cultural contexts, providing the theoretical tools and analytical framework for the empirical study.

Chapter 5 forms the empirical core of this research, presenting a cross-national content analysis and case study of six domestic climate-related events in China and Brazil. Through Issue-Specific Frames, Generic Frames, and Sentiment Analysis, the chapter presents the key findings from three perspectives: The

framing strategies and differences in climate reporting across Chinese and Brazilian media; The political, economic, cultural, and institutional factors shaping media coverage; The role and cross-national variation of dominant themes in climate narratives. By systematically analyzing 261 news articles, this chapter reveals the media logic of global issues in non-Western contexts.

The final chapter synthesizes the research findings, articulates the theoretical contributions and practical implications, and acknowledges the limitations and directions for future research. It not only integrates the empirical and theoretical insights from previous chapters but also proposes a conceptual framework for the localized communication of global issues, underscoring this study's value for social communication, cross-cultural studies, and Global South climate discourse research.

Overall, this dissertation follows a coherent research trajectory: beginning with macro-level background and theoretical foundations, proceeding through the institutional and content analysis of environmental journalism in China and Brazil, and culminating in a cross-national empirical study and integrative conclusion. This structure systematically unveils the framing construction, discursive strategies, and social significance of climate communication in Global South countries.

2. Historical Review of Climate Change

Climate change has emerged as one of the most critical global issues of the 21st century, influencing political decision-making, economic development, social governance, and public life. From a scientific perspective, modern climate science traces its origins back to the early 19th century (Dessler, 2011). Initial research focused on the physical mechanisms of the greenhouse effect, while in the latter half of the 20th century, the impact of human activities on the global climate became a central concern in the scientific community. Since the 1980s, assessment reports issued by the Intergovernmental Panel on Climate Change (IPCC) have further advanced global awareness of climate change. However, despite a broad scientific consensus, societal perceptions and responses to climate change remain widely contested. These debates extend beyond scientific facts to include policy choices, economic interests, national development strategies, and sociocultural factors.

This chapter employs a multi-level analytical approach, integrating perspectives from the history of science and social communication studies to examine the evolution of climate change science and its dissemination across different social, political, and economic contexts. The analysis unfolds across four dimensions. First, it reviews the evolution of climate change science and its incorporation into global communication studies, clarifying the historical logic and research trajectory through which climate change emerged as a public issue. Second, it systematically traces the historical development of international climate mechanisms, examining the formation and growing influence of global climate governance frameworks. Third, it reviews the processes of negotiation and contestation among nations on climate change issues, analyzing the politicization of this international scientific agenda from the perspectives of politics, economics, and technological development. This section further explores the challenges climate change faces as a global governance issue, particularly in the context of diverging national interests. Finally, it highlights China's and Brazil's climate policies and domestic socio-cultural contexts, summarizing both the similarities and differences between the two countries as members of the Global South, thereby providing

theoretical support and an analytical lens for the comparative research undertaken in this dissertation.

The structure of this chapter is as follows: Section 2.1 outlines the development of climate change science and its introduction into communication research; Section 2.2 focuses on the formation and move of international institution on climate change; Section 2.3 analyzes the politicization of the climate change agenda and the dynamics of international negotiations; and Section 2.4 examines the characteristics and limitations of existing climate policies and socio-cultural contexts in China and Brazil, concluding with insights that inform the subsequent empirical analyses.

The core objective of this chapter is to outline the developmental trajectory of climate change discourse within a broader environmental narrative framework and to analyze its scientific, political, and social dimensions. Specifically, this research seeks to explore why skepticism and resistance persist despite the establishment of a well-defined scientific framework for climate change. Additionally, this study examines how scientific knowledge is influenced by national policies, industrial interests, media discourse, and public opinion, aiming to reveal the complexity of climate change as a contested issue.

This chapter achieves its research objectives through a systematic review of academic journal articles, monographs, international policy documents, research reports from various institutions, and official website materials. The study primarily focuses on mainstream discourses that support the scientific consensus on climate change and does not engage with the "denial" perspectives of climate change skeptics. This methodological choice is based on the recognition that mainstream scientific consensus plays a crucial role in shaping public understanding and driving policy action.

To construct this analytical framework, this study draws upon Thomas Kuhn's theory of *The Structure of Scientific Revolutions* and Bruno Latour's Actor-Network Theory (ANT).

Kuhn's theory contrasts with the traditional uniformitarian view of scientific progress, which posits that scientific advancement is a continuous accumulation of facts and technologies (Rahman, 2013). Instead, Kuhn argues that scientific development is driven by paradigm shifts, whereby scientific progress occurs

through periodic disruptions and transformations. He proposes a catastrophic model of scientific change, in which periods of normal science are interrupted by crises, leading to paradigm shifts where new scientific theories replace old ones. The evolution of climate science exhibits a similar trajectory: from early theories of the greenhouse effect to the growing scientific consensus on the impact of human activities on global warming, culminating in the establishment of the mainstream scientific framework articulated in IPCC reports.

Latour's Actor-Network Theory (ANT), on the other hand, emphasizes that science does not develop solely through internal theoretical progress but is constructed through interactions between human and non-human actors. The formation of scientific knowledge is not only shaped by scientists and their research methodologies but also by social, political, and economic forces. For instance, in the process of forming and consolidating the scientific consensus on climate change, the establishment of scientific conclusions has depended not only on experimental data and computational models but also on the interplay of government policies, international organizations, media representations, and industrial interests. The development of climate change science exemplifies this dynamic, as it has been shaped by multiple stakeholders and has achieved varying degrees of acceptance by the public across different societal contexts.

By integrating Kuhn's and Latour's theories, we gain a more comprehensive understanding of the evolution of climate change. Kuhn's paradigm shift theory explains why scientific consensus undergoes crises and transformations, while Latour's actor-network theory elucidates why the same scientific consensus may encounter varying levels of acceptance or resistance in different social settings. For example, despite the extensive scientific evidence presented in IPCC assessment reports, some nations and corporations remain skeptical, a stance closely tied to political interests, energy policies, and public opinion. By synthesizing these two theoretical perspectives, this study offers a deeper analysis of the trajectory of climate science and its dissemination and influence within society.

2.1 The Scientific History of Climate Change

For thousands of years, humans have speculated about the nature of climate. As with many other scientific disciplines, the development of climate science has not followed a linear trajectory of accumulation but has instead undergone a process of paradigm shifts. From its initial fragmented discoveries to the eventual formation of a global scientific consensus, climate science has experienced multiple stages of scientific revolution. Based on a synthesis of previous scholarly research (Rahman, 2013; Oreskes & Conway, 2010; Weart, 2024; Dessler, 2011), and in light of new observations, this study categorizes the development of climate change science into four stages: the pre-scientific stage of climate change research, the paradigm shift stage, the consolidation of the new paradigm, and the stage of interdisciplinary deepening and policy integration.

2.1.1 The Pre-Scientific Stage of Climate Change Research: Fragmented Studies

The first stage, the pre-scientific stage of climate change research, spanned from the 19th century to the mid-20th century. During this period, scientists gradually accumulated data related to Earth's climate and identified certain anomalies, such as the fundamental principles of the greenhouse effect and preliminary evidence of temperature changes following the Industrial Revolution. However, at this stage, climate change remained within the framework of "normal science" and had not yet reached a clear scientific consensus. The debates were largely confined to the scientific community of climatologists, and related research was scattered across different academic disciplines (Rahman, 2013).

Although "climate change" is now recognized as a significant global issue, early scientists did not fully grasp its potential adverse effects. The origins of modern climate research can be traced back to 1824, when the French mathematician and physicist Joseph Fourier described the greenhouse effect in an article published in *Annales de la Chimie et de Physique*. He explained that a planet's atmosphere could absorb heat, raising the planet's surface temperature

above what it would be if it were an exposed, airless rock (Rahman, 2013; Dessler, 2011).

In the 1830s, the geologist Louis Agassiz and his colleagues discovered glacial deposits across various parts of Europe. From these findings, they inferred that northern Europe had once been covered by ice, a conclusion that challenged the prevailing understanding at the time. Before this discovery, it was widely assumed that the climate had remained consistent throughout history and would continue to do so in the future. However, evidence of large-scale glacial activity indicated that Earth's climate had undergone significant shifts in the past and could change again in the future. This revelation laid the foundation for a century of subsequent climate science research, prompting scientists to further investigate the evolution of the climate system (Dessler, 2011).

In 1859, the Irish experimental physicist John Tyndall discovered that heat absorption in the atmosphere was primarily driven by water vapor and carbon dioxide, despite the fact that these gases comprised only a small fraction of the atmosphere. He was the first to identify carbon dioxide as a greenhouse gas—meaning it could trap heat and prevent it from escaping into space. Tyndall regarded this as a fundamental fact about our planet, without assigning any particular social or political significance to it (Oreskes & Conway, 2010).

By the late 19th century, human understanding of the climate system had made significant progress (Dessler, 2011). In 1896, Swedish scientist Svante Arrhenius, a Nobel laureate renowned for his research on chemical reactions, introduced a groundbreaking idea. He recognized that by burning fossil fuels such as coal, thereby adding CO₂ to the Earth's atmosphere, humans could increase the planet's average temperature (Weart, 2024). Arrhenius estimated that a doubling of atmospheric CO₂ concentration would lead to a temperature rise of 5 to 6 degrees Celsius. Remarkably, despite having access to only the most rudimentary climate system data, his sensitivity estimate of 2.0–4.5°C closely aligns with modern climate projections.

Although Arrhenius' calculations were primarily focused on explaining the Ice Ages, he also realized that human activities—particularly coal combustion—were contributing CO₂ to the atmosphere (Dessler, 2011). His work marked the inception of the theory of anthropogenic global warming. Nevertheless, while the

contours of modern climate science had already begun to emerge in the early 20th century, many fundamental aspects of the field remained poorly understood. Although Arrhenius predicted that human-emitted CO₂ would accumulate in the atmosphere, many scientists at the time believed that most of this CO₂ would be absorbed by the oceans, while some CO₂ is indeed quickly absorbed by the oceans, a significant portion remains in the atmosphere. Additionally, some researchers argued that water vapor dominated atmospheric absorption of infrared radiation, rendering the addition of CO₂ inconsequential. Arrhenius also estimated that it would take thousands of years for human emissions to release enough CO₂ to significantly warm the climate. He failed to anticipate the exponential growth of fossil fuel consumption, which increased at such a rapid pace that it was easy to underestimate the long-term changes it would drive (Dessler, 2011).

What later became known as the "greenhouse effect" was merely one of many hypotheses regarding climate change at the time—and not the most widely accepted one. The few scientists who paid attention to Arrhenius' theory relied on crude experiments and rough approximations to argue that human emissions were incapable of altering the Earth's climate. The prevailing view held that the vast and complex global climate system was beyond the influence of insignificant human actions. Most believed that global climate cycles were regulated by a benign "natural equilibrium" that would maintain stability indefinitely (Weart, 2024).

At that time, the level of public concern about environmental issues was much lower. People viewed weather and climate changes as some of nature's most harsh weapons, and nature itself was seen as a dangerous force (Dessler, 2011). When severe winters or prolonged droughts could result in human death, humans did not perceive themselves as capable of challenging nature. Therefore, if human progress, such as the burning of fossil fuels, altered the climate, it was not considered a problem. Deforestation, the replacement of forests with farmland, or the hunting of wildlife were regarded as improvements and progress (Dessler, 2011). For people at that time, nature was not something to be protected or preserved. Little did they know that a century later, the balance of power between nature and humanity would shift.

In the 1930s, some measurements indicated that the United States and the North Atlantic region had significantly warmed over the past half-century .

Meteorologists at the time believed that this was simply a stage in a mild natural cycle, possibly regional, with its causes unknown (Weart, 2024). Around this time, British inventor and engineer Guy Stewart Callendar proposed that this warming was actually caused by human carbon dioxide emissions. In his work, he confirmed Arrhenius' observation that burning fossil fuels would warm the Earth, but he revisited the old measurements of atmospheric carbon dioxide and, unlike Arrhenius, he realized that humans had already begun increasing the level of carbon dioxide in the global atmosphere (Dessler, 2011). However, like most people at the time, Callendar was not particularly concerned that human alterations to the environment would have any harmful effects.

This idea of human activity having no harmful impact on the environment began to change in the 1950s due to multiple influencing factors. Andrew Dessler's article records several significant events during this period. One of these was the invention of nuclear weapons. During World War II, nuclear bombs with yields in the tens of kilotons were used twice. By the 1950s, the power of hydrogen fusion bombs had increased hundreds of times. In fact, a nuclear bomb carried by a 1950s bomber had a greater explosive power than all the explosives used in World War II. People gradually realized that humanity now possessed the ability to destroy itself, making the idea that we could alter the environment seem more plausible by comparison.

Air pollution also became an important issue. Perhaps the most famous historical air pollution event was the deadly smog in London in 1952. At that time, most households in London used coal for heating. In early December 1952, a temperature inversion occurred over London, forming a stagnant air mass above the city. As people burned coal, the air was filled with black coal smoke. This dark cloud hung over London, blocking the sunlight and causing a sharp drop in temperature. This, in turn, led people to burn even more coal for warmth, resulting in further accumulation of smoke in the air (Weart, 2024). It wasn't until December 9th, when the weather changed, that the deadly fog was blown away, vanishing as quickly as it had appeared—by then, thousands of Londoners had already died.

Meanwhile, people in many parts of the world were becoming wealthier. The poor often worried about where their next meal would come from or where they would sleep at night—they were less concerned about the environment, while

wealthier individuals were more focused on a high-quality material life (Dessler, 2011). The affluent material lifestyle prompted people to seek a higher quality of life and attempt to listen to the distant cries of the world.

Another significant event was the International Geophysical Year (IGY) held in 1957 and 1958. This was an international effort aimed at coordinating polar observations of the Earth to improve our understanding of the fundamental geophysical processes that govern the environment. The intensive observations conducted during this year greatly enhanced our understanding of the Earth and the countless ways in which humanity alters it. One of the most notable measurements that began during the IGY was the monitoring of atmospheric carbon dioxide (Dessler, 2011).

With the advancement of computer technology and improvements in climate models, scientists gradually deepened their understanding of global warming. The sharp increase in government funding made these studies possible, particularly from military agencies interested in better understanding weather and geophysics. This knowledge was not only crucial for future battles but could also enhance national prestige in the Cold War competition (Weart, 2024). In the following few years, the increasing number of climate monitoring reports contributed to the discovery of the fact that human activities were causing climate change.

In 1960, the young scientist Charles Keeling began conducting long-term measurements of atmospheric gas levels. He was a scientist obsessed with accuracy (Weart, 2024). His discovery—that the concentration of CO₂ in the atmosphere was continuously rising—provided direct evidence of global warming. American scientists began warning political leaders that this could be a real issue. At least some of them—including then U.S. President Lyndon Johnson—heard this message. However, they did not take action on it (Oreskes & Conway, 2010).

Although Keeling was the first to accurately measure atmospheric carbon dioxide levels on Earth in 1960, it wasn't until 1970 that climate change was accurately regarded as a scientific issue (Rahman, 2013).

2.1.2 Paradigm Shift: Humanity's Ability to Alter Nature

By the 1970s, climate change research became the focus of the scientific community. The American Institute of Physics noted that the rise of environmentalism in the early 1970s led to public skepticism about the benefits of human activities on Earth. This, in turn, transformed curiosity about the climate into anxious concern. Several degrees of warming no longer seemed benign, and with the possible impact of scientists' findings, they noted the shocking potential for rising sea levels and agricultural damage (Weart, 2024). From that point on, concerns about anthropogenic global degradation spread, triggering a large volume of international cooperation, plans, and meetings involving not only scientists but also representatives from interested communities. The plans and meetings of the 1970s appeared to be aimed at exploring and acknowledging the extent of human-induced climate change (Rahman, 2013). An example of this is the Global Atmospheric Research Program (GARP), organized in 1974 by the World Meteorological Organization (WMO) and the International Council of Scientific Unions (ICSU).

At that time, scientists were still focused on the potential issue of global warming caused by the increase in greenhouse gas concentrations in the atmosphere. However, at the same time, the aerosol content resulting from human activities was also on the rise, for example, the burning of sulfur-containing coal. Aerosols tend to cool the Earth, thus offsetting some of the warming caused by the increase in greenhouse gases. Some scientists believed that humans had actually added enough aerosols to the atmosphere to outweigh the impact of greenhouse gases, leading to a net cooling effect on the climate (Dessler, 2011).

Subsequently, a reasonable scientific debate arose about which effect was dominant. The majority of scientists concluded that catastrophic cooling was unlikely to occur, as dust and smoke would dissipate from the atmosphere within weeks, whereas carbon dioxide could remain in the atmosphere for centuries (Weart, 2024). Ultimately, the debate's outcome favored those predicting that global warming would become the primary impact on humanity (Dessler, 2011).

In February 1979, the first World Climate Conference (WCC) was held in Geneva, initiated by the World Meteorological Organization (WMO). The

conference, which focused on the theme "Climate and Mankind," issued a declaration. The meeting noted: "What is serious is that the continuing expansion of human activities on Earth may affect regional, or even global, climate changes... There is an urgent need for global cooperation to explore potential future global climate changes and, based on this new knowledge, to develop plans for the future development of human society." (Yang, 2005).

As concerns about climate change grew, in 1979, the U.S. National Academy of Sciences convened an expert panel to discuss reliable statements on the issue. They reached a consensus and published the influential Charney Report. The report clearly stated that human activities were causing global temperatures to rise. The conclusion was written as follows: "If carbon dioxide continues to increase, the study group finds no reason to doubt that climate changes will result and no reason to believe that these changes will be negligible. The conclusions of prior studies have been generally reaffirmed." From a more quantitative perspective, the conclusion was as follows: when carbon dioxide emissions reach twice the pre-industrial levels, sometime in the next century, the global average surface temperature will increase by 3°C, with a margin of error of $\pm 1.5^\circ\text{C}$ (Weart, 2024). This is remarkably close to today's estimates.

Scientists began to understand that the climate is a complex system, reacting to many influences. According to the new "chaos" theory, transitions in complex systems may occur suddenly. Support for this idea came from ice cores painstakingly drilled from the Greenland ice sheet. In the past, these cores showed large, disturbing temperature increases occurring not over centuries, but within decades (Weart, 2024).

Improved computer models also began to suggest how such jumps might occur, for example, by altering ocean circulation patterns. Now, experts predicted that global warming would not only bring rising sea levels but also unprecedented droughts, storms, floods, wildfires, and other weather disasters. Some politicians began to suspect that this might indeed be a public issue. However, modelers had to make many arbitrary assumptions about phenomena such as clouds, and even reputable scientists raised concerns about the reliability of the results. Others pointed out that little was known about how living ecosystems interact with climate and the atmosphere (Weart, 2024). For instance, they questioned how much CO₂

human activities, like deforestation, were adding to the atmosphere. One thing that scientists agreed on was the need for larger, more coherent research programs.

Further studies in the early 1980s enriched and confirmed the widespread view that humans were altering the climate. However, the public and most politicians remained largely indifferent to the issue (Dessler, 2011). One unexpected discovery was the explosive rise in the levels of other "greenhouse gases," such as methane and chlorofluorocarbons. By the late 1970s, global temperatures had already visibly risen, and some climate scientists had been predicting that unprecedented global warming would become evident around the year 2000 (Weart, 2024). In 1985, climate experts from 29 countries gathered in Austria, where the first initiative for an international treaty to prevent climate change was proposed (Yang, 2005).

The concerns of experts finally captured public attention in the summer of 1988 (Weart, 2024). That year proved to be one of the hottest and driest in U.S. history. As 40 percent of the nation's counties were affected, with crops failing, livestock dying, and food prices rising, people began to wonder if perhaps global warming was not so far off after all. Popular and media interest in climate soared (Oreskes & Conway, 2010).

On June 23, James Hansen, a NASA climate scientist, testified before the U.S. Senate Energy and Natural Resources Committee. In front of reporters, he expressed 99% confidence that the world was indeed warming, and that human activities were likely the cause.

This triggered a media storm. The New York Times placed Hansen's testimony on the front page (Oreskes & Conway, 2010). That year, Time magazine did not name a "Person of the Year" but instead chose "Endangered Earth" as its "Planet of the Year" (Dessler, 2011).

1988 was also the year when climate change transitioned from being an academic issue to a political one (Dessler, 2011). After the U.S. Congressional hearings, scientists at a major international climate conference held in Toronto called on governments worldwide to take proactive measures to reduce greenhouse gas emissions (Weart, 2024). In the following months, the United Nations General Assembly passed a resolution urging "the protection of the global climate for present and future generations" (Dessler, 2011).

To further strengthen international cooperation on climate change, the Intergovernmental Panel on Climate Change (IPCC) was established that same year, providing authoritative scientific assessments on global climate change research. The organization's goal was to summarize our understanding of climate change and the level of confidence we have in this knowledge for policymakers and the public (Dessler, 2011). Although the IPCC is managed under the United Nations, it consists of representatives independently appointed by various national governments. Hundreds of experts contributed their time to various working groups, which gathered to determine which aspects of climate science could be reliably expressed and which could not (Weart, 2024). During this period, climate change science gradually shifted from a scattered field of study to a widely accepted issue among the scientific community and policymakers.

It is evident that the second phase of climate change science was the paradigm shift phase, which took place in the 1970s and 1980s. During this time, the scientific understanding of climate change underwent a fundamental transformation. Increasing research showed that human activities, particularly greenhouse gas emissions, were the primary drivers of global warming. Key events during this period include the 1979 World Climate Conference and the establishment of the IPCC in 1988. These events reflect the paradigm shift within the scientific community, from early fragmented studies to the development of a scientific consensus on anthropogenic climate change.

The discovery of global warming was essentially completed. Scientists understood how the climate would change in the 21st century and the most significant impacts that would follow. Now, how the climate will actually change depends largely on the policies governments choose to implement (Weart, 2024).

2.1.3 The Beginning of Climate Change Skepticism

The response to the conclusion that "climate change is caused by human activities" was strong. Companies and individuals opposing all government regulations began to spend millions of dollars on lobbying, advertisements, and "reports" that mimicked scientific publications, attempting to convince the public

that there was no problem at all (Weart, 2024). Environmental groups, though less wealthy, were more passionate, which helped to create a sense of urgency through their surprising calls. The many uncertainties in science, along with the sheer complexity of the climate, provided ample room for endless debates about what actions, if any, the government should take (Weart, 2024).

In fact, this debate on climate change had already emerged within the scientific community. After the publication of the Charney Report (1979), the White House Office of Science and Technology began requesting more information from the National Academy of Sciences. Oreskes and Conway describe the government's delay in climate change policy and the ensuing debate in their book *Merchants of Doubt*. The economist Thomas Schelling chaired the advisory panel.

Schelling focused on what warming would mean socially and politically—an aspect of the issue that had hardly been studied, much less understood (Oreskes & Conway, 2010). As a result, his letter to the academy emphasized uncertainty, although he highlighted not only the uncertainties in social sciences but also in physical sciences. He argued that due to the enormous uncertainty surrounding climate change and its potential costs, policymakers should not take any action yet, but should instead fund more research (Oreskes & Conway, 2010).

In addition to the White House's request, the U.S. Congress also authorized the National Academy of Sciences to undertake a comprehensive study of CO₂ and climate. The new committee was chaired by Bill Nierenberg, with Schelling also participating in this new group. In this report, the committee presented a report with two distinctly different viewpoints: physical scientists believed that the accumulation of CO₂ was a serious problem, while economists argued that it was not. The latter viewpoint formed the framework of the report, which provided the first and last chapters (Oreskes & Conway, 2010). This comprehensive report merely listed the conflicting viewpoints and did not attempt to reconcile them.

In this report, natural scientists expressed concern about the rapid, one-way changes in climate caused by CO₂. These changes would severely challenge ecosystems that could not adapt in just a few decades, as well as human infrastructure. However, economists rejected this warning, suggesting that the best approach might be to address the symptoms of climate change, for example, alter the weather to manage the issue or adapt to it.

The economists' viewpoint gained political dominance at that moment. In fact, it provided the arguments for the emerging climate change skeptics and ultimately served as the basis for the Reagan administration's decision to remove the issue from the political agenda (Oreskes & Conway, 2010). This report was used by the White House to counter the ongoing scientific work of the Environmental Protection Agency (EPA). The EPA had prepared two reports, both of which concluded that global warming would be severe and that the nation should take immediate action to reduce coal usage. However, White House science advisors used the economist-dominated report to rebut the EPA's stance.

These reports introduced all the major themes that later hindered the regulation of greenhouse gases, with one exception. The reports did not deny the legitimacy of climate science, but instead ignored it, supporting the economists' argument: addressing the symptoms without solving the root cause and at a lower cost; as long as the government does not intervene, new technologies will solve any problems that arise; and if technology cannot solve all the problems, we can simply migrate (Oreskes & Conway, 2010).

The committee provided the White House with what it wanted. Historical records suggest that it wasn't merely a coincidence. During a meeting with the Climate Research Committee, Department of Energy officials informed the members that they "did not favor... speculative, alarmist, 'wolf is coming' scenarios" (Oreskes & Conway, 2010). Senior policy analysts from the White House Science Office were also involved. They believed that technology would eventually provide the answers to both energy supply and environmental protection challenges.

It was not until 1997, in the "Economists' Statement on Climate Change," organized by economists Dale W. Jorgenson of Harvard University, Paul R. Krugman of MIT, Robert M. Solow, Kenneth J. Arrow of Stanford University, and William D. Nordhaus of Yale University, with signatures from 2,000 American economists, including six Nobel laureates in economics, that economists encouraged President Clinton's administration to take action on climate change (Li, 2009). They unanimously agreed that global climate change posed significant risks in environmental, economic, social, and geopolitical aspects and required preventive measures. Economic research had already shown that many potential

policies to reduce greenhouse gas emissions would have a net benefit greater than the costs.

We can observe that during the 1980s, economists and natural scientists had different assessments of the importance of climate change. When a scientific fact involves societal and political implications, its importance and the solutions to it vary based on the scholars' perspectives. Scientific research itself is not isolated but nested within social, economic, and political structures. Especially in topics such as climate change, while science provides facts, policy choices are often determined by social interests, ideologies, and political games. When climate knowledge becomes linked with political policies, it is no longer just neutral facts but is embedded within the social, economic, and political systems. The government's difficult choice between short-term economic interests and long-term environmental risks is one of the core contradictions behind the slow progress of climate policy. The discourse framework of uncertainty in climate science can be used as an excuse for policy delays or cancellations, a situation that still frequently occurs today.

In his analysis of the acid rain case in the 1950s, Dessler summarized the strategies used by environmental skeptics at the time. He mentioned that one key element of the skepticism strategy was to identify sympathetic scientists who could convey skeptical messages to the public. Following this strategy, despite the scientific community's belief in the connection between tobacco and the environment, there were no definitive scientific conclusions for several decades (Dessler, 2011). The success of the tobacco strategy encouraged others to adopt it in other policy debates, including the climate change debate.

Dessler analyzed the group of climate skeptics, describing them as a diverse group: some people disputed all claims, while others only questioned certain parts. For example, some skeptics acknowledged that the Earth was warming but doubted human responsibility for it. However, they generally despised any science that might lead to increased government regulation (Dessler, 2011).

2.1.4 Scientific Consensus on Climate Change

The third phase is the consolidation of the new paradigm (from the 1990s to the early 21st century), during which the global scientific community reached a basic consensus on the causes, impacts, and responses to climate change. This consensus was further advanced through international cooperation mechanisms such as the IPCC reports and the Paris Agreement, promoting global policy action. This phase was characterized by a deepening scientific consensus and its widespread dissemination in policy-making and public awareness. Both science and policy began to focus on designing solutions.

The first assessment report (FAR) released by the IPCC in 1990 systematically summarized the scientific evidence on global climate change. While there was still some uncertainty, the report began to emphasize the impact of human activities on the climate. The IPCC was reluctant to make strong assertions based primarily on computer models. It waited to see irrefutable evidence proving that the predicted global temperature changes had indeed occurred. It was not until 2001 that the IPCC managed to reach a consensus, using such cautious language that no government representative dared to object: severe global warming was happening, and humans were the main cause (Weart, 2024).

The first IPCC assessment report reinforced the recognition that human activities were driving climate change. Though still has uncertainty, many world leaders believed that action was necessary to address climate change (Dessler, 2011). The Earth Summit held in Rio de Janeiro in 1992 was a result of this momentum. The meeting adopted the United Nations Framework Convention on Climate Change (UNFCCC), which has nearly all member states, including the United States, China, and all other major emitters. The principles outlined in the UNFCCC remain the main foundation for negotiating emission reduction treaties (Dessler, 2011). World leaders made a solemn commitment to strive to prevent "dangerous human interference with the climate system" (Weart, 2024).

The most contentious debate in climate change policy concerns mitigation measures. In this regard, the established goal of the UNFCCC is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system." This goal is widely

recognized at this abstract level (Dessler, 2011). In practice, however, the meaning of this statement depends on the definition of the term "dangerous." It is a value judgment—what one person considers dangerous may not be viewed as such by others. In order to make any climate change agreement fair or just, the concept of "common but differentiated responsibilities" was also established in the UNFCCC. This means that all countries must participate in addressing climate change, but not necessarily in the same way. Specifically, wealthy industrialized nations should begin by reducing emissions, with developing countries following suit.

By the mid-1990s, no country had met the emission reduction targets set by the UNFCCC, thus the need arose for a legally binding emissions reduction treaty. Around the same time, the IPCC released its second scientific assessment report on climate change, concluding that "evidence suggests that humans have had a discernible impact on the climate." This statement reflected significant progress in climate change science since the first IPCC assessment, with more evidence now linking observed warming to human activities.

In response to these developments, the international community adopted the Kyoto Protocol in December 1997, setting emission reduction targets for industrialized countries. The Kyoto Protocol was signed by 84 countries and is considered the most important commitment to addressing global climate change (Rahman, 2013).

Unlike the non-binding emissions reductions of the UNFCCC, the Kyoto Protocol required participating industrialized countries to reduce their emissions by an average of about 5% below 1990 levels during the commitment period from 2008 to 2012. On the other hand, developing countries had no emissions reduction obligations.

At the policy level, the signing of the Kyoto Protocol in 1997 marked the international community's first attempt to control greenhouse gas emissions through legal means. Although governments in various countries have strengthened their actions to address climate change to varying degrees, this new mechanism has faced some challenges—different governments have expressed different demands, especially the significant divide between developed and developing countries. Developing countries refused to consider reductions in emissions, and a campaign funded by right-wing and industrial interests in the U.S. Senate preemptively

rejected the Kyoto Protocol (Weart, 2024), even though Bush had signed the protocol. Canada also withdrew from the agreement before the emissions reduction deadline. Countries maintained different attitudes toward climate change policies and mechanisms due to their own developmental needs, as will be discussed further below.

In the early 21st century, the conclusions of the IPCC were reviewed and endorsed by the national academies of science of each major country, as well as nearly all other organizations that could represent scientific consensus. At the same time, experts expanded their understanding of some potentially less likely but more severe impacts. For example, there were signs that the melting ice sheets could raise sea levels faster than the IPCC had previously suggested. Worse still, new evidence indicated that the warming itself was leading to changes in forests, tundras, and wetlands, which would further contribute to warming (Weart, 2024).

By 2001, the IPCC's third assessment report pointed to clear and increasingly robust evidence, and by 2007, the fourth assessment report declared global warming to be "unequivocal." In 2004, *Discover* magazine published an article about the most significant scientific stories of the year, one of which was the scientific consensus reached on global warming. Similarly, *National Geographic* declared 2004 to be the year in which global warming was "taken seriously" (Oreskes & Conway, 2010).

2.1.5 Diversification of Issues and Cognitive Reshaping

The recognition of global warming by the public has not been without challenges. The greenhouse effect and the intensified climate change caused by human emissions of greenhouse gases have been thoroughly understood and have a solid scientific foundation. Climate change is not merely a scientific topic; it is also a matter of public and political debate. Addressing climate change will fundamentally affect natural systems, energy production, transportation, industry, government policies, development strategies, population growth planning, equity in distribution, and individual freedoms and responsibilities worldwide (Schneider & Mastrandrea, 2010).

Policymakers, lobbyists, financial interest groups, environmental advocates, and climate change opponents have all worked to steer public opinion and direct the funds they control toward their preferred directions. Most mainstream scientists have countered these efforts with the methods at their disposal: conducting research to enhance understanding and predictive ability, responsibly reporting research data, developing best practice theories, fostering international cooperation, and calling for policy considerations (Schneider & Mastrandrea, 2010).

Entering the 2010s, climate change science entered a more diversified and policy-oriented phase. During this period, we saw the strengthening of scientific consensus, with an increasing number of interdisciplinary studies on climate change. People have discovered that climate change is not just a distant scientific knowledge, but a subject involving energy, transportation, personal life, green business, foreign policy, etc. Climate change affects people's lives.

The field of scientific research deepened. By 2010, long-standing predictions were beginning to materialize much earlier than many had expected—ocean acidification, unprecedented deadly heatwaves, record-breaking floods and droughts, and temperature changes affecting the survival of sensitive species. A significant new area of research developed, with some scientists shifting from calculating future impacts to showing how global warming is already harming people. Research indicated that even if all emissions were to cease immediately, the gases lingering in the atmosphere would continue to warm the Earth for thousands of years (Weart, 2024).

Dozens of teams were involved in large-scale computer simulations, showing that as global temperatures rise, the costly impacts will occur sooner than expected. If the average temperature severity exceeds 1.5°C (2.7°F), the extent of the damage will multiply (the 1°C increase around 2015 had already been surpassed) (Weart, 2024).

During this period, the development of climate change research displayed a trend of diversification. This was not only reflected in the in-depth development of climate science itself but also in the increasing number of interdisciplinary studies exploring this global issue. The overall quantity of research continued to rise. Relevant scholars collected historical climate change literature (Badullovich et al., 2020) and found that since 2007, the number of research papers on climate change

has rapidly increased. Moreover, the range of disciplines involved has continued to expand, covering social sciences, humanities, and engineering technologies, among others.

Almost all mainstream scientists and the majority of science journalists accepted the consensus. However, at the political, media, and public levels, research has shown that countries with powerful fossil fuel industries—key political figures—continue to mock the evidence (Weart, 2024). We see the consensus on climate change being challenged in the political arena and in online public discussions.

2.1.6 Key Points and New Challenges in Climate Change

Modern climate change research originated in the 19th century, primarily driven by scientists' curiosity to explore climate phenomena. Early researchers, such as Joseph Fourier, proposed the basic theory of climate change, such as the greenhouse effect (Dessler, 2011). Research during this phase was mainly based on scientists' personal interests and had not yet formed a systematic scientific consensus. At this time, climate change was viewed as a purely scientific issue (Rahman, 2013).

With the rise of environmentalism in the 1970s, climate change gradually became a topic of concern for the scientific community. Scientists, governments, and the public began to focus on the social consequences of climate change, which led to the involvement of institutions such as the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). In 1988, the Intergovernmental Panel on Climate Change (IPCC) was established, marking the entry of climate science into the international policy arena.

With the publication of a series of IPCC assessment reports, the scientific consensus on climate change was further consolidated. Scholar Vlassopoulos pointed out that since the 1990s, the definition of "global warming" has gradually shifted, from an independent environmental issue primarily concerned with carbon dioxide to a global public issue discussed as the root cause of threats to human survival (Vlassopoulos, 2012). Rahman argued that climate change transitioned

from a "nature-centered" paradigm (a physical problem) to a "human-centered" paradigm (a social issue) (Rahman, 2013).

From the 2010s onwards, climate change science has increasingly intersected with multiple fields such as economics, politics, and social justice. The global community began to focus on how to translate scientific research into concrete policy actions. This new phase of climate change issues emphasized the importance of solutions and promoted the strengthening of climate change capacity building in national policies.

Despite significant progress in climate change science and the development of global climate governance mechanisms, numerous challenges and crises remain.

Firstly, the flexibility of agreements has led to an imbalance in global action and difficulties in implementing emission reduction targets. Although the Paris Agreement set the goal of "limiting global warming to well below 2°C, and striving to limit it to 1.5°C," actual progress in emission reductions has been behind. The United Nations Framework Convention on Climate Change (UNFCCC, 2023) assessment in 2023 showed that current national emission reduction commitments are insufficient to achieve this goal.

Secondly, the increasing politicization of climate change and its geopolitical impacts have made scientific discussions more difficult. Climate change has transcended the realm of science and become part of international political maneuvering. Some countries or political parties use climate issues for their own political purposes, making scientific discussions more complex. We are faced with a divided public perception and challenges in climate information dissemination. Despite the scientific consensus on climate change being very clear, there remains significant public disagreement on the issue.

The conflict between economic interests and the green transition is an unavoidable issue in policy development. Although renewable energy technologies have made significant progress, the global economy remains heavily dependent on fossil fuels, especially in some developing countries. Some countries are still investing in new fossil fuel projects. For example, in 2023, the United Kingdom approved a new oil field exploration plan in the North Sea, which sparked protests from environmental organizations, highlighting that the contradiction between "economic growth vs. climate responsibility" remains unresolved.

Moreover, the intensifying impacts of climate change and insufficient adaptive capacity are urgent issues that humanity needs to address. The frequency and intensity of extreme weather events are increasing, causing severe global impacts. However, many countries still lack sufficient climate adaptation capacity. Even developed nations are beginning to face challenges in infrastructure adaptation. For instance, 2023 and 2024 were recorded as the hottest years in China since meteorological records began, with prolonged heatwaves causing power load surges in cities in East China, leading to power rationing in some areas. In the first half of 2024, Brazil experienced the highest wildfire record in 20 years for the same period. The southern state of Rio Grande do Sul faced extreme weather and heavy rainfall, resulting in at least 149 deaths and affecting over 2.3 million people.

In summary, climate change science has undergone four stages, from theoretical exploration to global action. Currently, it is in a period where scientific understanding has become increasingly mature, but policy implementation and global coordination still face significant challenges. The following research will focus more on the collaboration between institutions and the divisions between countries in climate negotiations. Using Brazil and China's climate cases, the study will further explore the development of global climate action.

2.2 Development of Climate Institutions and Mechanisms

As introduced in the previous chapter, climate change research reached an initial consensus in the 1980s. In 1979, at the first World Climate Conference, scientists from multiple countries issued a warning, calling for international action to foresee and prevent potential anthropogenic global warming (Gupta, 2001). Since then, climate change has gradually become a central issue of global concern, prompting the establishment of a series of global governance frameworks and mechanisms.

Global efforts have led to certain successes in climate governance. According to the IPCC's Climate Change 2021: The Physical Science Basis report, the primary cause of global warming is human activity, particularly the emission of greenhouse gases such as carbon dioxide and methane. The report indicates that since the

Industrial Revolution, global average temperatures have increased by about 1.1°C, while the concentration of greenhouse gases has reached the highest levels in the past 800,000 years. Additionally, the report highlights the profound impacts of climate change on the global natural environment and human society, including the increase in extreme weather events, rising sea levels, ecosystem destruction, and widespread effects on agriculture, energy, and public health (IPCC, 2021).

On the international policy level, the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988 provided an authoritative scientific basis for global climate change assessments and policy development. The IPCC's assessment reports not only present cutting-edge climate change research findings but also provide decision-making support for national governments in formulating climate policies. Its assessments have had a profound impact on the formation of various international climate agreements, including the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the 1997 Kyoto Protocol, and the 2015 Paris Agreement. These mechanisms constitute the essential institutional foundation for global climate governance.

However, these institutions and frameworks still face numerous challenges in addressing global warming. Based on the UNFCCC, the basic framework for international climate negotiations has been established. The implementation and end of the Kyoto Protocol revealed the characteristics of current international cooperation and provided directions for improving cooperation frameworks. It also exposed the divisions between nations in climate cooperation. The Paris Agreement, emphasizing Nationally Determined Contributions (NDCs), made a significant step forward in achieving global consensus on goals, but due to the lack of a binding mechanism, there remains uncertainty regarding the actual implementation of emission reduction commitments (Falkner, 2016).

The establishment of the IPCC and related international climate mechanisms and institutions marks an important milestone in the institutionalization process of climate science. This section will introduce this process of institutionalization by first analyzing the historical background, institutional structure, and assessment methods of the IPCC, as well as its role in global climate governance. Furthermore, this section will discuss the development, effectiveness, and challenges faced by the UNFCCC, the Kyoto Protocol, and the Paris Agreement, in order to reveal the

complexity of global climate governance and potential future directions for its development.

2.2.1 Background of the Establishment

As scientific data began to show that the Earth's atmosphere was gradually warming, numerous international scientific conferences have been held since the 1970s. Scientists gradually accumulated evidence indicating that emissions caused by human activities had begun to affect the climate. The first conference to address climate change as a significant political issue took place in 1988 in Toronto, where more than 300 scientists and policymakers from 48 countries attended. The conference recommended that governments and industries reduce emissions to 20% below 1988 levels by 2005 as a preliminary global goal (Paterson, 1996). In 1990, at the second World Climate Conference held in Geneva, scientists and ministers from 137 countries participated, and the ministers agreed on a global strategy based on the precautionary principle (Beukering & Vellinga, 1996). The first significant institutional milestone was the establishment of the IPCC in 1988 (Schroeder, 2010).

The creation of the IPCC is closely linked to the international consensus on climate change. As scientific data began to indicate that the Earth's atmosphere was warming, numerous international scientific meetings have been convened since the 1970s. However, despite early research suggesting a link between climate change and human activities, the scientific community did not immediately reach consensus on the issue. Some scientists remained skeptical about whether human activities were the primary cause of climate change. In the 1980s, with rising global temperatures, increasing extreme weather events, and further research on climate change, scientific consensus gradually formed. The establishment of the IPCC was a direct reflection of this consensus. In 1988, the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) jointly initiated the formation of the IPCC, aiming to assess the state, trends, and impacts of climate change through global scientific collaboration and provide policy recommendations to governments.

The establishment of the IPCC was driven not only by scientific consensus but also by the international political context at the time. By the late 1980s, the global issue of climate change had begun to attract international attention. At this time, the Cold War was nearing its end, and the atmosphere of international cooperation was gradually improving. Environmental issues have become a shared concern among nations. In particular, in 1988, the United Nations Environment Assembly and experts in the field of climate change pushed for the internationalization of climate change as an issue. The spirit of global cooperation during this period provided a favorable political environment for the establishment of the IPCC. Some studies have pointed out that during the 1990s, international cooperation on climate change saw higher levels of trust between nations than today (Gupta, 2016).

As a transnational and interdisciplinary issue, climate change involves balancing the maintenance of global public interests with national interests. To promote global cooperation and action, the establishment of the IPCC marked the formation of a global climate governance framework. This framework emphasized the fairness, transparency, and inclusiveness of scientific research. In this process, the international community underscored the global and long-term nature of climate change, urging countries to form a consensus based on scientific assessments and take coordinated action. These values provided strong support for international cooperation and made the IPCC an indispensable part of the global climate governance system.

2.2.2. Establishment of the IPCC

The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) with the aim of assessing “scientific, technical, and socio-economic information related to understanding the risks of human-induced climate change” in a manner that is “policy-relevant” rather than “policy-prescriptive” (Schroeder, 2010).

As the core institution for global climate change scientific assessments, the IPCC's organizational structure is designed to ensure the independence, transparency, and impartiality of its scientific evaluations. The IPCC's structure includes the Plenary, the Chair and Secretariat, three Working Groups (WGs), Task Forces, and the Technical Support Unit. The Plenary, as the highest decision-making body, consists of representatives from 195 member governments and is responsible for approving the assessment reports, electing leadership, and setting work plans. The Secretariat, located at the WMO headquarters in Geneva, coordinates administrative work. The IPCC's core research tasks are performed by three working groups: Working Group I (WG I) focuses on the physical science basis of climate change, Working Group II (WG II) assesses impacts and adaptation, and Working Group III (WG III) studies mitigation strategies (IPCC, 2022).

The IPCC is not authorized to conduct its own research. Instead, it evaluates peer-reviewed and published scientific and technical literature to prepare state-of-the-art scientific reports that are policy-relevant. Its major publications include the assessment reports and their Summary for Policymakers (SPM) and synthesis reports, which are published every five to six years.

During the IPCC's assessment process, all research reports must undergo a rigorous review procedure. Reviewers include climate scientists, government representatives, and policymakers from around the world. For example, the Sixth Assessment Report (AR6) of the IPCC covered a wide range of topics, including global warming, the scientific basis of climate change, impacts, and adaptation strategies, incorporating over 14,000 published references.

The IPCC Plenary meets to negotiate the SPM, often line-by-line and sometimes word-by-word. In the best case, knowledge generated by scientists is politically acknowledged at the meetings. In the worst case, scientific findings are diluted to a politically acceptable level. However, no substantial changes can be made to the text without the consent of the lead authors, as they have the authority to veto modifications they deem unfounded. Thus, the only means of influencing the outcome is by using procedural rules as tools to delay the process (Schroeder, 2010). Unlike the long assessment reports, the concise SPM is widely disseminated, quoted, and reported by the media.

The IPCC's assessment reports cover a broad range of climate change scientific topics, including the physical science basis of climate change, its impacts on ecosystems and human societies, and strategies for mitigation and adaptation. Each assessment report provides a comprehensive analysis of various aspects of climate change, offering scientific foundations for global climate change governance.

IPCC's assessment reports not only hold academic value but also play a crucial role in international politics and climate policy formulation. The historical development stages of international climate negotiations align closely with the publication cycle of the IPCC's assessment reports. International negotiations and scientific assessments are mutually dependent in terms of agenda and mechanisms (Dong, 2016).

With the continuous development of climate change science and the growing severity of global climate change, the IPCC faces ongoing demands and challenges in terms of its assessment methods and the content of its reports. On one hand, the complexity and diversity of climate change require the IPCC to place greater emphasis on interdisciplinary collaboration and innovation in its assessment processes. On the other hand, the IPCC must continuously enhance the transparency and credibility of its assessment reports to ensure that its scientific findings are widely recognized on a global scale. To this end, the IPCC has recently increased its research on the socio-economic impacts of climate change and the relationship between climate change and sustainable development (Cooper, 2023).

2.2.3 International Regime: The United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) is the foundational agreement for global climate change governance. After 16 months of negotiations, the UNFCCC was signed at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro and entered into force in March 1994 (Schroeder, 2010). Over 31 years since its adoption, 198

countries and the European Union have ratified, joined, or recognized the treaty, making it nearly universal.

The primary goal of the UNFCCC is to reduce greenhouse gas emissions through global cooperation to prevent human activities from causing harmful impacts on the climate system. To achieve this goal, Article 3 of the Convention emphasizes five principles to guide the actions and measures of the parties (Schroeder, 2010): (1) common but differentiated responsibilities, meaning that industrialized countries, having a historical responsibility, should take the lead in mitigating climate change; (2) the specific needs of developing countries, particularly those most vulnerable to the adverse effects of climate change, should be fully considered; (3) the precautionary principle, which states that a lack of full scientific certainty should not be a reason to postpone measures to mitigate climate change; (4) sustainable development, meaning that policies and measures to protect the climate should be in line with national circumstances and promote economic development; (5) parties should cooperate to promote an open international economic system, achieving sustainable economic growth, particularly for developing countries.

The signing of the Convention marked an important step in global climate change governance, laying the foundation for subsequent climate agreements and mechanisms. The UNFCCC framework includes several key components. The Conference of the Parties (COP) is the highest decision-making body of the Convention, responsible for setting policies and guidelines for climate change response. The COP meets annually to determine the strategic direction for global climate change governance. Additionally, the UNFCCC has a permanent Secretariat, which coordinates the daily operations of the Convention and provides technical and financial support. Furthermore, the UNFCCC has established several subcommittees and working groups tasked with specific policy implementation and technical assessments. For example, the Subsidiary Body for Scientific and Technological Advice (SBSTA) is responsible for methodological work and fostering cooperation in climate system research and observation, while the Subsidiary Body for Implementation increasingly focuses on advancing work related to Measurement, Reporting, and Verification (MRV).

Since its establishment, the UNFCCC has provided a framework for responding to global climate change and has facilitated the adoption of several important climate agreements. The most notable achievements include the Kyoto Protocol and the Paris Agreement. The Paris Agreement, reached in 2015 in Paris, aims to limit global temperature rise to below 1.5°C, marking the beginning of a new phase in international climate cooperation. The Convention established practices and processes to support the ongoing development and implementation of the regime (Oberthür & Ott, 1999). The Convention provides a long-term platform for global climate change governance, helping countries coordinate action at various levels.

2.2.4 Climate Mechanisms—The Kyoto Protocol and The Paris Agreement

The Kyoto Protocol is an international climate agreement adopted in 1997 in Kyoto, Japan, and it was established based on the United Nations Framework Convention on Climate Change (UNFCCC). The core of the Kyoto Protocol is the requirement for developed countries to reduce greenhouse gas emissions within a specified timeframe, with specific reduction targets set. The protocol entered into force in 2005 and became the legal framework for global climate change mitigation.

The Kyoto Protocol set a target for developed countries to reduce their greenhouse gas emissions by 5.2% by 2012. The agreement utilized market-oriented mechanisms for emission reductions, such as emissions trading, the Clean Development Mechanism (CDM), and Joint Implementation (JI), which allowed for the transfer of emission rights between countries, providing flexibility to achieve the reduction targets.

However, the Kyoto Protocol did not include key emitting countries such as the United States and China. The United States announced its withdrawal from the agreement in 2001, citing its demand for all Annex I parties to commit to stabilizing their emissions at 1990 levels during the 2008–2012 period and for developing countries to also participate in commitments. However, the Group of 77 countries

insisted on not making commitments during the first commitment period (Oberthür. & Ott 1999).

Europe took on a leadership role in the Kyoto Protocol, actively inviting countries such as Japan, Russia, Canada, New Zealand, and Australia to participate. However, due to the inability to achieve the emission reduction targets, Canada withdrew in 2011, while Japan and Russia announced they would not join the second commitment period.

At this point, international cooperation faced a deadlock. On one hand, countries were unable to reach a consensus on governance, with developed countries concerned about free-riding by other nations. On the other hand, environmental issues were indeed linked to economic development, and the high costs of energy transition led developing countries, which were in their growth phase, and energy-rich countries to fear that mandatory emission reductions would hinder their economic development. Climate international cooperation faced significant challenges, and after the first commitment period of the Kyoto Protocol ended, the international community continued to seek new frameworks for cooperation, but progress was slow.

The Paris Agreement is an international climate agreement adopted in December 2015 at the Climate Conference in Paris, France, marking a new chapter in global climate change governance.

The Paris conference saw participation from over 19,000 government representatives, including 150 heads of state, over 6,000 representatives from non-governmental organizations and businesses, including many CEOs, and approximately 2,800 media personnel. It provided an opportunity for public and private actors at various levels (nations, regions, cities, international organizations, businesses, and non-governmental organizations) to engage (Bodansky, 2016).

Unlike the Kyoto Protocol, which relied on legally binding emission reduction targets, the Paris Agreement adopted a more flexible and inclusive approach, requiring countries to submit voluntary emission reduction commitments and update and strengthen them periodically according to the actual situation of global climate change.

The core objective of the Paris Agreement is to limit the global average temperature rise to below 2°C, with efforts to restrict it to 1.5°C. The agreement

specifies emission reduction targets for all countries, but these targets are not mandatory. Instead, they are voluntarily proposed by each country based on their own circumstances and set as "Nationally Determined Contributions" (NDCs).

The signing of the Paris Agreement signifies a new phase in international cooperation on climate change (Zhu, 2019). Bodansky (2016) summarized its features as follows: 1) It is a legally binding document; 2) It is global in scope, applicable not only to developed countries; 3) It establishes the same core obligations for all countries, incorporating a mix of bottom-up and top-down governance frameworks; 4) The agreement sets up a long-term, enduring framework compared to previous agreements such as the Kyoto Protocol or the Copenhagen Accord; 5) The long-term framework institutionalizes an iterative process, with parties reconvening every five years to assess collective progress and present the next five-year emission reduction plan; 6) It sets expectations for progressively stronger actions over time; 7) It establishes a common transparency and accountability framework; 8) It has seemingly gained universal or near-universal acceptance (Bodansky, 2016).

The NDCs submitted by countries cover various areas, including greenhouse gas emission reductions, renewable energy investments, and energy efficiency improvements. Under the framework of the agreement, some countries, including China, Brazil, the EU, and the US, have already started implementing policies to reduce greenhouse gas emissions and set clear emission reduction targets.

Although the Paris Agreement is widely considered a milestone in international climate governance, its actual effectiveness still faces challenges. First, whether countries will be able to meet their NDC targets remains an unresolved issue. Whether the NDCs submitted by countries are sufficient to meet the core objective of the Paris Agreement is still a contentious question. According to the IPCC AR6 First Working Group report of 2021, if all countries fully implement their latest NDCs, global temperatures are still expected to rise by approximately 2.4-2.6°C by 2100, far exceeding the 1.5°C target. Moreover, the effectiveness of countries' commitments and policies requires more empirical research and evaluation. Stechemesser and other scholar evaluated 1,500 climate policies implemented over the past 25 years and identified only 63 as the most successful (Stechemesser et al., 2024), which accounts for only 4.2% of the total policies.

2.2.5 The Challenges of Climate Mechanisms

In the global governance of climate issues, the IPCC and climate mechanisms provide theoretical and practical frameworks for addressing global climate change. Gupta divides the global climate change negotiations into three historical phases (Gupta, 2016):

The first phase, before 1996, was characterized by a structured approach to the issue, involving single-loop learning. In this phase, climate change was viewed as a technical, bureaucratic, and manageable issue. The climate regime focused primarily on emissions (a global issue with global interests) and paid less attention to adaptation (a local issue with local interests), thus simplifying the responsibility level of international cooperative institutions and focusing on the establishment of the regime.

The second phase, from 1997 to 2008, was marked by the issue being regarded as a moderately structured problem, with active participation from businesses and local governments. More skeptics initiated opposition movements, questioning the validity of climate change. It became clear that climate change was a political issue, requiring a rethinking of the relationship between climate change and development.

The third phase is where the issue is seen as a completely unstructured problem, with clear scientific evidence. Climate change became recognized as a systemic and structural issue. We are required to relearn, forget, and engage in transformative learning—climate change demands that we fundamentally change our ideologies, lifestyles, and how these will influence our production and consumption patterns. Politically, countries began to discuss climate change using terms like green economy, inclusive growth, and inclusive development.

In the process of advancing climate mechanisms, some scholars have pointed out the challenges facing international negotiations, which were ones of the reasons for the transition from the Kyoto Protocol to the Paris Agreement and remain issues that need to be addressed today.

First, there are significant differences in the power and size of delegations from different parties. Wealthy countries tend to send larger delegations with

experts covering all agenda topics, while poorer countries send smaller delegations, where generalists must select the topics they focus on.

Second, the difficulty in implementing the "common but differentiated responsibilities and respective capabilities" principle has been an issue. Early on, the challenge was the dichotomy between industrialized and developing countries. Industrialized countries wanted to focus on technical issues related to greenhouse gas emissions, while developing countries wanted to treat climate change governance as a development issue and emphasize historical responsibility (Schroeder, 2010). This dichotomy was corrected during the Paris Agreement period, as the Agreement eliminated the classification of Annex I and non-Annex I countries and encouraged all countries to participate in emission reduction efforts.

In international climate negotiations, the principle of "equity and fairness" has always been emphasized. To involve more countries, climate mechanisms have developed in a direction that is more relaxed and non-binding. However, what we now need to understand more deeply is the extent to which countries have fulfilled their "responsibilities," the distance their efforts are from the main goals of the mechanism (effective practice), and whether and how international institutions influence this practice. This requires further research and reflection.

2.3 International Politics and Negotiations on Climate Change

Since the late 20th century, climate change has gradually become a focal point of international concern. Over the past few decades, the international community has made significant progress in climate governance. From the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 to the adoption of the Kyoto Protocol in 1997 and the conclusion of the Paris Agreement in 2015, the global climate governance framework has been increasingly refined. These multilateral cooperation mechanisms have not only established the fundamental framework for global responses to climate change but have also encouraged countries to take more proactive measures in both mitigation and adaptation.

Particularly in the post-Paris Agreement era, nations have committed to setting emission reduction targets through Nationally Determined Contributions (NDCs), demonstrating a new model of global climate cooperation. Additionally, various regional cooperative mechanisms—such as the European Union's Emissions Trading System (ETS), the U.S.-China climate cooperation agreements, and the BRICS nations' collaborations in renewable energy—indicate a deepening global climate governance system.

Despite these significant agreements, global climate governance continues to face challenges. There remain considerable gaps between countries in fulfilling their emission reduction commitments, and current global mitigation efforts are insufficient to achieve the 1.5°C temperature control target set by the Paris Agreement. Profound differences persist between developed and developing countries regarding burden-sharing, climate finance, and technology transfer. Disputes over the principle of "common but differentiated responsibilities" remain a major obstacle in international climate negotiations. Moreover, the effectiveness of climate governance mechanisms themselves is often questioned, given the uncertainties of national policies and the lack of enforcement capacity.

This section aims to analyze the complexities of international climate politics and negotiations, focusing on the difficulties in advancing climate governance and the challenges facing existing international mechanisms. By examining the North-South divide in climate negotiations, assessing the current state of climate justice, and exploring the new opportunities brought by the energy transition, this chapter seeks to understand the dilemmas of contemporary international climate cooperation. Investigating the positions and interests of different countries and blocs in climate governance will help illuminate the agenda-setting and discourse frameworks of international climate negotiations, revealing the underlying logic of climate change politics. As a critical component of climate change studies, this chapter's analysis will lay the foundation for subsequent empirical research, facilitating an understanding of the major controversies in media coverage of climate negotiations and the underlying causes of these debates.

First, this section will examine the reasons behind the slow progress in climate governance, addressing the misconceptions between climate science and policy. Next, it will explore the key points of contention in international climate

negotiations, analyze the concept of climate justice, and discuss the challenges in global climate diplomacy. The section will also assess the current landscape of energy transitions. Finally, it will review the existing multilateral models of international climate cooperation.

2.3.1 The Reasons That Climate Change Policies Struggle to Advance: Misconceptions of Fundamental Premises

Despite climate change being one of the core issues in international politics, the global response has not progressed at the expected pace. In recent years, many countries have established carbon neutrality targets and achieved certain advancements in renewable energy and carbon markets. However, global carbon emissions have yet to show a sustained downward trend. The Emissions Gap Report published by the United Nations Environment Programme (UNEP) indicates that the current Nationally Determined Contributions (NDCs) pledged by countries remain insufficient to limit global warming to within 1.5°C (UNEP, 2024).

The political advancement of climate change policies is constrained by multiple factors, including the limitations of global governance mechanisms, the divergences among national interest groups, and policymakers' misconceptions about the climate policy process (Victor, 2011; Qi, 2010; Xu & Zhang, 2025). Victor (2011), in his book *Global Warming Gridlock*, discusses three key misconceptions regarding global climate policy, arguing that these assumptions are not grounded in reality. Even today, it seems that these misconceptions continue to foster overly idealistic expectations about climate policies.

Before discussing these issues, Victor highlights several core political challenges and facts related to climate mitigation. First, the amount of carbon dioxide emitted by human activities far exceeds the rate at which natural chemical and biological processes can permanently remove excess gases from the atmosphere. To halt and eventually reverse the accumulation of carbon dioxide and other long-lived greenhouse gases, emissions must be drastically reduced before 2050 and continue to decline in the following decades. This entails significant costs—some studies suggest that the costs of addressing climate change are several

orders of magnitude greater than those associated with controlling ozone depletion (Victor, 2011). Furthermore, society must undergo a transformation of its energy infrastructure, a process that has been progressing slowly.

Second, because carbon dioxide is a long-lived greenhouse gas, its regulation is plagued by temporal inconsistencies. The costs of controlling pollutants are immediate, whereas the benefits are uncertain and often only manifest in the distant future after years of effort. Political systems, however, tend to favor policies that provide immediate benefits while deferring costs—an approach that runs counter to the policy requirements for addressing global warming. This dynamic frequently leads to political inaction. However, as societies hesitate, the likelihood of catastrophic consequences continues to increase. The instability of climate policies, as seen in countries like the United States and Brazil, undermines confidence in long-term international cooperation on climate governance.

Finally, the slow removal process of carbon dioxide makes climate warming a truly global issue. Any air pollutant that remains in the atmosphere for more than one to two years will disperse globally. Emissions from any single location contribute to global warming, creating a major challenge: a country's regulatory efforts can easily be undermined by leniency elsewhere.

Victor takes a practical perspective, pointing out three physical facts about climate change that explain why global warming is the most difficult international problem society may be trying to solve. This shows the gap between policy theory and actual implementation. He argues that three key assumptions underlying climate change policy are not grounded in reality, which misdirects political energy (Victor, 2011): (1) the myth of scientists, (2) the myth of environmentalists, and (3) the myth of engineers.

The first myth is that policy will follow scientific consensus. Faith in this assumption has led policy advocates (as well as their opponents) to invest substantial resources in either establishing or undermining scientific consensus. While science is undoubtedly crucial, policymaking is primarily driven by national interests rather than purely scientific findings. Victor uses the definition of "safety" as an example, pointing out that the logic behind Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC)—which addresses safety—suggests that scientists can determine a "safe" level of global warming.

Policy would then be derived by back-calculation of the necessary emissions reductions to avoid these dangerous thresholds.

Initially, it was believed that limiting atmospheric CO₂ concentrations to 550 ppm would be "safe"—a figure derived from being approximately twice the pre-industrial level. Later, the notion of safety was linked more closely to actual climate change impacts, leading to the emergence of the 2°C warming target above pre-industrial levels. The Paris Agreement subsequently set a goal of limiting global temperature rise to well below 2°C above pre-industrial levels, ideally keeping it within 1.5°C, which would require keeping CO₂ concentrations below 350 ppm.

Victor argues that safety is not solely a scientific issue. Policymakers must integrate the concept of "safety" with the political processes that translate pollution control into actionable policies; otherwise, the scientific red lines become meaningless. He contends that in areas requiring complex and costly regulatory reforms, serious policy does not simply begin with a target and then back-calculate acceptable human behaviors. The most critical policy processes are those that reveal what governments are both willing and able to do. The role of international institutions is to assist governments in achieving as much as they are willing and capable of, so that collective efforts better reflect collective interests (Victor, 2011).

The second misconception is treating global warming as a typical environmental issue. While the environmental impacts of global warming are substantial, framing climate change purely as an environmental problem has led policymakers to focus on ineffective solutions (Victor, 2011). This is because the traditional environmental policy toolkit does not align with the core regulatory tasks required for mitigating global warming. Most environmental issues are addressed through relatively straightforward technological transitions and regulatory policies. International environmental diplomats tend to favor universal agreements that encourage broad participation. However, Victor argues that this approach makes serious climate mitigation efforts more challenging, as it fosters inaction.

Following the Paris Agreement, institutional flexibility has encouraged broader participation, allowing countries to set their own Nationally Determined Contributions (NDCs). Flexible agreements seem to have enhanced national engagement. However, it is crucial to recognize that even though countries have set emission reduction targets, there remains a significant gap between these

commitments and the overall goals outlined in the Paris Agreement. Currently, the challenge we face is not merely governmental inaction but rather the insufficiency of existing efforts.

The third misconception is the assumption that technological innovation directly leads to implementation. Victor emphasizes that addressing climate change requires profound transformations in industrial economies. This misconception overemphasizes the invention of new technologies while underestimating the practical factors that determine whether low-emission technologies are widely adopted. Beyond technological breakthroughs, factors such as policy frameworks, market dynamics, and societal acceptance play crucial roles in technology deployment. In recent years, renewable energy technologies have made significant advancements. However, it is essential to acknowledge the considerable distance between technological research and large-scale implementation, including challenges related to infrastructure investment, high initial costs, and policy incentives.

These three misconceptions prompt a reconsideration of the current challenges in mitigating global warming. Overly high expectations for international climate policies and oversimplified assumptions about achieving climate goals can lead to suboptimal policy design from both practical and implementation perspectives.

2.3.2 Divergences in International Negotiations

International negotiations on climate change began with the signing of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, which laid the foundation for global climate action and established the principle of "common but differentiated responsibilities" (CBDR). Since then, climate negotiations have evolved through two major phases—the Kyoto Protocol and the Paris Agreement—each reflecting the international community's evolving understanding of climate governance.

The Kyoto Protocol introduced a division between Annex I and non-Annex I countries, exempting developing nations from binding emission reduction

obligations. However, this structural differentiation led to significant controversies in subsequent negotiations. In 2015, the Paris Agreement replaced the Kyoto Protocol, introducing a more flexible system based on Nationally Determined Contributions (NDCs), which allows countries to set their own emission reduction targets according to their national circumstances. Nevertheless, the agreement still faces numerous institutional challenges.

2.3.2.1 North-South Divisions

The longstanding divide between developed and developing countries remains a central issue in global climate negotiations. Developed nations advocate for all countries to take responsibility for emissions reductions, whereas developing nations emphasize historical responsibility and the right to development. This divide was institutionalized in the Kyoto Protocol through the classification of Annex I (developed) and non-Annex I (developing) countries.

Developing countries argue that responsibility for current climate change primarily lies with developed nations, whose industrialization has historically contributed to greenhouse gas emissions. Consequently, they demand that developed nations assume greater emission reduction responsibilities and provide financial and technological support to developing countries. Conversely, developed countries stress the urgency of global mitigation efforts, calling for action from all nations and asserting that certain developing economies, having grown significantly, should now bear greater responsibility.

Okereke analyzed seven key issues that characterized North-South divisions in early international climate negotiations (Okereke, 2010). These issues span multiple aspects of international climate governance and provide insight into the perspectives and positions of different national groupings regarding climate change policies.

The first issue concerns who should organize and conduct the negotiations—should it be the United Nations or a technical institution? The United States and some Western countries insisted that negotiations should be conducted by a special committee—a technical institution—led by the United Nations Environment

Programme (UNEP) and the World Meteorological Organization (WMO). Their objective was to establish a clear technical agreement focused specifically on stabilizing global atmospheric greenhouse gas concentrations. However, Brazil, India, and Mexico rejected this proposal, favoring negotiations under the organization and supervision of the United Nations. Developing countries viewed climate change not merely as a technical environmental issue but also as a political one. They saw the negotiations on a global climate agreement as an opportunity to address the broader injustices in the international economic system. Moreover, they sought to ensure that the negotiations would be conducted transparently and within a forum that maximized their participation.

The second issue was the type of institutional framework that should be established: a target-based agreement or a framework convention. Germany, the Netherlands, and Denmark advocated for urgent and ambitious action, calling for strict quantitative targets to be incorporated into the convention. Even before negotiations commenced, Germany and the Netherlands had unilaterally committed to emission reductions and strongly pushed for a binding convention. The United States, in contrast, sought a broad agreement without specific targets or binding commitments. Its position was based on the argument that there were too many scientific uncertainties surrounding climate change, making target-based agreements and quantified emission reduction commitments unnecessary. Instead, the United States called for an "implementation agreement" under the framework convention, allowing national governments to voluntarily design, implement, and periodically update mitigation actions in accordance with their domestic legal frameworks. This perspective was later reflected in the Paris Agreement. Developing countries were divided on this issue. A group of small island nations, recognizing their vulnerability to potential sea-level rise, called for ambitious targets and commitments. Meanwhile, many oil-producing nations, led by Saudi Arabia, were concerned about the potential consequences of global energy or carbon taxes. These countries preferred a weak institutional framework or no regulatory framework at all.

The third issue revolved around the ultimate goal of the convention—should it prioritize environmental protection or development? Developed countries sought to negotiate a relatively narrow treaty focused exclusively on limiting global

greenhouse gas emissions. They tended to separate environmental concerns from development and classified environmental issues into “global” and “local” impacts. Developed countries also advocated for unified global action to address challenges posed by “global” environmental problems. In contrast, developing countries aimed to establish a convention that explicitly linked climate action with international development issues, including poverty alleviation, debt relief, and North-South technology transfer. They argued that poverty and environmental issues were closely interconnected and that environmental protection in developing countries must be considered within the broader context of development and international economic relations. Rejecting the notion of prioritizing environmental concerns over development, they advocated for an integrated approach that addressed both issues simultaneously.

The fourth issue concerns who should bear the responsibility for addressing climate change—the West or the entire world? Initially, developing countries argued that Western industrialized nations should assume full responsibility for both the dangers posed by climate change and the efforts required to address it. Their reasoning was straightforward: since climate change was caused by the long-term emissions of developed nations in their pursuit of industrialization and economic growth, it was only fair that those responsible for the problem should bear the cost of its resolution.

Industrialized countries, however, did not accept this argument. While they acknowledged their larger share in both historical and current global greenhouse gas emissions, they pointed out that the balance could soon shift due to the rapid industrialization and population growth of developing countries. Moreover, industrialized nations sought to weaken the direct link between past industrial activities and climate change responsibility. They strongly advocated for an approach that incorporated efforts from all nations worldwide. The United States, in particular, insisted that it would not support any political process that did not require major developing countries—such as China, India, and Brazil—to reduce their own emissions. Ultimately, the parties agreed to adopt the principle of common but differentiated responsibilities (CDR) as the foundation for North-South cooperation on climate change.

The fifth issue concerns how the burdens and benefits of cooperation should be distributed—through aid or justice. The central question in this debate was what obligations the North owed to the South and how best to fulfill them. The fundamental tension in negotiations stemmed from the starkly different interpretations of the CDR principle: one side viewed it as aid or assistance, while the other regarded it as a matter of equity and justice.

For developed countries, CDR merely acknowledged that their greater financial and technological capabilities positioned them to play a more significant role in addressing a common global concern. They insisted that any assistance provided to developing countries should be considered aid rather than a global justice obligation. In contrast, developing countries approached CDR from a responsibility-based perspective, clearly interpreting it as recognition of global fairness. As a result, they not only insisted that developed countries should take the lead in emissions reduction but also demanded significant North-South resource transfers to help poorer nations participate in climate action. Ultimately, the United Nations Framework Convention on Climate Change (UNFCCC) recognized historical responsibility for emissions and stipulated that the participation of developing countries should be conditional on the provision of additional financial resources. Developing countries continued to argue that their current economic hardships made it impossible for them to bear emission reduction targets. Furthermore, they pointed out that developed nations had not done enough to fulfill their obligations under existing treaties. On the other hand, developed nations highlighted the rising emissions of some developing countries, particularly China and India, and argued that from the perspective of global atmospheric stability, exempting developing nations from emission reduction obligations was untenable.

The sixth issue concerns the choice of policy instruments—monetary or market-based mechanisms. One innovative proposal—the establishment of a multilateral atmospheric fund to finance global climate action, particularly the oversight of North-South resource transfers—received strong support from many developing countries. However, developed nations strongly opposed it.

Rather than proposing direct financial transfers from the North to the South, developed countries introduced a series of complex market and economic mechanisms, particularly emissions trading schemes and “joint implementation”

initiatives. The parties ultimately agreed on a range of policy instruments, including bubbles, joint implementation, emissions trading, and the Clean Development Mechanism (collectively referred to as flexible mechanisms). All these mechanisms were designed to enable countries to participate in various specialized economic activities to achieve the objectives of the convention. Market-based mechanisms have since remained at the core of international climate policy. Meanwhile, Brazil continued to lead other developing nations advocating for a fund-based approach.

The seventh issue concerns the balance between efforts in prevention and treatment—mitigation or adaptation. Ultimately, mitigation received greater attention from all parties. First, as the European Union and the United States engaged in intense debates over whether there should be quantified targets and emission reduction commitments, developing countries found it difficult to draw attention to adaptation. Second, most developing countries believed that the argument of historical responsibility would ensure their access to the necessary funding and technology transfers for addressing climate change. Third, and most critically, the scientific foundation was not yet strong enough to support coordinated action on adaptation.

The discussions above reveal that developed countries tended to favor technological solutions, focusing more on environmental issues rather than development concerns. They emphasized voluntary actions over equitable responsibilities. In terms of policy instruments, developed nations leaned toward market-based mechanisms rather than direct financial assistance. In contrast, developing countries emphasized global economic equity and political transparency, highlighting historical responsibility for carbon emissions and the close relationship between climate and development.

It is also noteworthy that the G77 and China faced deepening divisions in climate negotiations. Some of the poorest countries began to feel that, although many key provisions in the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol were, in principle, designed to serve the interests of developing nations, in practice, they often benefited only the more advanced among them. However, in international negotiations, developing countries consistently managed to form a unified negotiating bloc while sidestepping internal differences. Their shared interests far outweighed any

potential internal divisions—maintaining a common front was crucial for securing concessions related to resource transfers from developed countries, which were typically determined to preserve as much of their own advantage as possible (Oreskes & Conway, 2010).

The signing of the Paris Agreement reshaped the political landscape of international climate negotiations. While North-South climate divisions have evolved, core conflicts concerning finance, responsibility, and justice remain unresolved and continue to influence the global negotiation process within the current climate cooperation framework.

2.3.2.2 The Development and Current Challenges of Climate Justice

With the progress of international climate cooperation and the signing of the Paris Agreement, the issue of climate justice has garnered increasing attention. Climate justice extends beyond the North-South divide while still incorporating perspectives emerging from the differing opinions between developed and developing countries, as well as among developing nations themselves. It frames the divergences encountered in climate political negotiations from a broader perspective. Climate justice emphasizes the need to consider historical responsibility, development needs, and adaptive capacities of different nations. Discussions on climate justice are not confined to the national level but also extend to societal dimensions, including marginalized groups, Indigenous rights, and climate refugees.

Rose and other scholars analyzed equity principles in the climate domain and categorized them into three types: distributive equity, outcome-based equity, and procedural equity (Rose et al., 1998).

The first is Distributive Equity. This category of equity principles focuses on the allocation of atmospheric space as a property right, applying predefined distribution principles to the initial allocation of carbon emission quotas. Three mainstream distributive principles exist: the egalitarian principle, the sovereignty principle, and the polluter-pays principle.

The egalitarian principle asserts that every individual on Earth, regardless of nationality, gender, race, or income, has an equal right to carbon emissions for development and protection from climate-related harm (Kverndokk, 1995). The sovereignty principle holds that each country or economic entity has an equal right to emit greenhouse gases and that historical and current emission patterns establish a legitimate claim to maintaining their respective shares in the future (Young & Wolf, 1992), often referred to as the grandfathering or proportionality principle (Blanchard et al., 2001). The polluter-pays principle, based on Pigouvian theory, advocates that those responsible for pollution should bear the costs of mitigation (Lin et al., 2018). This principle argues that countries or economies contributing to global climate change through greenhouse gas emissions should assume responsibility for reductions. Given the long-term accumulation of greenhouse gases in the atmosphere, this principle has also sparked discussions on historical accountability for emissions.

The second is Outcome-Based Equity. This category of equity principles examines the impact of carbon mitigation burden-sharing on social welfare and establishes fairness criteria based on the resulting changes. Two primary distributive principles fall under this category: horizontal equity and vertical equity.

Both principles draw from taxation policies (Cazorla & Toman, 2000). The horizontal equity principle asserts that, after emissions allocations, the net welfare change as a proportion of GDP should be equal across countries or economic entities. The vertical equity principle, in contrast, holds that wealthier nations should bear a higher net welfare loss, while lower-income countries should bear a lesser burden, thereby promoting convergence in global welfare levels. This approach aligns with the progressive taxation model, incorporating differentiated considerations for mitigation contributions based on income levels.

The third is Procedural Equity. Procedural equity principles focus on the fairness of processes involved in carbon emissions allocation, primarily encompassing Rawls's maximin principle, the principle of political consensus, and the fair market principle. Rawls's maximin principle advocates allocating a larger share of emission allowances to the least advantaged, ensuring they achieve equality with those who have greater opportunities (Lin et al., 2018; Rawls, 2005). The principle of political consensus argues that international climate negotiations

should be conducted through equal dialogue and consensus-building, and any emissions distribution framework established through such negotiations can be considered fair. Lastly, the fair market principle posits that an effective market mechanism can optimize the allocation of carbon emission resources, rendering the outcomes of market transactions inherently just.

Based on a comprehensive analysis of existing carbon mitigation burden-sharing frameworks by Höhne and other scholar (2014), some research argued that considerations of equity in allocation scheme design are primarily based on four key dimensions and their various combinations: emission responsibility, mitigation capacity, the egalitarian principle, and the sovereignty principle (Lin et al., 2018).

Firstly, when it comes to the principle of Emission Responsibility. In the field of climate change, the principle of responsibility is a fundamental and widely accepted equity principle. It aligns with the core concept of the "polluter-pays principle" in environmental management practices. Emission responsibility-based carbon mitigation allocation frameworks require countries that emit greenhouse gases into the atmosphere to assume corresponding mitigation obligations (Rajamani, 2000).

Since most greenhouse gases have long atmospheric lifetimes, responsibility accounting must consider historical cumulative emissions rather than merely current emission flows (Grübler & Fujii, 1991; Neumayer, 2000). Specifically, three key aspects must be acknowledged. First, contemporary global climate change is driven by the cumulative greenhouse gas emissions in the atmosphere. Second, entities that have historically and currently consumed significant portions of the global carbon budget must bear responsibility for occupying this limited public atmospheric space. Third, historical economic development and industrialization have been largely powered by fossil fuel consumption, meaning that extensive historical emissions have facilitated economic growth, industrialization, and the accumulation of social wealth—factors that constitute the foundation for a nation's capacity to address climate change (Caney, 2006, 2009).

Debates regarding emission responsibility remain contentious. The primary controversy concerns the starting year for calculating historical emissions. One perspective suggests that 1990 should be the baseline year, as this marks the publication of the Intergovernmental Panel on Climate Change (IPCC)'s First

Assessment Report and the initiation of global climate governance processes (Posner & Sunstein, 2009). An alternative viewpoint advocates for 1960 or 1970 as the baseline year, arguing that scientific research during the 1960s and 1970s brought attention to the role of greenhouse gas emissions in driving global climate change. For example, in 1979, the U.S. President's Science Advisory Committee issued a report warning of global climate change (U.S. President's Science Advisory Committee, 1979). A third perspective contends that greenhouse gas emissions had already contributed to global climate change before scientific and political consensus was established; therefore, historical responsibility should not be diminished due to the lack of prior recognition. This view supports using 1850 as the baseline year to reflect large-scale emissions and accumulations of greenhouse gases since the First Industrial Revolution.

Second, when accounting for historical cumulative emissions, there are further discussions regarding the scope of greenhouse gas (GHG) accounting and the levels of demand. The issue of GHG accounting scope primarily concerns carbon emissions related to energy use, carbon emissions resulting from land-use change (LULUCF), and the contributions of non-CO₂ greenhouse gases. Different accounting scopes influence the allocation of responsibility. For example, excluding emissions from the land sector would result in a reduced mitigation responsibility for developing countries. While all greenhouse gases contribute to global climate change, ideally, emission reduction responsibilities should be allocated based on the totality of greenhouse gas emissions. However, the uncertainty in accounting for land-sector emissions is significantly greater than that for fossil fuel-based greenhouse gases, and excluding land-sector emissions in responsibility allocation discussions is thus somewhat justified (Höhne & Blok, 2005). Additionally, greenhouse gas sources should be categorized based on different levels of demand, such as emissions from survival needs, development needs, and luxury consumption (Agarwal & Narain, 2019; Shue, 1993). Some studies argue that emissions arising from survival needs should be exempt from historical responsibility.

Third, the issue of whether to consider dynamic changes when accounting for historical cumulative emissions has been a topic of discussion, focusing on two main points. First, some studies argue that global greenhouse gas emission patterns

are continually changing, with developed countries having completed industrialization and entered a low-carbon economy, while carbon emissions in developing countries are rapidly expanding. Therefore, historical cumulative emissions accounting should fully reflect these dynamic changes (Botzen et al., 2008). Second, over long time scales, there is the question of whether to consider the decay and disappearance of greenhouse gases in the atmosphere. In fact, even if greenhouse gases from historical emissions no longer exist in the atmosphere, these gases have already contributed to climate change and climate disasters. Their removal, via carbon sinks like oceans and terrestrial ecosystems, has also led to environmental problems such as ocean acidification (IPCC, 2014). From a scientific perspective, it is not necessary to account for the decay and disappearance of greenhouse gases over long time scales when calculating historical emissions.

From an economic perspective, the principle of economic capacity is primarily based on differentiated considerations of how different income groups can address climate change (Caney, 2010). Generally, within societal governance structures, groups with higher economic capacity are expected to bear higher costs and expenditures for public goods (such as national defense, education, and environmental governance), thereby avoiding the exacerbation of income disparities. Similarly, in the field of climate change, countries with higher economic development and technological capabilities, due to their stronger economic and technological capacities, should assume greater responsibilities for climate mitigation. This is typically measured using per capita GDP as an indicator of a country's comprehensive capacity to address climate change (Winkler et al., 2011, 2013).

In addition to considering capacity differences at the national level, it is also possible to account for differences in the capacity to address climate change at the individual level (Chakravarty et al., 2009b; Kartha et al., 2009). Under this theoretical framework, individuals from any country with higher economic capacity (per capita income) should bear a greater share of the mitigation obligations, avoiding excessive exemptions for wealthy groups in developing countries and extra burdens on low-income groups in developed countries.

As the understanding of climate change response capabilities deepens, some perspectives suggest that this capability should not be limited to economic concepts

such as income, funds, and wealth. Winkler et al propose modifying the sole use of GDP by incorporating the Human Development Index (HDI), which reflects a country's composite development level, including education, healthcare, and income, to provide a more comprehensive understanding of the differences in countries' capacities to address climate change (Winkler et al., 2011, 2013).

Increasingly, studies are adopting the approach of setting income thresholds to protect the basic survival needs of low-income groups, thereby exempting them from emission reduction responsibilities (Karthi et al., 2009; Müller & Mahadeva, 2013). This is because reducing poverty and eliminating poverty are paramount goals for sustainable development. In comparison to environmental responsibility, the right to survival has a higher priority both legally and morally. Addressing climate change should give way to improving the quality of life for impoverished populations, or at least should not obstruct the achievement of this goal. Some literature categorizes this principle, which emphasizes development rights or basic needs, as a new principle of basic fairness (IPCC, 2007; Lin et al., 2018). However, it is essentially an exemption of climate responsibility granted to specific groups under the principle of capacity, and its connotation still aligns with the core concept of the capacity principle.

When talking about the principle of Egalitarianism. In international governance, the term equality generally refers to the principle of equality for all, originating from the first principle of justice in John Rawls' Theory of Justice (Rawls, 2005). In the field of climate change, this concept of equality for all is extended to mean that regardless of nationality, gender, race, or income, every person on Earth is entitled to equal carbon emission development rights and the right to be free from climate damages (Agarwal & Narain, 2019; Grubb, 1989). This equal right to emissions is typically applied to future carbon emission budgets, although some studies also apply it to include both historical and future total carbon emission budget spaces.

Since every person is entitled to equal carbon emission development rights, carbon emission rights allocation schemes distribute the total carbon budget based on the population size of each country. Given the potential incentives this allocation could create for population growth, some scholars suggest using population

numbers from an agreed fixed year, while other studies propose using standardized population growth projections (Grubb, 1995).

As many developed countries have already far exceeded the global average per capita emissions level, requiring them to immediately reach the global average per capita emissions level is unrealistic. Therefore, some studies propose establishing a transitional period before countries' per capita emissions converge to similar levels (Böhringer & Welsch, 2006; Bows & Anderson, 2008; Meyer, 2004; Welsch, 1993). Under this "Contraction & Convergence" (C&C) scheme, many developing countries' per capita emissions will remain well below the global average for a long time. As a result, Höhne et al. (2006) advocate for setting per capita emission thresholds to safeguard the basic rights of developing countries. Specifically, a country would only need to begin the process of per capita emission convergence once its per capita emissions reach a certain threshold, which aligns with the concept of Common but Differentiated Convergence (CDC) (Höhne et al., 2006).

In addition to applying the per capita principle to future remaining carbon emission space, some studies also advocate applying the per capita principle to include both historical and future carbon emission total budget spaces (Lin et al., 2018). These "carbon budget schemes," based on the concept of "budget management," are essentially a combination of the historical responsibility principle and the egalitarian per capita principle. The key differences lie in the handling of historical cumulative emissions, the starting year, methods for addressing the increasing population over time, and the distribution of carbon budgets over long time scales. Since many developed countries' per capita cumulative emissions have already far exceeded the global per capita cumulative emissions, under these schemes, these countries will need to drastically reduce their future per capita emissions or even require negative emissions. The associated responsibility will need to be borne through mechanisms such as international carbon trading, financial support, and technology transfer.

Finally, the Nationalism principle is considered as well. The principle of nationalism is based on national sovereignty, asserting that each country has an equal right to emit greenhouse gases. The past and present emission patterns of countries effectively form a legitimate basis for maintaining the status quo in future

emission shares (Young & Wolf, 1992). In contrast to the egalitarianism principle, nationalism advocates for respect for national sovereignty and proposes solving new issues arising under the old system through the efficient method of "maintaining the status quo," also known as the grandfather principle, meaning "no retroactive action."

Although the grandfather principle is simple, it affirms the reasonableness of existing situations and is characterized by high efficiency. It avoids the obstacles and growing pains that may emerge during the resolution of new problems, allowing for a quick exit strategy. As a result, the grandfather principle is widely applied in many social rule systems, such as environmental law, tax law, banking law, food and drug law, and medical assistance (Lin et al., 2018). The grandfather principle also has practical applications in international law, including EU environmental management and international trade law. For example, in climate governance, the first commitment period of the Kyoto Protocol and the EU Emissions Trading Scheme both adopted the grandfather principle for the initial distribution of carbon emission rights at the national level (Blanchard et al., 2001).

Grubb(1995) believes that the nationalism principle and the egalitarianism principle represent two extremes of fairness based on distribution, with the former often supported by developed countries and the latter more readily accepted by developing countries. Therefore, some proposals suggest a preference scoring system between the two (Lin et al., 2018), thus achieving a form of "reconciliation." In fact, as mentioned earlier, the per capita convergence scheme (C&C) and Common but Differentiated Convergence (CDC) would show similar distribution effects to the grandfather principle when the convergence year is sufficiently late (e.g., achieving per capita emission convergence by 2070). Since per capita emissions would remain at levels not significantly different from the current situation over the long term, these schemes would resemble the grandfather principle in terms of distribution effects (Meinshausen et al., 2015). Similarly, when the convergence year is sufficiently late, the emission intensity convergence scheme would also display distribution effects similar to the grandfather principle.

Vaillancourt et al. (2004) further consider additional dimensions of fairness, such as historical responsibility, emission reduction capacity, and interpersonal fairness, within the grandfather framework. They established a comprehensive

index system incorporating multiple indicators such as population, land area, (cumulative) GDP emissions, emission intensity, and fossil fuel production and consumption. They built a relationship between these indicators and the value of carbon emission rights allocation. While this scheme covers all major dimensions of fairness, its core remains the grandfather principle.

It is important to note that the aforementioned principles are based on an individualistic classification, emphasizing fairness for individuals and nations. We must also acknowledge the inequality faced by export-oriented countries in the context of globalization. Parks and Roberts (2010) emphasized the concept of "ecological unequal exchange." Empirical research results indicate that when countries engage in trade, the market price of primary products is often undervalued, and the substantial transfer and degradation of materials and energy during the extraction, transportation, and processing of export products are often overlooked (Rice, 2007; Jorgenson, 2016). Consequently, trade relations between wealthy and poor countries remain highly unequal, as underdeveloped countries export large quantities of low-priced products, and the value of these products does not include the environmental (and social) costs of extraction, processing, or transportation.

Researchers adopting this analytical approach have made a significant discovery: many developing countries traditionally regarded as successful export-oriented economies are, in fact, suffering enormous and unrecorded (both economic and ecological) losses (Parks & Roberts, 2010). Scholars have analyzed global ecological unequal exchange from a structuralist perspective, using the example of how the development of Latin American economies has been hindered by external forces—the "structure" of the world economy. Taking China as an example of an export-oriented country, former Chinese Foreign Minister Yang Jiechi once stated that a significant portion of China's carbon emissions is, in fact, a byproduct of the demand for manufactured goods from Northern countries. He emphasized, "I hope that when people use affordable and high-quality Chinese products, they also remember that China is facing increasing pressure from transferred emissions" (China Youth Daily, 2008).

As climate change discussions have evolved, the North-South divide and climate justice have received increasing attention and debate. In the face of complex evaluation schemes based on multidimensional justice and distribution principles,

there remains room for improvement. Lin et al. (2018) in their comparative analysis of internationally influential carbon emission allocation studies, found that integrated model analysis allows for significant operational flexibility in terms of fairness principle preferences, allocation scheme selection, and parameter settings, which can undermine the objectivity of the models (Lin et al., 2018). For instance, selecting different starting years for historical cumulative emissions can lead to vastly different allocation results, with many outcomes favoring industrialized nations. This variation is due to differences in historical responsibility. If calculations begin in 1870, the ranking of historical cumulative greenhouse gas emissions among major countries or blocs is as follows: the United States (25%), the European Union (22%), China (13%), and India (4%). However, if 1990 is used as the starting point, the ranking shifts to: the United States (20%), China (20%), the European Union (14%), and India (5%) (Zhu, 2020).

The choice of starting year for historical cumulative emissions calculations reflects underlying national circumstances. These circumstances not only pertain to historical responsibility but also include differences in current emissions and stages of development. Scholars argue that research from the perspective of developed countries dominates both in quantity and influence. Under such discursive dominance, large developing nations—including China—bear significant pressure for emission reductions (Lin et al., 2018). Scholars call for more research contributions from academics in developing countries to assess climate justice and integrated allocation models. A comprehensive, objective, and balanced approach that reflects the concerns of all parties should be adopted to construct an influential integrated model for carbon reduction contribution allocation.

2.3.2.3 On the Roundtable of Negotiations

Discussions on the divergences between the Global North and Global South in climate negotiations and climate justice are framed within the broader context of international climate cooperation. The fundamental concept underlying these discussions is that climate change mitigation policies require the participation of all

nations—we are all seated at the same roundtable. However, some scholars have questioned the roundtable itself (Aklin & Mildenerberger, 2020; Colgan et al., 2021; Keohane & Victor, 2011; Ostrom, 2012; Sabel & Victor, 2017; Victor, 2011b) .

Victor critiques a fundamental issue in international negotiations: governments set ambitious targets but lack a clear understanding of how to achieve them. He identifies four flawed tools used in climate negotiations:

Universal Membership – From the outset, formal UN climate negotiations have been open to all countries, with key decisions typically requiring consensus. However, the large negotiation table comes at a significant cost, as agreements reflecting diverse voices are difficult to negotiate and often cater to the least ambitious members. In extreme cases, such agreements achieve consensus by imposing no additional obligations on countries. Victor argues that starting with broad participation can lead to shallow cooperation, with global warming being a prime example. To achieve deep and stringent commitments, negotiations often need to begin with smaller groups.

Targets and Timetables – For the most committed governments and non-governmental organizations, the ultimate goal of climate negotiations is to reach consensus on emissions targets and timetables. This focus stems from the belief that only through establishing targets and timelines can climate agreements yield environmental benefits. Using the example of the domestic disputes within the United States during the Kyoto Protocol era, Victor highlights that key factors influencing emission levels are largely beyond government control. Scholars have found that targets and timetables can be effective when commitments align with feasible policy efforts. However, when emission caps are excessively stringent—requiring governments to ensure reliable alternatives for every application—the process loses momentum. When governments are uncertain about what they can realistically achieve in advance, a high degree of flexibility is necessary.

Recent global stocktaking results have shown that before 2020, the emission reduction ambitions and implementation efforts of developed country parties fell short of the requirements previously outlined by the Intergovernmental Panel on Climate Change (IPCC), which stated that developed nations needed to reduce emissions by 25% to 40% compared to 1990 levels by 2020—an objective that was not met (Fan et al., 2025). Developing countries have pointed out that developed

nations failed to fulfill their mitigation commitments under the Cancun Agreements and that their pre-2020 actions did not align with their targets, nor did they establish subsequent implementation and compensation mechanisms.

Legally Binding Agreements – Nearly all governments and non-governmental organizations committed to mitigating global warming believe that legally binding agreements (treaties) are superior to non-binding agreements. Under similar conditions, governments almost always place greater emphasis on legally binding laws over non-binding arrangements. However, considering corporations and organizations that operate beyond direct government control, Victor argues that the real challenge of economic and environmental cooperation lies in modifying the behavior of companies and individuals who are not entirely governed by state authorities. He contends that governments often lack complete information on what they can realistically enforce.

When dealing with issues marked by uncertainty, scholars have focused considerable attention on compliance, as it is a logical starting point for examining how laws influence behavior. However, Victor points out that a perfect record of compliance often indicates that governmental commitments were too modest (Victor, 2011a). From a compliance perspective alone, legally binding agreements almost always appear more effective than non-binding ones. Yet, in international law, perfect compliance is often a problem rather than a goal—good compliance news frequently signals poor cooperation outcomes.

Enforcement—One of the main reasons for supporting legally binding treaties with targets and timetables is that such commitments are considered easier to enforce. However, Formal intergovernmental enforcement mechanisms are extremely rare in international environmental law. Victor (2011) points out that most international environmental laws do not incorporate many incentives because the commitments they entail largely reflect actions that governments would take regardless (Victor, 2011b).

Relevant studies indicate that when the United States, the European Union, and Canada set their emission reduction targets, they had already achieved more than half of their reduction commitments. In international environmental issues, incentives are usually emphasized over punitive measures, making it difficult to organize alliances for enforcement (Victor, 2011b). Current progress shows that

nations propose appropriate mitigation targets and provide self-reports, but compliance progress remains generally difficult to assess (Fun et al., 2025). For instance, countries such as Brazil, South Africa, and Indonesia set their emission reduction targets based on deviations from the Business-As-Usual (BAU) scenario. However, they do not specify the exact BAU emission levels and trajectories in their respective documents, making it challenging to compare emission changes and evaluate their compliance (Fun et al., 2025). Therefore, the current challenge is to establish a more comprehensive system to verify the quality of these data—ensuring accuracy and comparability—and to develop unified standards for assessing self-reported information as soon as possible.

Building upon Victor's perspective, recent research has introduced a new approach to international climate change policy, characterizing climate politics as a distributional conflict rather than a collective action problem. This bottom-up, practice-based solution is gaining traction (Aklin & Mildenerberger, 2020; Colgan et al., 2021; Sabel & Victor, 2017). This view suggests that, to avoid prolonged diplomatic deadlock, analysts and diplomats can adopt a bottom-up approach to coordinate national climate policies. Decomposing the large-scale issue of climate change into smaller, more manageable units is seen as key to effective cooperation (Sabel & Victor, 2017). This bottom-up approach places greater emphasis on the influence of domestic politics. Scholars argue that the discourse surrounding free-riding has been overemphasized, while the significance of distributional conflicts—particularly within domestic political contexts—has been underestimated (Colgan et al., 2021). Domestic interest groups play a crucial role in either advancing or obstructing the effective implementation of climate policies through the negotiation of benefit distribution.

The development of this theoretical perspective necessitates further case studies across different national contexts. The following section will provide a detailed analysis of the cases of Brazil and China to better understand the domestic factors influencing climate change policy implementation.

The key issue in the models of collective action or small-group cooperation, as discussed by Victor and other scholars, is the willingness of participating countries to cooperate. Chinese scholars have conducted research on national willingness to participate in international cooperation on climate change (Qi, 2010).

This research suggests that a country's decision to engage in international environmental cooperation depends on two main factors: motivation for cooperation and the associated costs. The motivation for cooperation is influenced by ecological security and market factors, while the cost of cooperation is determined by economic and political costs. These aspects will be examined in detail in the national case studies. Notably, climate governance requires countries to bear substantial costs, making it inherently burdensome. Thus, increasing national participation necessitates strong positive incentives. The research highlights those advancements in technology—particularly the development of renewable energy—may provide favorable market incentives for international climate cooperation, encouraging key countries to take the lead in promoting such collaboration.

2.3.3 A New Opportunity: The Energy Transition

Scholars have pointed out that technological development may be a key variable in reshaping the landscape of global climate cooperation (Qi, 2010). The current global transition in energy technologies has been a recurring topic in climate conferences. Technological innovation not only reconfigures the competitive dynamics among nations but also creates new possibilities for global climate change mitigation. Is global climate politics now approaching a turning point, where the energy transition presents a critical opportunity? Given Victor's discussion on the myth of technology, it is essential at this stage to observe the concrete progress of new technologies and assess their implementation. This section will examine the current state of energy technology development, international competition in the renewable energy sector, and the ways in which the energy transition is influencing international climate negotiations.

At COP28, the Paris Agreement underwent its first Global Stocktake, resulting in the adoption of the UAE Consensus, which emphasized the accelerated development of renewable energy, the transition away from fossil fuels, and the establishment of net-zero energy systems. This outcome underscores the central role of energy transition in achieving global climate objectives (Chai et al., 2024).

Notably, the final agreement of the stocktake explicitly included the phrase “transitioning away from fossil fuels” for the first time in the history of Conference of the Parties (COP) negotiations (UNFCCC, 2023). The recognition of the need for a global shift away from fossil energy marks a significant milestone in the international effort toward energy (An et al., 2024).

Several ambitious declarations were launched by participating nations based on shared interests and perspectives, including the Global Pledge on Renewable Energy and Energy Efficiency, the Global Hydrogen Initiative, the Global Cooling Pledge, and the Tripling Nuclear Energy Declaration (An et al., 2024). For instance, 37 countries—including Brazil, Canada, Japan, India, and Germany—joined the Global Hydrogen Initiative, acknowledging the critical role of green hydrogen in energy transition, energy security, and industrial decarbonization. These countries pledged to advance green hydrogen production and international trade while accelerating the recognition and certification of renewable, low-carbon hydrogen and its derivatives.

The final document of the first Global Stocktake adopted key provisions on energy transition, covering not only fossil fuels, coal-fired power, renewable energy, energy efficiency, nuclear energy, and net-zero energy systems but also carbon capture, utilization and storage (CCUS), transport sector decarbonization, methane reduction, international cooperation, and investment (UNFCCC, 2023).

Numerous international organizations and renowned think tanks have conducted analyses and projections on global energy transition and technological innovation, emphasizing the necessity of achieving carbon neutrality and accelerating the deployment of renewable energy. The Working Group III report of the Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) states that significantly reducing greenhouse gas emissions from the entire energy sector requires a major transformation, including a substantial reduction in overall fossil fuel consumption, the deployment of low-emission energy sources, a shift toward alternative energy carriers, and improvements in energy efficiency and conservation (IPCC, 2022).

According to estimates in the World Energy Transitions Outlook 2023 published by the International Renewable Energy Agency (IRENA), the share of renewable energy in the global energy mix must increase from 16% in 2020 to 77%

by 2050 (IRENA, 2023). To achieve this, the global annual installed capacity of renewable energy generation must increase by 1.066 billion kW per year from 2023 to 2050 (Chai et al., 2024). Similarly, the Breakthrough Agenda Report 2023, jointly released by the International Energy Agency (IEA), IRENA, and the UN Climate Change High-Level Champions, highlights that to reach net-zero emissions by 2050, global renewable energy capacity must reach 11 billion kW by 2030, approximately three times the capacity of 2022. By 2030, renewable energy is expected to account for approximately 70% of total electricity generation capacity (Chai et al., 2024).

Despite the ambitious plans proposed by stakeholders and global leaders, it is essential to acknowledge that the development of new energy technologies remains in its early stages. Firstly, while there has been a rapid increase in technology patents, many technologies are not yet mature. The IEA's Energy Technology Perspectives 2020 report projects that under an accelerated deployment scenario for low-carbon energy technologies, the world could achieve net-zero emissions by 2050. Notably, the battery and energy storage sector has seen a surge in patent applications. According to the Innovation in Batteries and Electricity Storage report jointly published by the European Patent Office (EPO) and IEA, patent applications in the battery and storage sector grew significantly between 2005 and 2018, with an annual growth rate of 14%, and battery patents accounted for 90% of all energy storage patents (Chai et al., 2024).

Between 2016 and 2023, the number of granted green and low-carbon patents and publicly disclosed patent applications steadily increased, with cumulative granted patents reaching 649,000 and publicly disclosed applications totaling 1.276 million (Project Group for Statistical Analysis of Green and Low-Carbon Patents, 2024). A regional analysis of technological advancements reveals that China has made significant progress in carbon reduction for fossil energy, while the United States leads in greenhouse gas capture, utilization, and storage (CCUS) and fossil fuel decarbonization. Meanwhile, Europe is advancing in clean energy and CCUS, whereas Japan and South Korea have notable strengths in energy storage technologies.

The International Energy Agency (IEA), in its Net Zero by 2050: A Roadmap for the Global Energy Sector report, stated that 50% of the key technologies

required to achieve net-zero emissions by 2050 are still immature. Similarly, the Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach report (IEA) highlighted that innovation and application of clean energy technologies are crucial to achieving carbon neutrality. As of 2023, 50% of the key technologies needed for net-zero emissions remain underdeveloped, but this proportion is expected to decrease to 35% by 2050. Therefore, technological breakthroughs are urgently needed to facilitate the net-zero transition (Chai et al., 2024).

From the perspective of energy consumption structure, fossil fuels continue to dominate the global energy mix, accounting for 84% of total energy consumption. In 2023, oil and coal together accounted for more than half of global primary energy consumption, making up 31.6% and 26.5%, respectively. Meanwhile, renewable energy accounted for only 8.2%. Additionally, natural gas, hydropower, and nuclear energy contributed 23.2%, 6.5%, and 4.0%, respectively, to the world's primary energy consumption.

The energy transition is a long-term process that involves multiple phases, from technological discovery to market adaptation. At present, the development of global new energy technologies is transitioning from the discovery stage to the adaptation stage. The path to sustainable development and innovation-driven growth represents a new economic trajectory, with carbon neutrality becoming a new regulatory framework for industrial investment, energy supply and demand, capital flows, international trade, and technological research. Countries such as the European Union, Japan, India, China, and Brazil are actively engaging in innovative practices.

For instance, the European Union established the Smart Grid Technology Platform in 2005, identifying three core research areas: integration of renewable energy and distributed power generation, coordination between electric vehicles and the grid, and bidirectional interaction between the grid and users. According to various scenario studies and forecasts, by 2050, solar and wind power are expected to supply 50% of Europe's final energy demand (Chai et al., 2024).

China continues to maintain a global leadership position in renewable energy. Firstly, renewable energy generation and installed capacity have continued to grow. By the end of 2023, China's installed renewable energy capacity reached 1.516 billion kW, accounting for 51.9% of the country's total power generation capacity.

For the first time in history, renewable energy capacity surpassed coal-fired power capacity, and China's share in global renewable energy capacity exceeded 40%. Secondly, China's new energy vehicle (NEV) industry has become a pillar of the national economy. In 2023, China led global NEV production and sales for the ninth consecutive year, with Chinese NEVs accounting for 63.5% of the global market (Chai et al., 2024).

Brazil possesses natural resource advantages and a successful track record in energy transition. The Lula administration has actively engaged in international climate politics and holds significant development potential in biofuels and green hydrogen. In 2023, the Brazilian government introduced the Future Fuels Bill, which encompasses several national programs, including the National Sustainable Aviation Fuel Program and the National Green Diesel Program. These initiatives primarily focus on energy optimization in the transportation sector, covering private vehicles, aviation, and commercial passenger and freight transport. The International Energy Agency (IEA) has identified Brazil as a key driver of global biofuel development. According to IEA projections, developing countries will account for approximately 70% of global biofuel demand growth between 2023 and 2028, driven by strong policy incentives, increasing demand for transportation fuels, and abundant bioresource potential. Notably, Brazil is expected to contribute over 40% of this demand growth, making it the most significant leading nation in the sector (Zhang, 2024).

The energy transition presents new opportunities for international climate cooperation while also introducing new challenges. Under the Paris Agreement framework, national emission reduction commitments are closely tied to technological advancements, and competition in new energy technologies significantly influences the structure of international cooperation. Scholars have emphasized the necessity of translating Nationally Determined Contributions (NDCs) into concrete actions (Chai et al., 2024). Countries should prioritize the implementation of long-term strategic plans, the establishment of global funding mechanisms for energy transition and technological innovation, the acceleration of global green and low-carbon technology innovation and sharing, and the strengthening of international cooperation in energy transition and technological development.

2.3.4 Future Prospects: Innovation Sharing and International Cooperation

Returning to the issue of international cooperation on climate change, new and increasingly diverse cooperative models have emerged in response to the evolving global landscape. Scholars argue that a more diversified and multi-level approach to cooperation is both positive and necessary (Jordan et al., 2018; Ostrom, 2012; Victor, 2011a).

Research indicates that the primary mechanisms of international cooperation on climate adaptation take the form of multilateral and bilateral agreements (Jiang et al., 2021). These cooperative efforts primarily involve funding support from major developed nations or groups, such as the United States, Japan, and the European Union, to developing countries, particularly the least developed nations.

In recent years, climate change has expanded beyond the framework of the United Nations Framework Convention on Climate Change (UNFCCC) and its Conferences of the Parties (COP), becoming a central topic in other international multilateral mechanisms. For instance, at the G20 Environmental Ministers' Meeting, Brazil proposed the establishment of a Permanent Tropical Forest Fund, aimed at providing financial support for tropical forest conservation. Through the BRICS framework, China, Brazil, and other member states have engaged in climate change and sustainable development cooperation, jointly promoting global environmental governance. Similar multilateral mechanisms include South-South cooperation, the Heiligendamm Process (G8+5), and the Amazon Cooperation Treaty Organization (ACTO), among others.

The Paris Agreement has also strongly encouraged non-state and sub-national actors to take both existing and new climate actions (Hale, 2016), emphasizing the growing importance of polycentric governance (Jordan et al., 2018). Bernauer's research highlights the distinctions between national and sub-national climate policies, noting that federal and project-based initiatives tend to prioritize reputational benefits, whereas state-level projects emphasize tangible, practical advantages such as technological knowledge and capital acquisition (Bernauer, 2013).

During periods of stagnation in international climate cooperation, scholars have underscored the significance of regional cooperation (Ostrom, 2009, 2012; Victor, 2011b). Climate cooperation is now entering a new phase, where institutional flexibility enables signatory states to continue advancing their emission reduction commitments, and international political discourse on climate change is becoming more dynamic. However, current emission reduction efforts remain insufficient to achieve the targets set by the Paris Agreement. In this context, strengthening regional cooperation and enhancing the competitiveness of member states within a broader framework of collective climate action suggests that a polycentric climate governance model may serve as an effective cooperative strategy.

2.4 Background of Brazil and China

This section presents China and Brazil as case studies in the context of climate change governance. As two of the most significant developing economies, China and Brazil hold a unique position and influence in the global climate governance framework. Their approaches to international climate cooperation are shaped by a combination of factors, including economic development levels, energy structures, domestic political systems, and cultural perceptions. China is both the world's largest greenhouse gas emitter and a global leader in renewable energy development, while Brazil plays a crucial role in climate governance due to its rich biodiversity and vast tropical rainforest coverage.

This section aims to conduct an in-depth analysis of the climate change policies, international cooperation efforts, domestic governance strategies, and societal perceptions in both countries. By adopting macro, meso, and micro perspectives, this study explores the evolving roles and policy trajectories of China and Brazil in global climate governance. A comparative analysis of these two countries will provide a clearer understanding of their similarities and differences in climate governance, offering a valuable reference for developing countries in formulating climate policies and fostering international cooperation.

The research will employ literature review, policy analysis, and data analysis to examine the distinctions and commonalities between China and Brazil's climate governance approaches. The analysis will cover key dimensions such as science, energy, ecology, economy, domestic policies and regulations, international cooperation, and social and public beliefs, which are also the primary focus areas in media discussions on climate change. By exploring these dimensions, this study seeks to provide a comprehensive understanding of the experiences and challenges faced by China and Brazil in climate governance. Finally, the study will summarize the key characteristics of climate policies and domestic contexts in both countries by analyzing costs and motivations to assess their willingness to participate in climate governance (Qi, 2010).

In the field of climate change research, Western nations such as the United States and European countries have dominated the discourse. This study contributes to a more inclusive understanding of the role of developing countries in climate governance. Case studies from developing nations enrich the global climate change discourse by introducing diverse perspectives and policy approaches, thereby contributing to the development of more equitable and effective global climate policy cooperation.

2.4.1 China's Climate Change Policies and Practices

China is located in East Asia, along the western Pacific coast. It has a total land area of approximately 9.6 million square kilometers and a maritime area of about 4.73 million square kilometers. Between 1901 and 2020, China's annual average surface temperature increased by 1.6°C. The country's climate is characterized by hot and rainy summers, cold and dry winters, and a synchronization of high temperatures and rainy periods. China frequently experiences extreme weather events, with droughts, floods, cold waves, and typhoons being the most significant hazards. Droughts are more common in the

northern regions, while both droughts and floods occur in the south. In 2020, under the influence of global climate change, China experienced an increased frequency and intensity of heavy rainfall and flooding, with 37 regional heavy rainfall events recorded nationwide.

Climate change has impacted China's agriculture, water resources, terrestrial ecosystems, marine and coastal zones, and public health. Key manifestations include a northward shift of planting boundaries and increased frequency of pests and diseases. The water resource vulnerability in Xinjiang and northern China has intensified. Chinese scientists predict that many animal species will migrate toward higher latitudes and altitudes, with 5% to 20% of species facing a high risk of extinction. By 2050, it is estimated that 9% to 34% of wild plant species will face heightened extinction risks. Additionally, super typhoons and storm surges will pose increasing threats to coastal populations. For example, in October 2013, during a strong typhoon, 70% of Ningbo's Yuyao City was submerged, with flooding lasting for several days and affecting 830,000 residents.

Rising ocean temperatures have led to a severe decline in China's coastal fishery resources. Moreover, sea level rise has resulted in the loss of land area; since the 1990s, approximately 22% of China's coastline has retreated inland, causing a loss of 224.48 square kilometers. Chinese scientists have also found that climate change has contributed to premature mortality among vulnerable populations and has accelerated the spread of infectious diseases such as dengue fever. In 2019, the public health burden caused by dengue fever in China was 21 times higher than in 2005.

According to data from China's National Communication Report released in 2023 (see Table 1), the secondary and tertiary sectors currently dominate China's economy. In 2020, the industrial sector accounted for 30.8% of total output, while agriculture contributed 13.6%. The wholesale and retail trade, finance, and real estate sectors were the main components of the tertiary sector.

Table 1 - China - Key Socioeconomic Indicators (2020)

	Population	Urbanization rate	Industrial structure-population	Industrial structure-GDP	Foreign trade
CHINA	At the end of 2020, the total population of mainland China was 1.412 billion, of which 902 million were urban residents and 510 million were rural residents.	63.90%	The primary industry employs 23.6%, the secondary industry employs 28.7%, the tertiary industry employs 47.7%. The total number of employed people is 750.64 million.	The total value of domestic GDP is 101,598.62 billion yuan. Among them, the primary industry accounts for 7.7%; the secondary industry accounts for 37.8%; and the tertiary industry accounts for 54.5%. The per capita GDP is 72,000 yuan.	In 2020, China's total merchandise trade amounted to approximately 4.63 trillion USD, with exports totaling around 2.58 trillion USD and imports reaching about 2.05 trillion USD (based on an estimated exchange rate of 1 USD $\approx$ 6.96 CNY in 2020).

Data Source: China's National Communication Report, 2020

From the perspective of energy structure, according to data from the National Bureau of Statistics of China, the country's total installed power generation capacity in 2022 reached 2,564.05 gigawatts (GW). Of this, thermal power (coal-fired) accounted for 1,332.39 GW, representing 51.96% of the total capacity. Hydropower contributed 16.13%, grid-connected solar power accounted for 15.31%, grid-connected wind power represented 14.25%, and nuclear power made up 2.17% of the total installed capacity. China has maintained its position as the global leader in wind and solar power generation, with the share of these energy sources increasing annually. From a global perspective, in 2023, China's total electricity generation reached 9,456.4 terawatt-hours (TWh), ranking first worldwide, followed by the United States with 4,494.0 TWh, and then India, Russia, Japan, and Brazil.

Regarding carbon emissions, as discussed in the context of climate justice, carbon emissions can be measured in various ways. This section focuses on three key metrics: annual national carbon emissions, per capita carbon emissions, and historical cumulative emissions. Chart 1 presents data on annual national carbon emissions. In 2023, China's total carbon emissions reached 11.9 billion tons, accounting for 31.5% of global emissions. The United States followed with 5.08 billion tons, then the European Union and India. South America's total carbon emissions remained relatively low at 1.11 billion tons, representing only 2.9% of

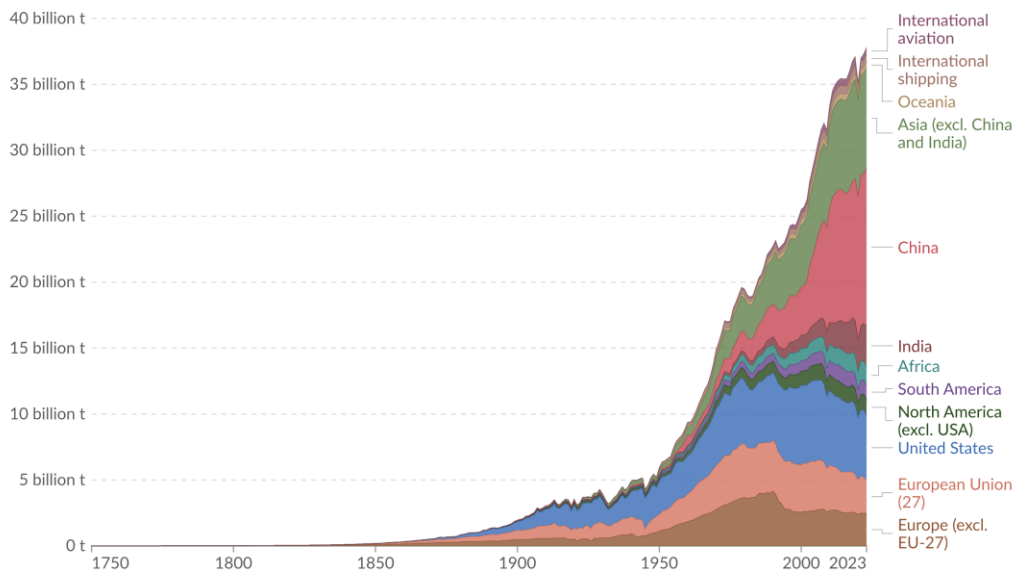
the global total. Since 2002, China's carbon emissions have seen a significant increase, coinciding with the country's accession to the World Trade Organization (WTO) in December 2001. This event marked the rapid industrial expansion of China, establishing it as the "world's factory" and leading to substantial energy consumption and carbon emissions. During the COVID-19 pandemic in 2020, emissions temporarily declined but subsequently resumed their upward trend, aligning with China's self-identification as being in the "primary stage of socialism," which entails ongoing industrial development.

Chart 1 - Annual CO₂ Emissions by World Region, 1750–2023

Annual CO₂ emissions by world region

Emissions from fossil fuels and industry¹ are included, but not land-use change emissions. International aviation and shipping are included as separate entities, as they are not included in any country's emissions.

Our World
in Data



Data source: Global Carbon Budget (2024)

OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

Source: Our World in Data, based on Global Carbon Budget 2024

Chart 2 - Per Capita CO₂ Emissions by Country and Region, 1750–2023

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land-use change is not included.



Data source: Global Carbon Budget (2024); Population based on various sources (2024)

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1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

Source: Our World in Data, based on Global Carbon Budget 2024

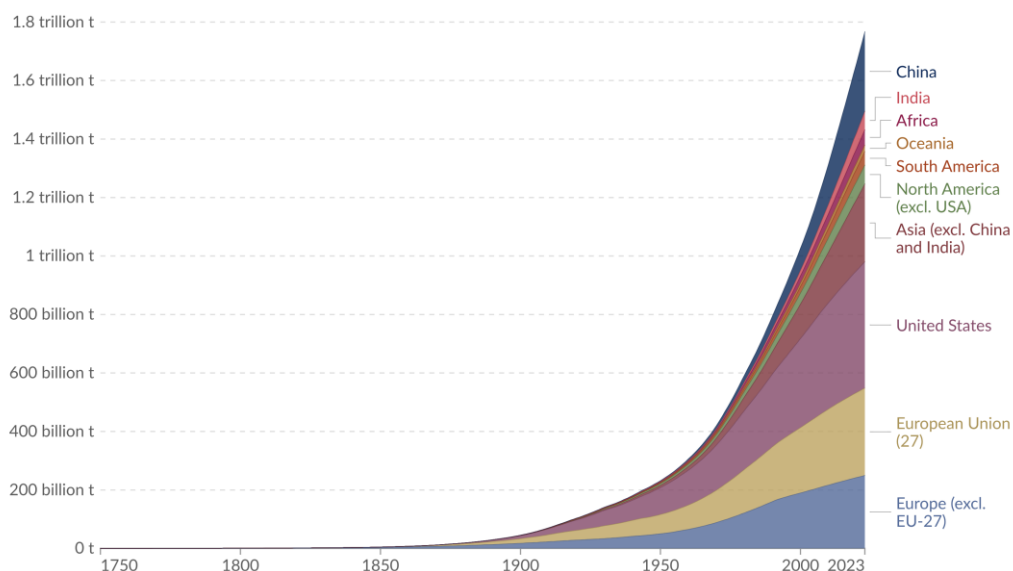
However, when examining per capita emissions (Chart 2), it is evident that in 2023, the per capita carbon emissions of the United States and Canada remained significantly higher than those of China, at 14.3 and 14.0 tonnes, respectively, compared to China's 8.4 tonnes and Brazil's 2.2 tonnes. The per capita emissions of the United States and Canada peaked in the 1970s and have been on a declining trend since 2000, whereas China and India's per capita emissions continue to rise. From the perspective of historical cumulative emissions (Chart 3), Europe and the United States account for the majority of total historical carbon emissions, followed by North America (including Canada) and China.

Chart 3 - Cumulative CO₂ Emissions by World Region, 1750–2023

Cumulative CO₂ emissions by world region

Our World
in Data

Cumulative carbon dioxide (CO₂) emissions by region from the year 1750 onwards. This measures CO₂ emissions from fossil fuels and industry¹ only – land-use change is not included.



Data source: Global Carbon Budget (2024)

OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

Source: Our World in Data, Global Carbon Budget 2024

In global climate change negotiations, China has long insisted that any international climate agreement should be based on the principles of historical responsibility and differentiated responsibility (Bernauer et al., 2016). Within this framework, China considers itself a developing country. Historically, China has opposed the imposition of mandatory greenhouse gas emission targets on developing countries, including itself, within the international community. However, in recent years, China has made significant commitments and taken substantive unilateral measures to address climate change (Bernauer et al., 2016).

Regarding emission reduction commitments, at the 2009 Copenhagen Climate Change Conference, China announced a set of Nationally Appropriate Mitigation Actions (NAMAs), pledging to reduce carbon dioxide emissions per unit of GDP by 40%–45% from 2005 levels by 2020, increase the share of non-fossil fuels in primary energy consumption to approximately 15%, expand forest area by 40 million hectares compared to 2005, and increase forest stock volume by 1.3 billion cubic meters compared to 2005 levels.

In terms of domestic policy planning, in 2016, China released the "Outline of the 13th Five-Year Plan," explicitly stating that during the 13th Five-Year Plan period, total carbon emissions should be effectively controlled. The plan set specific targets for 2020, including an 18% reduction in carbon dioxide emissions per unit of GDP compared to 2015, total energy consumption capped at 5 billion tons of standard coal, a 15% reduction in energy consumption per unit of GDP compared to 2015, an increase in the share of non-fossil energy to 15%, a forest coverage rate reaching 23.04%, and a forest stock volume of 16.5 billion cubic meters.

According to data from 2020, China has exceeded these targets:

Significant reduction in carbon intensity: From 2015 to 2020, China reduced carbon dioxide emissions from energy activities per unit of GDP by approximately 18.8%, surpassing the targets set in the 13th Five-Year Plan. By 2020, emissions had decreased by 48.4% compared to 2005 levels, exceeding China's 2009 commitment to the international community of a 40%–45% reduction by 2020.

Continuous adjustment of the energy structure: In 2020, the share of non-fossil energy in total energy consumption reached 15.9%, an increase of 3.9 percentage points from 2015, surpassing both the 13th Five-Year Plan target and the 2009 goal of approximately 15% non-fossil energy by 2020.

Continued increase in forest carbon sinks: Forest stock volume exceeded 17.5 billion cubic meters, surpassing both the 13th Five-Year Plan target and the 2009 goal for forest stock volume expansion by 2020.

On September 22, 2020, Chinese President Xi Jinping announced during the general debate of the 75th United Nations General Assembly that China would enhance its nationally determined contributions (NDCs), adopt more vigorous policies and measures, and strive to reach peak carbon emissions before 2030 while working towards carbon neutrality before 2060.

In March 2021, China released the 14th Five-Year Plan (FYP) Outline, which explicitly proposed the implementation of the 2030 climate change NDC targets and the formulation of an action plan to achieve peak carbon emissions before 2030. The 14th FYP established specific goals across various sectors, including energy, industry, construction, transportation, and carbon sequestration in ecosystems. For instance, it set targets to increase the share of non-fossil energy in total energy

consumption to approximately 20% and to raise the proportion of renewable energy in primary energy consumption to around 18%.

China has developed its Five-Year Plan system within the framework of its socialist development model. This system represents a top-down approach to national economic planning, involving state intervention in major construction projects, the distribution of productive forces, and key economic proportions. The first FYP was introduced in 1953, and China is currently in its 14th planning period. Climate issues have been incorporated into these plans as a key component.

Regarding adaptation policies, according to China's National Communications, the country has developed plans and policies in various domains, including water resources, terrestrial ecosystems, marine and coastal ecosystems, agriculture, public health, urban adaptation, disaster prevention and mitigation, and land-use planning. Specific initiatives include establishing an extreme weather and climate event monitoring and early warning system, improving farmland construction standards to enhance drought resistance, and ensuring urban water security.

In terms of institutional arrangements, China has established a multi-level organizational structure for addressing climate change, encompassing national, local, and sectoral levels. At the national level, in June 2007, the State Council—the highest executive body of state power and the highest state administrative authority—established the National Leading Group on Climate Change and Energy Conservation and Emissions Reduction, chaired by the Premier. This leading group serves as an interdepartmental, comprehensive coordination mechanism for climate change and energy conservation efforts. In 2008, to further strengthen institutional capacity in climate governance, the National Development and Reform Commission (NDRC) established the Department of Climate Change, and in 2012, the National Center for Climate Change Strategy and International Cooperation was founded. At the local and sectoral levels, following 2008, many provincial governments established dedicated climate change departments within their respective agencies to oversee climate policies and actions.

China regularly compiles and submits National Communications (NCs) and Biennial Update Reports (BURs) on climate change. To date, four NCs and four BURs have been submitted to the United Nations Framework Convention on

Climate Change (UNFCCC). The drafting institutions include the National Center for Climate Change Strategy and International Cooperation (NCSC), the Chinese Academy of Agricultural Sciences (CAAS), Tsinghua University, the Administrative Center for China's Agenda 21, and the National Climate Center, among others. Upon completion, these reports must be approved by the State Council before being formally submitted to the UNFCCC Secretariat.

In terms of international politics, China has engaged in both bilateral and multilateral cooperation with developed countries, including those in Europe and North America. These collaborations have focused primarily on carbon markets, the China-EU Urbanization Partnership, and green and low-carbon investment and financing (Shen & Xie, 2018; Zhang, 2022). For instance, China has signed cooperation agreements with countries such as Germany, France, the Netherlands, Canada, and New Zealand to promote collaboration in areas such as expert exchange and energy innovation. Climate change has also emerged as a key area of Sino-American cooperation, with the two countries engaging in concrete exchanges on topics such as green ports, zero-emission public transport, and forestry mitigation. In 2016, at the U.S.–China Climate-Smart/Low-Carbon Cities Summit, 11 Chinese provinces (or municipalities) and 18 U.S. states (or cities) signed the “U.S.–China Climate Leaders Declaration.”

Moreover, China's regional cooperation with other governments has increased, including the establishment of key environmental and climate cooperation platforms and mechanisms such as China–Japan–South Korea, China–ASEAN, Lancang–Mekong, Belt and Road Initiative (BRI) countries, China–Africa, and BRICS nations. It is evident that China has integrated the climate change agenda into its existing frameworks for international economic cooperation. For example, at the 2019 Belt and Road Forum for International Cooperation, the Ministry of Ecology and Environment led the establishment of the BRI International Green Development Coalition in collaboration with Chinese and international partners. This coalition includes over 150 partners from 43 countries, including environmental authorities from 26 co-building countries. Within the scope of South–South cooperation, by the end of 2020, China had signed nearly 40 agreements on climate-related South–South cooperation with close to 30 developing countries. Additionally, China established the South–South Climate

Cooperation Fund (SSCCF), further strengthening its partnerships—such as with Brazil—through this fund and associated multilateral mechanisms.

Existing studies have analyzed China's efforts to establish new multilateral institutions and to reshape the content and form of existing ones. Bull (2024) describes this phenomenon as “transmuted multilateralism,” where existing multilateral institutions continue to exist, but their roles and functions are transformed as new initiatives emerge around them. Additionally, some scholars argue that factors on the international political stage influence China's climate ambitions and targets, and even, to some extent, determine its multilateral climate governance strategy (Zhang, 2022). China's climate diplomacy has undergone two major shifts, marked by the Copenhagen Summit in 2009 and the Paris Summit in 2015, during which the country transitioned from a passive follower to an active participant and potentially a global leader (Zhang, 2022). In the practice of climate diplomacy, China acts as a highly strategic player. Some scholars contend that a multilateral approach should not be seen as a consistent characteristic (Kastner et al., 2020), but rather as one that evolves dynamically in response to international influences (Zhang, 2022).

China seeks to play a more constructive role in the implementation of its global strategy by influencing global governance, and climate change has been one of the earliest fields in which China began to take action (Wu, 2017; Zhang, 2022). Chinese leaders consider China's international standing on climate change as part of the country's long-term political interests (Buzan, 2021).

Scholars argue that China's willingness to assume a leadership role in climate governance is a product of both domestic environmental interests and global political strategy (Zhang, 2022). In the early days, China positioned itself as a guiding function rather than a structural leader (Zhuang et al., 2018), while the latest research points out that China is active in multilateral institutions (Bull, 2024). Empirical observations indicate that China pursues its leadership objectives by making institutional, moral, and financial contributions (Shen & Xie, 2018). Nonetheless, industrialized countries continue to dominate in rule-setting, agenda formulation, and steering the direction of international negotiations. China has been striving to obtain greater institutional rights in these areas—namely, more influence

in the negotiation process—yet such interests often lead to conflicts with industrialized nations (Zhang, 2022).

At the level of media influence, comparative studies of Chinese and foreign media coverage have revealed that Chinese climate news heavily relies on information from government officials and elite experts. Moreover, media discourse in China tends to align closely with official narratives, focusing primarily on three domains: climate conferences, international climate cooperation, and issues related to the economy and people's livelihoods (Liu, 2022). Chinese media also place greater emphasis on guiding public opinion and shaping public perception regarding climate change (Zhang & Yang, 2022). A more detailed discussion of these issues will be presented in Chapter Three.

From the perspective of the Chinese public, some empirical studies have indicated that while the majority of Chinese citizens acknowledge the reality of climate change and recognize human activity as a significant driver of the process, their overall level of knowledge on the issue remains relatively low (Center for Climate Communication and Risk Governance Research, 2023; Jia & Pan, 2024). Research suggests that public recognition and awareness of the importance of climate change in China may be largely motivated by a desire to align with national or governmental positions (Jia & Pan, 2024). Based on two survey studies, Jia and Pan (2024) also found that Chinese citizens tend to perceive the risks of climate change to themselves, their families, or their communities as relatively low — significantly lower than the risks they perceive climate change poses to the nation. The findings reveal that perceptions of national benefits have a stronger influence on individuals' climate attitudes than perceptions of personal benefits (Jia & Pan, 2024). However, when individuals are required to take concrete actions, the perceived threat to the nation no longer serves as a reliable predictor of public behavior. Instead, personal benefits—such as economic opportunities, daily expenses, health, and education—begin to play a significant role and become the most important determinant. This highlights the mismatch between the high level of public support and the low level of personal action on climate change in China (Center for Climate Communication and Risk Governance Research, 2023; Jia & Pan, 2024), as well as the disconnection between elite-driven communication discourses and the realities of individual daily life (Center for Climate

Communication and Risk Governance Research, 2023). Scholars emphasize the need to strengthen public awareness of the individual risks posed by climate change and to promote more grassroots action toward low-carbon transitions.

At the cultural level, while the connection between climate change and individual lives remains relatively weak, its influence is gradually permeating society. A study analyzing climate change-related videos on Chinese video-sharing platforms found that over 50% of the content consisted of news reports and public service advertisements, while user-generated content accounted for only 7.3%, with significant variations in quality (Hu & Zhang, 2018). Nonetheless, as some American scholars have pointed out, artists are increasingly participating in climate change advocacy (Boykoff et al., 2010). The global nature of popular culture is evident in climate change discourse. For example, China's largest music festivals have incorporated "low-carbon elements," where food waste generated at festivals is repurposed into soil fertilizer. In art, in 2020, China released its first science fiction film addressing climate change.

2.4.2 Climate Change Policies and Practices in Brazil

Brazil is located in the eastern part of South America, along the western Atlantic coast. The country has a total land area of approximately 8.51 million square kilometers, featuring a great diversity of climatic regimes, a variety of natural attributes (including soil, topography, vegetation, and fauna), and one of the world's largest coastal zones, extending 10,900 kilometers. These factors contribute to a unique environmental composition that supports six major biomes: the Amazon (49.5%), the Cerrado (23.3%), the Atlantic Rainforest (13%), the Caatinga (10.1%), the Pantanal (1.8%), and the Pampa (2.3%). Collectively, these biomes constitute one of the richest biodiversity regions on the planet.

According to records from the National Institute of Meteorology (INMET), Brazil's annual average surface temperature increased by more than 1°C between 1961 and 2023. Brazil's climate is characterized by the coexistence of tropical and temperate zones. The northern regions experience a hot and humid climate with abundant rainfall, whereas the southern regions have four distinct seasons, with

lower temperatures in winter. Brazil is highly susceptible to extreme weather events, with droughts, floods, storms, and forest fires being the most significant climate-related disasters. Under the influence of global climate change, the country has experienced prolonged heatwaves, intense short-term rainfall, long-term droughts, and water shortages in various regions. In recent years, the frequency of extreme weather events has increased. In 2024, the state of Rio Grande do Sul experienced record-breaking rainfall, leading to severe flooding, while wildfires in the Amazon reached historically high levels.

The Intergovernmental Panel on Climate Change (IPCC) projects that by the end of the 21st century, the average temperature in Latin America could rise by 1°C to 6°C. This warming is expected to lead to species extinction, the transformation of tropical forests into grasslands, desertification, increased water scarcity, and the proliferation of agricultural pests, all of which will impact food production. Coastal regions will be affected by storms and rising sea levels, resulting in coastal erosion and the degradation of marine ecosystems. The most severe consequences will be observed in tropical regions of the continent, particularly in the Amazon rainforest, which harbors the world's most biodiverse ecosystems (Chiquetto & Nolasco, 2024).

According to data (Table 2) from Brazil's National Communication and the Brazilian Institute of Geography and Statistics (IBGE), Brazil's economy is predominantly based on the secondary and tertiary sectors. In 2022, the services sector accounted for 58.6% of the country's total economic output, while the industrial sector contributed 21.2%. The key industries within the tertiary sector include transportation, administration and auxiliary services, information and communication, and tourism.

Table 2 - Brazil – Key Socioeconomic Indicators (2022)

	Population	Urbanization rate	Industrial structure-GDP	Foreign trade
BRAZIL	In 2022, Brazil had a total population of 203.1 million, with 177.5 million residing in urban areas and 25.6 million in rural areas. Additionally, the country had 1,693,535 Indigenous people, accounting for 0.83% of the total population.	87.40%	Brazil's Gross Domestic Product (GDP) reached 9.9 trillion reais. The agricultural sector contributed 6.8%, the industrial sector accounted for 21.2%, and the services sector represented 58.6% of the total GDP. The per capita GDP stood at 46,154 reais.	In 2022, Brazil's total exports amounted to \$335 billion, while total imports reached \$272.7 billion.

Data Source: Brazil's National Communication; IBGE, 2022

From the perspective of energy structure, Brazil demonstrates a high share of renewable sources in its energy matrix. According to data from the National Electric Energy Agency (ANEEL), of the 200 GW of installed capacity, 84.25% originates from renewable sources, while 15.75% is derived from non-renewable sources, including 1% nuclear energy. The three largest renewable sources in Brazil's electricity matrix are hydropower (55%), wind power (14.8%), and biomass (8.4%). Among non-renewable sources, natural gas (9%), oil (4%), and coal (1.75%) are the most significant contributors.

The high proportion of renewable energy in Brazil's overall energy matrix indicates that the country has already undergone a substantial energy transformation. In its latest National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), Brazil emphasized that it is undertaking a second wave of energy transition, characterized by a more comprehensive and regulated approach. This new phase aims to construct a robust regulatory framework and implement national-level public policies to reduce emissions in hard-to-abate sectors. In particular, Brazil is prioritizing the development of a low-carbon

hydrogen market as a viable alternative to fossil fuels. Policy instruments such as the Ten-Year Energy Expansion Plan (PDE) and the National Energy Plan 2050 (PNE) serve as strategic frameworks to ensure a coordinated and integrated approach to energy planning.

With regard to greenhouse gas emissions, Brazil emitted 2.3 billion tons of CO₂ equivalent (GtCO₂e) in 2023. According to data from the International Energy Agency (IEA), this represents 1.2% of global emissions. Land-use change was once again the leading contributor to gross emissions in the country, accounting for 46%, or approximately 1.062 billion tons of CO₂e. This was followed by the agriculture sector, with 631 MtCO₂e (28%); the energy sector, with 420 MtCO₂e (18%); waste, with 92 MtCO₂e (4%); and industrial processes, with 91 MtCO₂e (4%). Compared to the country's emissions in 2022 (2.6 GtCO₂e), this represents a 12% reduction. A notable factor in this reduction was the 24% decline in emissions from deforestation, resulting from the current administration's reinstatement of command-and-control policies aimed at curbing deforestation in the Amazon (SEEG, 2024).

Brazil's per capita emissions have remained relatively low in comparison with other major economies. In 2023, the figure stood at 2.2 tonnes per person, in contrast to 8.4 tonnes in China, and significantly lower than the 14.3 tonnes in the United States and 14.0 tonnes in Canada.

In the realm of international climate negotiations, Brazil has consistently argued that climate change is both a political and a scientific issue, emphasizing the necessity of balancing environmental protection with economic development (Chong, 2024). The Brazilian delegation is typically led by scientists, reflecting the country's commitment to grounding its proposals in objective and scientific methodologies, particularly regarding the principle of common but differentiated responsibilities (CBDR). For instance, during the Kyoto Protocol negotiations, Brazilian scientists made two key contributions that had long-lasting impacts on international climate policy: (i) the rigorous application of historical emissions as a basis for assigning current emission reduction responsibilities, and (ii) the proposal to create a clean development fund to support sustainable development projects in the Global South.

At the 2024 United Nations Climate Change Conference (COP29), Brazil reaffirmed its climate commitment by pledging to reduce its net greenhouse gas emissions to 67% below 2005 levels by 2035. Brazil's first Nationally Determined Contribution (NDC), published in December 2020, had previously established targets of a 37% reduction by 2025 and a 43% reduction by 2030.

It is worth noting that while Brazil places significant emphasis on forest-related issues, it has not sufficiently addressed the impact of its oil extraction activities on climate emissions. The Climate Change Performance Index (CCPI) has criticized Brazil for its continued reliance on fossil fuels. The strong policy focus on deforestation implies that the political struggle between actors supporting and opposing deforestation has come to dominate the broader political economy of climate action. Meanwhile, the rapidly expanding oil and gas sector has largely escaped scrutiny from climate institutions (Hochstetler, 2021).

To effectively implement this plan, Brazil formulated the Pact for Ecological Transformation, a cross-sectoral initiative involving the executive, legislative, and judiciary branches. This pact aims to achieve the following goals (NDC Brazil, 2024): (i) ecological sustainability; (ii) sustainable economic development; (iii) social, environmental, and climate justice; (iv) protection of the rights of children and future generations; and (v) resilience to extreme climate events. Specific focus areas include land-use planning, restructuring of the energy matrix, reduction of deforestation and wildfires, and conservation of biomes.

In addition, Brazil has committed to "climate federalism" to ensure the implementation of domestic climate policy in a top-down manner. On July 3, 2024, Brazil institutionalized this commitment through Federal Committee Resolution No. 3, which establishes climate policy as a priority on the agenda of all administrative levels of government. The resolution requires federal entities to develop climate plans, tools, and targets and to adopt them in a continuous, gradual, coordinated, and participatory manner (Brazilian Government, 2024).

To encourage the effective implementation of its climate agenda, Brazil positions the NDC as an investment platform. Through mechanisms such as the Ecological Transformation Plan (ETP), the Amazon Fund, the Tropical Forests Forever Fund (TFFF), and the National Bank for Economic and Social Development (BNDES), the country aims to reposition its economy toward a new

cycle of low-carbon growth. For example, under BNDES's initiative, the Arc of Restoration in the Amazon, it is estimated that investments of approximately R\$200 billion will be necessary, with the potential to create up to ten million jobs in the region. These funds will support projects in conservation units, indigenous lands, quilombola territories, rural settlements, undesignated public lands, and small-scale family farms.

Scholars have noted that while most international agreements focus on greenhouse gas mitigation, climate adaptation actions in Latin America remain underrepresented (Chiquetto et al., 2024). In Brazil, the National Plan on Climate Change (PNMC) was launched in 2008, yet a dedicated National Adaptation Plan was only introduced in 2016. In 2023, Brazil began drafting a new climate policy instrument known as Plano Clima, which will incorporate both mitigation and adaptation components. According to official government sources, the main challenge in the adaptation section of Plano Clima is to enhance the country's resilience to climate change while simultaneously addressing social inequalities in the pursuit of climate justice. However, as of yet, this policy has not been officially released.

Nonetheless, there are already successful early examples of adaptation policy in Brazil. One such initiative is the Pagamento por Serviços Ambientais (PSA). PSA is a financial mechanism that compensates rural producers, family farmers, land reform settlers, traditional communities, and Indigenous peoples for environmental services provided on their lands, which in turn generate societal benefits. In the municipality of Extrema, located in the state of Minas Gerais, public and partner resources have been used to incentivize the restoration of springs and water sources as part of a water resource protection program. By 2021, the initiative had planted over two million trees and restored more than 7,000 hectares of land.

Initially, Brazil approached climate change primarily as a matter of foreign policy and technical expertise, with increased attention to environmental concerns emerging after 2007. In 1999, Brazil established an inter-ministerial commission located within the Ministry of Science and Technology, which focused largely on the Clean Development Mechanism (CDM) and international reporting obligations (Aamodt, 2018). In 2007, an institutional reform transferred this commission to the presidency's Civil House. The restructured inter-ministerial committee shifted its

focus toward deforestation and the protection of biomes, reflecting a change in Brazil's positioning on climate change—from viewing it as a diplomatic and technological issue to recognizing deforestation as directly linked to emissions reduction goals. Brazil's forests are constitutionally protected as part of the national heritage (Republic of Brazil, 1988, Article 225), and within the climate change discourse, they have been redefined as a climate-related concern. The primary role of the inter-ministerial committee is to coordinate climate targets, which are distributed among the relevant ministries for implementation.

In addition to ministry-based institutions, non-state actors also participated through two major platforms: the Brazilian Forum on Climate Change and private governance arrangements aimed at deforestation-free trade in soy and beef (Hochstetler, 2021). This institutional configuration package—a combination of inter-ministerial coordination and civil society participation—constitutes a polycentric system of climate governance (Jordan et al., 2018).

It is noteworthy that in Brazil's political landscape, successive presidents have had a decisive influence on the country's climate ambitions and capacities (Hochstetler, 2021). Support for climate issues is often expressed through legislation and the strengthening of institutions, while opposition is reflected in the weakening of policies and budgetary cuts. Research has shown that during the Bolsonaro administration, the traditional use of climate agendas as a form of Brazil's diplomatic soft power was disrupted (Toni & Feitosa Chaves, 2022). The environmental agenda was severely undermined, primarily through the dismantling and degradation of institutions. Key departments addressing climate, forestry, and deforestation were dissolved, and the Brazilian Forest Service was transferred to the Agriculture Ministry (Toni & Feitosa Chave, 2022; Hochstetler, 2021). The administration also dismantled related governance bodies, rendering the institutional apparatus incapable of enforcement. Bolsonaro's approach to climate change carried strong populist traits—constructing an abstract narrative of foreign enemies and attacking global climate efforts and environmental protection (Toni & Feitosa Chave, 2022).

In this context, civil society assumed a significant representational role on the international stage (Fonteles, 2019; Oliveira, 2019; Toni & Feitosa Chaves, 2022). The administration of Luiz Inácio Lula da Silva has consistently demonstrated a

strong commitment to curbing deforestation in the Amazon region (Pereira & Viola, 2024). Upon his return to office, Lula reestablished and reinforced the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDam) and created the Interministerial Committee on Climate Change, aiming to rebuild the capacity of national environmental institutions.

However, scholars have noted that Lula's third term is situated at the intersection of complex domestic and international dynamics, making it far more challenging than his previous administrations (Pereira & Viola, 2024). On the one hand, Lula has taken proactive steps to control deforestation and to re-engage in international political forums. On the other hand, important socio-environmental figures within the government, such as Marina Silva and Sônia Guajajara, have clashed with traditional agribusiness and fossil fuel interest groups. The notion that fossil fuels are essential for improving Brazil's economic performance continues to prevail. There are signs of ambivalence in Lula's foreign policy, as well as persistent obstacles to advancing climate mitigation and adaptation measures (Pereira & Viola, 2024).

From the perspective of Brazil's national communications on climate change, the composition of climate science reflects a collective and multidisciplinary effort. The preparation of these communications involved approximately 185 institutions and over 300 experts from across the country. The contributing personnel were drawn from Brazil's scientific community, business sector, government agencies, class associations, third sector organizations, universities, and research centers. A significant portion of these participants were affiliated with the Brazilian Research Network on Global Climate Change (Rede CLIMA), with contributions primarily organized around four thematic coordination areas: energy, agriculture, land use, land-use change and forestry (LULUCF), and waste management.

At the level of international cooperation, the environmental agenda has been a significant component of Brazil's diplomatic soft power since the 1990s (Abranches, 2020; Toni & Feitosa Chaves, 2022). Brazil adopted a strategy led by the Itamaraty (Ministry of Foreign Affairs), which framed environmental issues as a central element of its foreign policy while avoiding the formulation of international agreements that might threaten Brazilian sovereignty—particularly those related to the Amazon region (Toni & Feitosa Chave, 2022).

In terms of multilateral and bilateral cooperation, beyond the Paris Agreement, Brazil signed the EU–Brazil Framework Cooperation Agreement, which includes collaboration on climate change, standardization, and other areas. It also launched the International Climate Initiative (IKI) with Germany, aimed at promoting industrial decarbonization, combating deforestation, and enhancing climate change adaptation. Moreover, Brazil is a member of the Amazon Cooperation Treaty Organization (Organização do Tratado de Cooperação Amazônica), which focuses on environmental protection and sustainable development in the Amazon Basin.

Regarding climate cooperation between China and Brazil, scholars have noted that under the frameworks of South–South cooperation and the Belt and Road Initiative (BRI), the two countries have engaged in concrete joint efforts. These include the establishment of China’s South–South Climate Cooperation Fund (SSCCF) and the Belt and Road Initiative Green Development campaign (Horn-Phathanothai & Studart, 2024). Chinese infrastructure investments in Brazil have been concentrated in the energy sector, along with greenfield investments or acquisitions in port infrastructure. Between 2007 and 2021, China invested approximately US\$32 billion in Brazil’s electricity sector, with a significant portion allocated to sustainable sources such as wind and solar energy. Scholars argue that issues related to science, technology, and development have driven the green diplomacy between China and Brazil (Studart & Myers, 2021).

At the media level, scholars have conducted studies on Brazil’s mainstream, regional, and alternative media, finding that Brazilian media generally rely on international media resources, with news emphasizing international agreements and scientific conclusions. However, there is limited coverage of local reports, which detaches the media from local realities (Loose & Carvalho, 2023). The focus on global issues often obscures national, regional, and local perspectives on the climate crisis, leading to the marginalization of Global South discourses.

Scholars have examined specific mainstream media outlets and found that Brazilian mainstream news magazines, such as *Veja*, *Isto É*, *Época*, and *Carta Capital*, emphasize the (Chong, 2024). The Brazilian delegation is typically led by scientists, reflecting the country’s commitment to grounding its proposals in objective and scientific methodologies, particularly regarding the pri. Researchers have also studied coverage of the Amazon region and critically pointed out that

climate news reporting is still influenced by internal colonialism—local communities continue to be excluded from decision-making processes regarding the future of the region, and nature is often viewed merely as an economic resource, benefiting groups that do not reside there (Loose & Carvalho, 2023).

At the level of public perception, surveys conducted by ITS-Rio and Yale University (2022) reveal that 77% of Brazilians believe climate warming is influenced by human activities, a significantly higher proportion than the 60% reported among the U.S. population. Even more striking is that 96% of Brazilians believe global warming is currently occurring. The effects of climate change in Brazil are primarily manifested through deforestation and forest fires, which produce immediate and visible impacts on the population. According to data from MapBiomas, more than 30.8 million hectares of land in Brazil were burned in 2024—an area larger than the entire territory of Italy—and this figure represented a 79% increase compared to 2023.

It is noteworthy that, although mainstream views on climate change have gained strength, public attitudes in Brazil are showing signs of polarization. Existing studies and data indicate that Brazilians' recognition of the importance of climate change has been increasing, while beliefs denying global warming are also on the rise. Scholars attribute the strengthening of anti-scientific positions to several factors: the anti-environmental stance of the Bolsonaro government, the spread of misinformation via social media and messaging apps, attempts by the previous government to discredit the media, and the intensification of political polarization (Loose & Carvalho, 2023).

In the online environment, studies have found that international climate summits and abnormal local temperature events tend to generate more public discussion (Evangelista & Garcia, 2024; Lycarião et al., 2025; Pearce et al., 2019). In terms of discursive forms, researchers have observed an increasing trend toward the politicization of climate change discourse (Evangelista & Garcia, 2024). Similar to other political discussions, climate-related debates in Brazil are often marked by violence, including hate speech, disrespect, and verbal aggression directed at other groups (Lycarião et al., 2025). Analysis of Brazilian TikTok content further reveals that public discussions rarely cite reliable sources and often adopt emotionally

charged narratives, provoking reactions such as climate anxiety and despair (Evangelista & Garcia, 2024).

Scholars argue that the politicized nature of the discourse, coupled with the lack of reference to formal scientific knowledge, often results in discussions remaining confined to the political dimension or focused on acknowledging the crisis, extreme events, and localized impacts, while rarely addressing the need for collective or political action.

Brazil has a vibrant associational life, with many civil society organizations and economic actors participating in political activities through both formal and informal channels (Hochstetler, 2021; Abranches, 2020; Toni & Feitosa Chaves, 2022). One notable example is the Brazilian Forum on Climate Change, which was established to promote dialogue between the federal government and various sectors of society, including academia, the business community, non-governmental organizations, and local governments. The Forum brings together collaborators from multiple sectors to contribute to the formulation of Brazil's Nationally Determined Contributions (NDCs), provide strategic policy guidance, and participate in international negotiations. The 1992 Rio Earth Summit (Rio 92) marked the beginning of civil society involvement in climate governance in Brazil, catalyzing the creation of scientific and policy think tanks both domestically and globally (Abranches, 2020).

Beyond scientific and governance-related debates, Brazilian society and scholarship have also focused on locally rooted issues—particularly those related to inequality and ecological culture. These include the disproportionate impact of climate change on the most vulnerable populations living in urban peripheries and the Amazon region (Dickinson, 2021), as well as Indigenous perspectives on climate change (Grande et al., 2023; Machado et al., 2023). In terms of public engagement and awareness, Brazil has leveraged music and audiovisual media to promote climate consciousness. For instance, the Rock in Rio music festival, through its carbon offsetting program, successfully compensated for approximately 420,000 tons of greenhouse gas emissions generated over 18 editions held in Brazil, Portugal, and Spain.

Furthermore, several documentaries—such as *A Lei da Água* and *Sob a Pata do Boi*—have exposed the ecological and climatic impacts of deforestation and the

illegal expansion of livestock farming. These films have been used as tools for policy debates and environmental education in schools, illustrating the intersection of media, culture, and climate advocacy in Brazil.

2.4.3 Similarities and Differences Between context of China and Brazil on Climate Change

In the context of increasingly severe global climate change, China and Brazil, as two of the world's most important emerging economies, play pivotal roles in the global response to climate challenges. Both countries exhibit distinct characteristics in terms of natural geography, climate change impacts, foreign policy, domestic governance, media and public engagement, and their willingness to participate in international efforts. Through a comparative case study and horizontal analysis, this research seeks to provide a more comprehensive understanding of the diverse pathways and complex dynamics shaping climate governance in the Global South. The following section outlines the characteristics and engagement strategies of the two countries across seven dimensions.

1. Commonalities and Differences in Natural Geography and Climate Change Impacts

China and Brazil are both geographically vast nations with significant ecological and topographical diversity. China's territory spans multiple climatic zones, from tropical to subarctic, and features complex terrains and a densely populated landscape. These factors make China particularly vulnerable to the impacts of extreme weather events. In recent years, the country has experienced an increasing frequency and intensity of climate-related disasters such as floods, droughts, sandstorms, and heatwaves. A notable example is the catastrophic rainstorm that struck Zhengzhou on July 20, 2021, causing severe casualties and property damage, and sparking national concern over the climate resilience of urban infrastructure.

In contrast, Brazil is renowned for its tropical rainforest ecosystem, particularly the Amazon—the world's largest tropical rainforest. The Amazon is not only a critical global carbon sink but also plays a vital role in regulating the

planet's climate system due to its rich biodiversity. Unlike China, where urban extreme weather events are a major concern, Brazil's climate challenges are primarily ecological in nature, including deforestation, intensifying droughts, and land degradation. For instance, in September 2024, large-scale wildfires in northern and central-western Brazil resulted in extensive destruction of habitats and further disrupted regional hydrological cycles.

Brazil's abundant natural resources and favorable environmental conditions have positioned the country as a global leader in clean energy. In contrast, China's resource endowment is characterized by coal abundance and relative scarcity of oil and natural gas (Han et al., 2022). Given this structure, China faces an urgent need to increase the share of renewables in its primary energy mix. In response, the central government has been aggressively expanding renewable energy development, particularly in wind and solar power.

2. Convergence and Complementarity in Climate Diplomacy and Multilateral Cooperation

Both China and Brazil emphasize the principle of common but differentiated responsibilities (CBDR) in their climate diplomacy, a cornerstone of the Global South's position in international climate governance. China has actively sought to construct an image of leadership in climate diplomacy by promoting the Green Belt and Road Initiative, participating in multilateral climate negotiations, and setting ambitious goals such as "carbon peaking" and "carbon neutrality." In its approach to international cooperation, China's aspiration to shape global leadership is closely linked to the transformation of existing multilateral institutions and increasing the voice of the Chinese government.

Following the return of President Lula to office, Brazil has also sought to reestablish itself as a responsible climate actor on the international stage. The government has reaffirmed its commitment to the Paris Agreement, reinstated the functionality of environmental agencies, reactivated the Amazon Fund, and endeavored to enhance Brazil's influence in climate discourses across the Global South. Unlike China's emphasis on institutional creation, Brazil's pursuit of climate leadership has centered more on asserting influence within Latin America and exercising an active voice within existing international institutions.

The foundation for Sino-Brazilian cooperation has grown increasingly robust. Brazil is one of China's most significant investment destinations in Latin America. China's capital and technological advantages in green energy complement Brazil's natural endowments in renewable energy. For example, the State Grid Corporation of China has invested in several wind power projects in northeastern Brazil, such as renewable energy parks in Bahia. These initiatives have not only generated local employment but also contributed to Brazil's energy transition towards a greener structure. The cooperation between the two countries outweighs competition, with notable complementarities in fields such as technology transfer, green finance, and climate disaster response.

Moreover, China and Brazil share convergent positions in international climate negotiations. Both advocate for the right of developing countries to formulate climate strategies based on their national circumstances. From a climate governance perspective, China adheres to what has been termed a “thin green transition,” which is rooted in the concepts of ecological modernization and green growth. This view holds that sustainable development and economic growth can be simultaneously achieved through technological and institutional advancement (Bull, 2024). In Chinese policy documents, “ecological civilization” and “high-quality development” are central themes.

Similarly, Brazil's climate policies are development oriented. For instance, the Brazilian Forum on Climate Change promotes the integration of development and climate governance by adopting the principles of a regenerative economy and seeking to transform Brazil's economic and environmental development model. This shared vision of green transition facilitates consensus-building between China and Brazil within the broader discourse of sustainable development.

3. Domestic Policy Systems

Both China and Brazil exhibit top-down governance mechanisms in the implementation of climate change policies, though these mechanisms differ in degree and form. In China, the central government sets strategic targets—such as those outlined in the 14th Five-Year Plan, which includes objectives for carbon peaking and energy structure adjustments—while local governments are tasked with translating these goals into specific industrial transformation and emissions control measures. This demonstrates a high degree of policy centralization and

strong administrative capacity, allowing for rapid and coordinated responses. Moreover, China's policy continuity tends to be relatively stable across political cycles.

In contrast, Brazil's climate policy is more susceptible to fluctuations based on the political cycle. Presidential transitions exert a decisive influence on the direction and continuity of environmental policies. During the administration of President Bolsonaro, key environmental agencies such as IBAMA were significantly weakened, leading to increased deforestation and damage to Brazil's international reputation. Upon returning to office, President Lula promptly reversed many of these policies, restructuring climate institutions and increasing enforcement personnel in Amazon conservation areas. These shifts reflect the fragility and reversibility of Brazil's climate governance in the face of political contestation.

Additionally, China's governance model lacks deliberative democracy (Westman et al., 2019), which means that concepts such as inter-party competition and legislative approval processes function differently compared to Brazil and other democratic systems. For example, in China, environmental and climate-related policymaking may involve horizontal coordination among various ministries, including the Ministry of Ecology and Environment (which oversees and guides planning and decision-making related to environmental issues), the China Meteorological Administration (which provides scientific evidence on environmental and climate conditions), the Ministry of Foreign Affairs (which manages international negotiations), and other government organs. In Brazil, by contrast, climate-related policy disputes are often manifest through inter-party competition and debates of interest.

In China, policy conflicts often occur along vertical lines of authority between central ministries and local governments (Zhang, 2022), as well as among ministries at the same administrative level. For instance, both the Ministry of Ecology and Environment and the Ministry of Foreign Affairs are involved in overseeing China's participation in the United Nations Framework Convention on Climate Change (UNFCCC) Conferences of the Parties, leading to overlapping mandates and potential bureaucratic friction.

4. Divergences in Media Communication and Public Perception

Both Chinese and Brazilian media emphasize the values of international climate conferences and scientific consensus in their coverage of climate issues. However, there are significant differences in the content and focal points of their reporting. Chinese media tend to highlight government leadership, national strategy, and technological innovation, particularly through positive portrayals of ecological civilization and green transformation. This aligns closely with the state's educational agenda and its emphasis on developmental narratives.

In contrast, Brazilian media cover a broader range of topics, including social justice, biodiversity, and the plight of marginalized groups. Climate reports often feature indigenous communities and residents of favelas as key subjects facing climate-related risks, while also examining the impacts of environmental policy on social inequality. This narrative reflects the Brazilian media system's emphasis on social engagement and pluralistic perspectives, and it resonates with the country's polycentric governance structure that values inclusiveness among diverse stakeholders. It is worth noting that Brazilian media narratives often link climate change to phenomena such as forest fires and droughts, which have a more immediate and tangible impact on residents' daily lives compared to the climate change cases commonly reported by Chinese media. This study argues that the issue of climate change is more localized in Brazil than in China, which also accounts for part of the divergence in media attention and focus between the two countries. A more detailed analysis of media communication will be presented in Chapter Three.

5. Comparative Analysis of Public Engagement and Perception Mechanisms

At the level of public cognition, both countries exhibit a high degree of recognition of climate change. Survey data indicate that in China, public acknowledgment of climate change is largely shaped by top-down policy guidance and a motivation for collective identification. Citizens tend to perceive climate change as a national issue, with greater implications for the country than for individuals. Nonetheless, the specific impacts of climate change on personal lives remain insufficiently recognized among the general population.

The Brazilian context is more complex. On one hand, public acceptance of the scientific consensus on climate change has been steadily increasing. On the other hand, climate change denialism has also been on the rise, particularly under the influence of populist or extreme political leadership. This cognitive polarization

reflects both the pluralistic nature of Brazil's media environment and the underlying socio-cultural fragmentation within the country.

6. Divergent Pathways of Civil Society Participation and Social Mobilization

In Brazil, non-state actors have played a long-standing and structurally diverse role in climate governance. As early as the 1992 Rio Earth Summit, a large number of civil society organizations were actively involved. These social organizations and NGOs have contributed significantly to shaping public awareness and understanding of environmental and climate issues. Culturally, Brazil integrated environmental themes into public activities such as music festivals and educational programs as early as the early 21st century, creating a unique green cultural atmosphere. Even during the administration of President Bolsonaro, Brazilian environmental organizations continued to speak out actively at international conferences such as COP26, urging the international community to pay attention to Brazil's environmental policy setbacks. This reflects the resilience of Brazil's polycentric governance structure.

In contrast, China's public participation pathway is more centralized and policy driven. The integration of climate issues into everyday public life is a relatively recent development, closely tied to China's increasing engagement in international climate governance. Existing studies have shown that Chinese public attitudes toward climate change tend to align with the state's official position, and that policy discourse plays a significant role in shaping public awareness (Zhang, 2022).

7. Motivations and Cost-Benefit Analysis of International Engagement

Both China and Brazil demonstrate strong willingness to engage in global climate governance, yet their motivations and cost structures differ significantly.

China reinforced its strategy of climate leadership after the Trump administration withdrew from the Paris Agreement, aiming to establish itself as a responsible global actor within the framework of a "shared future for mankind." After the Biden administration rejoined the Paris Agreement, the risk of the U.S. shifting again—especially with the reelection of Trump in 2025—may once again weaken America's role in climate diplomacy. In this context, China may seek to leverage its stability and policy continuity as political capital on the international

stage. At the policy level, China's "dual carbon goals" (carbon peaking and carbon neutrality) have become a national strategy, enshrined in the Government Work Report and the 14th Five-Year Plan, signaling its proactive stance in climate governance.

Moreover, China is enhancing its competitiveness through green technological innovation. By the end of 2024, the country's electric vehicle (EV) production exceeded 9 million units, capturing over 60% of the global market. Chinese EVs are also increasingly exported to other countries, with firms like BYD securing a notable market share in Brazil.

In contrast, Brazil is facing mounting climate adaptation costs, particularly from droughts, wildfires, and ecological degradation. The demands of economic development have intensified the country's need for international cooperation and green investment. Investments in renewable energy in Brazil's Northeast region are growing rapidly. In 2023, Brazil launched a green hydrogen project in Ceará in collaboration with the European Union, with an expected annual output value of R\$1 billion. Shifts in climate policy also reflect the Brazilian government's emphasis on international image. Toward the end of the Bolsonaro administration, partly influenced by the departure of Trump, Brazilian diplomacy began to pivot toward climate issues in an effort to rehabilitate the country's global reputation.

Under President Lula's first term from 2003 to 2010, environmental issues already received considerable attention, with the promotion of biofuels and the establishment of Amazon conservation mechanisms, making environmental policy a form of political capital. This path dependency quickly resumed when Lula returned to office in 2023, reinforcing both the institutional foundations and societal support for Brazil's engagement in climate governance.

Although the two countries have different starting points, both consider climate governance as a key component of their national strategies, indicating that major developing countries are increasingly shifting toward becoming potential leaders in the global climate agenda (Zhang, 2022). While China aspires to transition from a passive follower to a potential leader, Brazil seeks to restore and rebuild its regional leadership. Nevertheless, as scholars have argued, China is a highly strategic participant in international governance, and its multilateralism should not be viewed as a consistent trait but rather as a dynamic response to

international pressures (Kastner et al., 2020; Zhang, 2022). Similarly, Brazil's engagement is strongly influenced by political transitions and the international context. Therefore, climate policy and international governance in both countries should be understood as dynamic processes shaped by specific cases and contexts, revealing their inherent complexity and evolving characteristics.

In conclusion, this chapter has traced the evolution of climate change from a scientific inquiry to a complex global governance issue shaped by politics, economics, and social dynamics. It reviewed the historical development of climate science, the formation and influence of international climate mechanisms, and the politicization of climate change through global negotiations and national interests. It further examined how China and Brazil, as key representatives of the Global South, have approached climate change through their policies, institutional arrangements, and socio-cultural contexts. Together, these analyses illuminate the multifaceted trajectory of climate change as both a scientific and political phenomenon, while providing a theoretical and historical foundation for the comparative study undertaken in this dissertation.

By situating climate change within a broader framework of scientific paradigms and actor-network interactions, this chapter has demonstrated that scientific consensus alone does not guarantee uniform social or political acceptance. The ways in which climate knowledge is produced, negotiated, and disseminated are deeply intertwined with institutional structures, media discourse, and public perception. Building on this understanding, the next chapter shifts focus to the field of environmental journalism in China and Brazil, examining how these national media systems construct, frame, and communicate environmental and climate issues. This transition marks the movement from a macro-level historical and theoretical exploration to a meso-level analysis of media structures and news production, thereby laying the groundwork for the empirical case studies that follow.

3. Environmental journalism in China and Brazil

This chapter aims to provide a systematic examination of environmental journalism in China and Brazil and to analyze the underlying logics and developmental trajectories shaped by their distinct political, social, and media structures. As a critical subfield of communication studies, environmental journalism not only fulfills the functions of information dissemination and social oversight, but also reflects the governance logic and discursive practices of states in addressing environmental and climate issues. With the growing salience of global climate change and ecological crises, news media play a pivotal role in shaping public agendas, constructing perceptions of environmental risk, and facilitating policy interactions. Therefore, an in-depth analysis of the environmental journalism systems in China and Brazil contributes to a better understanding of institutional differences in environmental communication and offers scholarly value for comparing communication patterns in Global South countries.

In the international scholarly context, China and Brazil represent two fundamentally different political systems and media ecologies. China's media system is deeply embedded in the propaganda and governance apparatus of a single ruling party. The development of environmental journalism is strongly influenced by state policy orientations and institutional control, and its content often integrates functions of propaganda, education, and limited watchdog reporting. In contrast, Brazil's media landscape is dominated by commercialized outlets operating within a democratic framework. News production is shaped both by market logic and elite discourse, while also reflecting the complexities of political radicalization and a digitally mediated communication environment. These structural differences affect not only the selection of environmental topics and reporting styles but also the modes of social participation, public oversight, and engagement with international discourse. Adopting this perspective, the chapter seeks to reveal the developmental characteristics, structural logic, and content patterns of environmental journalism in China and Brazil.

The structure of Chapter 3 is organized into two major sections, offering a systematic review and parallel analysis of environmental journalism in both

countries. The first section, China's Environmental Journalism (Section 3.1), begins with an introduction to China's media system and its relationship with the development of environmental journalism, examining its historical evolution, structural characteristics, and institutional norms. It further explores the content features and reporting styles of environmental journalism in China, as well as the ways in which these are shaped by the country's environmental governance logic. A historical review of its developmental stages highlights the tension between policy-driven orientations and marketization.

The second section, Brazil's Environmental Journalism (Section 3.2), starts with the background of democratization and media marketization in Brazil. It analyzes the country's media structure, journalistic norms, and the historical trajectory of environmental journalism, with particular attention to the influence of digitalization and social movements on topic selection and discursive construction. It also examines the content features and reporting tendencies of Brazilian environmental journalism, including its focus on environmental conflicts and the tension between internationalization and localization.

Through these two sections, the chapter portrays the historical development and structural characteristics of environmental journalism in China and Brazil, thereby laying the foundation for the comparative analysis of climate change news in the subsequent chapters.

3.1 China Environmental Journalism

3.1.1 An Introduction of China's Media System

China's media system is founded upon the governance structure led by the Chinese Communist Party (CCP), where the overwhelming role of the state constitutes a distinctive feature of the Chinese media landscape (Zhao, 2011). All Chinese media outlets are owned by Party and state institutions (Nathan, 2003). The state retains authority over the appointment of media officials. Furthermore, the government has established a comprehensive credentialing system for journalism professionals. All journalists are required to undergo training on official ideology,

media policies and regulations, journalistic ethics, Marxist journalism theory, and other related subjects (Zhao, 2011), thereby ensuring a localized model of professionalization in the Chinese journalism industry (Chin-Chuan, 2003).

Drawing upon the dimensions proposed by Hallin and Mancini for comparative media analysis, Zhao notes that the dominant role of the Party-state in the Chinese media system differs from the form of “intervention” discussed in their Western framework. In China, the influence is not derived from ideological differences between left- and right-wing political parties, but rather from the unitary ideological dominance exerted by a single-party state.

Historically, Communism, nationalism, and developmentalism have been closely intertwined in the CCP's mobilizational ideology (Lin, 2006). Since the post-Mao era, the CCP's programs, ideological stances, and moral doctrines have undergone substantial transformation. As the Party gradually receded from its overtly Communist identity, nationalism and developmentalism came to dominate the political discourse, while Confucian moral values began to eclipse Communist moral values (Zhao, 2011). China continues to integrate its media system into broader state plans for offering moral guidance, promoting economic development, and facilitating social transformation. The media are employed to disseminate state-sanctioned values and moral norms (Zhao, 2011) and are used to mobilize collective social actions (Sun & Zhao, 2009). The CCP actively controls the media as a tool to shape the contours of Chinese modernity (Zhao, 2011).

The tradition of Party-affiliated media has deep historical roots. As early as the 1940s, Mao Zedong began to indigenize the Leninist model of the press in China, emphasizing that media should function not only as a communication channel between the Party leadership and local cadres but also as a conduit between the Party and the broader public. For instance, during the Mao era, reading newspapers within work units was a routine part of the weekday schedule. In contrast, commercial mass media modeled on the Western liberal tradition—primarily newspapers, including both broadsheets with serious news and entertainment content, and afternoon tabloids focused on soft news—flourished in major cities (Zhao, 2011). However, such media institutions were eliminated during the Cultural Revolution.

The official conceptualization of media as the "mouthpiece" of the Party signifies the highly instrumentalized nature of China's media system (Zhao, 2011). Scholar Zhao pointed out that Chinese journalism cannot be evaluated using Western standards of professionalism, such as political neutrality, "objectivity," and autonomy from political parties and governments (Zhao, 2011). In journalistic practice, as in the Western context where professionalism comprises multiple dimensions such as "autonomy", "distinct professional norms", and a "public service orientations" (Hallin & Mancini, 2004), Chinese journalists appropriate diverse and often conflicting ideas of journalism to construct and "localize" professionalism through "their improvised and situated practices" in a rapidly transforming media system (Chin-Chuan, 2003). The CCP's theory of the press asserts that the Party's mouthpiece is simultaneously the mouthpiece of "the people," since the Party claims to serve the people. Given that journalists are positioned as propagandists of the CCP, it is not entirely inconceivable that they may pursue their ideal of "public service" through their roles in Party journalism (Zhao, 2011). In the Chinese context, the concept of "serving the people" functions analogously to the Western notion of "public service", forming the ideological foundation of a uniquely Chinese conception of journalistic professionalism (Zhao, 2011). As a professional ideology, Western-style professionalism becomes "truncated and fragmented" in the Chinese journalism (Chin-Chuan, 2003).

Following the Mao era, the commercialization of Chinese media underwent a revolutionary transformation, led by the Party-state organs themselves (Zhao, 2011). Despite this commercialization, the production and distribution of news and information remained classified as "sacrosanct and inviolable," and ownership of media institutions—including newspapers and radio stations—continued to be monopolized by the state. The Chinese government recognizes that media are both instruments of propaganda and profit-generating enterprises (Zhao & Guo, 2005a).

In this context, China's media system still has its complexity. Two primary press segments have formed under marketization. The first is the traditional party-run organs, such as *People's Daily*, which serves as a means of intra-party communication between its leadership and its grassroots units. These newspapers are primarily issued by central and provincial institutions. The second type consists of mass-appeal papers that act as channels of communication between the Chinese

Communist Party (CCP) and the emerging urban middle class (Zhao, 2011), such as evening newspapers and metropolitan dailies. These publications may be issued by central, provincial, or municipal-level party organs. Market-driven mass-appeal papers tend to target diverse social groups, including workers, women, youth, intellectuals, and business elites. Compared to the party organs, which traditionally emphasizes policy and ideological propaganda aligned with the political goals of the CCP (Duan & Miller, 2021), mass newspapers are generally more commercialized and entertainment oriented.

Media outlets at the central and wealthy provincial and municipal levels are always at the forefront of media development, owing to their strong financial resources and large readership. Commercialization has contributed to the rise of two powerful elite niche markets: intellectual-oriented press and commercial press. The most prominent example of the former is *Nanfang Weekend*, a nationally distributed liberal-leaning supplement of *Nangfang Daily*, the official party organ of Guangdong province. The latter caters to China's emerging commercial class, modeled after *The Wall Street Journal* and *The Financial Times*. They appeal to two major kinds of "elite" – intellectual and business elites with liberal and technocratic orientations (Zhao, 2011).

It is worth noting that central and major provincial press, in order to fulfill their role as the Party's traditional mouthpiece, have more freedom to play a complementary watchdog role (Zhao, 2000). Due to the vertically integrated structure of media administration in China, these outlets are permitted to produce investigative reports on municipal affairs. Since the mid-1990s, the media have taken on a watchdog role, with a notable surge in investigative journalism for a period. Scholars have noted that the Chinese government has used critical investigative reporting—such as exposing corruption among local officials or uncovering labor rights abuses by enterprises—as a means to ease social tensions and foster a sense of identification between the public and the Party (Zhao, 2000). At the same time, this practice enables the government to address internal disciplinary issues, especially as party corruption had, by the late 1990s, significantly affected the country's economic development and provoked anger and resistance among segments of the public.

In this process, the media have been granted greater power—when central press point out cases of injustice, the government often assumes the role of a responsive actor, upholding justice. Investigative journalism thus serves multiple functions: it fulfills the political objectives of the Party, attracts audiences as well, and moreover aligns with mainstream Western journalistic norms. However, those media must exercise extreme caution when selecting topics. Their reporting must be in line with the short-term reform agendas of central policies, while also avoiding public outrage or risks to social stability (Zhao, 2000). After the movement in 1989, the media became more sensitive to political boundaries. Typically, investigative reports target individual wrongdoers rather than criticizing systemic or institutional mechanisms. To this day, the watchdog role of the Chinese media has not been institutionalized (Zhao, 2000), and remains heavily influenced by the political climate.

In recent years, anti-corruption has become one of the government's central priorities. However, media hardly conduct independent investigations into the processes of these cases; instead, they simply report official government declarations. China's political configuration, its rapid economic growth compressed into a few decades—condensing what took Western countries centuries—and the emerging social tensions associated with its status as being in the "primary stage of socialism," have contributed to a media system that remains volatile and unstable. Real-time studies of Chinese media under different issue contexts are therefore valuable for understanding the dynamic transformations of Chinese media and sociocultural structures, enriching the body of media and political communication scholarship in non-Western contexts.

Since 2010, the internet has increasingly become the primary platform for news consumption among the Chinese population. As of 2024, China's internet penetration rate has reached 78.6%, with over 1.029 billion online payment users. Emerging data-driven news aggregation platforms and social media have posed significant challenges to traditional journalism. For instance, the news app Jinri Toutiao, launched in 2012, quickly attracted a massive online user base due to its algorithmic capability to recommend personalized news content. By 2015, it had reached over 35 million daily active users. Following the success of algorithm-driven user engagement, the platform's founder later launched Douyin (known

internationally as TikTok). And, Weibo, often referred to as China's version of X (formerly Twitter), has become one of the main platforms for news circulation. In 2012, 60% of internet users in China were Weibo users, and today it boasts over 500 million registered users.

The Party-state has reaffirmed its commitment to the digital transformation of traditional media, calling for the integration of conventional journalism with the interactivity, speed, and competitiveness of new media platforms in the internet era, and introducing new concepts for communication (Repnikova & Fang, 2019). Upon taking office, President Xi Jinping emphasized winning the ideological battle in the media as a key Party task. In 2014, during the first meeting of the Central Leading Group for Cybersecurity and Informatization, he stated: “Creating a healthy online public opinion environment is a long-term mission that requires innovation in publicity and ideological work, the promotion of positive energy, and the cultivation of socialist values” (Repnikova & Fang, 2019).

Against this backdrop, traditional media have pursued efforts to advance digital development. Scholars investigating local media success stories—particularly *The Paper* (Pengpai Xinwen)—have found that its competitive advantage lies in the combination of high-quality political and investigative journalism with innovative propaganda strategies and a user-friendly digital interface (Repnikova & Fang, 2019). A founding executive of *The Paper* remarked that by blending critical journalism with propagandistic content, the platform assumed a revitalized version of the role traditionally played by state media, merging public opinion guidance with oversight functions. However, scholars found that this success is not easily replicable. As internet regulation becomes increasingly centralized, the Cyberspace Administration of China (CAC)—a central-level government body established after 2011—has cracked down on influential opinion leaders, contributing to the decline of investigative journalism. Consequently, local officials have shifted toward more conservative, politically risk-averse models of online news production (Repnikova & Fang, 2019).

It is important to note that in the digital environment, China's traditional media face increasing competition and disruption, which may affect their agenda-setting function. However, due to government control mechanisms—such as the professional licensing system for journalists mentioned earlier—Chinese

journalists and news sources remain subject to substantial regulation and oversight. Against this backdrop, coverage of environmental and climate change issues continues to rely heavily on reports from mainstream Chinese media, and such content typically aligns with the country's environmental and development policies. Nevertheless, different media outlets adopt varying framing strategies when reporting on environmental and climate-related issues, and these differences are undergoing dynamic change (Duan & Miller, 2021; Guo et al., 2023).

3.1.2 Structure and Norms of Chinese Media Reporting

Since the late 1970s, China has relaxed its control over newspapers, leading to their commercialization and partial privatization. This shift has gradually reduced the government's grip over media operations and finances (Stockmann, 2012). Two defining features characterize Chinese media today: on the one hand, market forces have become increasingly significant, as evidenced by heightened competition for readership and advertising revenue; on the other hand, the Chinese Communist Party (CCP) continues to exercise control over editorial policies (Zhao, 1998, 2008). Numerous scholars have emphasized that despite some changes in media funding sources, the press remains closely aligned with the Party's propaganda apparatus and continues to fulfill its fundamental role—albeit in increasingly complex and adaptive forms—of convincing the public of the correctness of Party leadership (Wang et al., 2017).

During the era of traditional media, Chinese news outlets were typically classified into two broad categories: Party-run media/Party organs (also referred to by journalists as official newspapers) and mass media (Stockmann, 2012; Zhao, 2011). The latter can be further divided into two subtypes: semi-official media and commercialized media (Stockmann, 2012). Notably, Chinese journalists and editors commonly acknowledge that there are no truly independent newspapers in China. The country has neither fully commercialized nor genuinely privatized its media—ultimately, all media organizations remain state-owned (Stockmann, 2012).

This classification emerges from systemic differences across several dimensions, including institutional affiliation, finances, and management and

personnel (Stockmann, 2012). In terms of affiliation, media professionals typically categorize newspapers based on their sponsoring institutions. Party-run media fall directly under the supervision of national/local Party committees or state agencies. All others are grouped into mass media. Party committees and party organs maintain a position of "structured dominance" and leverage policy advantages to "conquer" the mass market. In fact, China's mass newspapers—such as the evening papers and metro papers—are often subordinate to Party committees or affiliated with existing party-run media (Zhao, 2011). Party organs continue to receive state subsidies and rely primarily on subscriptions from various levels of government. In contrast, mass media depend on newsstand sales and lack the institutional subscriptions that offer a steady revenue stream (Stockmann, 2012).

In terms of management and personnel, the sponsoring institutions of party organs are deeply involved in their administration and staffing decisions. Journalists' salaries and career advancement are largely decoupled from performance metrics and instead reflect alignment with the Party's political stance rather than audience preference. Mass media, by contrast, are considered more reader-oriented and engage in audience research. In pursuit of profitability, these outlets operate more like private enterprises than state bureaucracies (Stockmann, 2012). Media practitioners in China often perceive party organs as embodying greater state involvement and closer ties between staff and the government, whereas mass newspapers are seen as more business-like entities that better respond to audience demands (Stockmann, 2012).

Another noteworthy structural feature of the Chinese press system is its high degree of localization, which varies significantly across cities (Stockmann, 2012). As a Leninist political system, the Chinese state comprises territorial divisions at the center, province, city, county, township, and village levels. It is composed of numerous government and Communist Party units (commissions, ministries, bureaus, and departments) at the national level, which replicate themselves in a vertical chain through lower levels of government. Individual units receive administrative guidance from above, but they are also subject to the leadership of the local governments to which they belong. Newspapers are integrated in this broader political structure at their level of government (Stockmann, 2012).

In order to obtain a publishing license, all newspapers must secure a sponsoring institution. The administrative rank of this sponsor determines the newspaper's own rank and its permitted distribution range. For instance, party-run newspapers are registered with Communist Party committees and serve as the Party's official voice at the corresponding level of government. Due to licensing policies that require institutional sponsorship, most newspapers are registered under local-level entities, which in turn constrains their circulation and reach. As a result, virtually every city in China—including even small towns—has its own newspaper (Stockmann, 2012).

This structure leads to different dominant media outlets in different cities, with market size and media composition varying by region. For example, in her study, Stockmann (2012) compares the media systems in Chongqing and Beijing. She finds that Chongqing's newspaper market is relatively small and less marketized than that of Beijing. Consequently, the Chongqing media landscape is primarily composed of party organs and mass media. In contrast, highly marketized cities like Beijing and Shanghai exhibit greater media diversity. In these cities, media can be classified into three categories: party organs, mass media, and semi-institutional (semi-official) media.

As mentioned above, semi-institutional (official) media belong to the category of mass media in terms of institutional affiliation. However, financially, private subscriptions can be obtained, such as the Beijing Youth Daily, and semi-institutional newspapers rely entirely on advertising financing and are not partially privatized (unlike commercial media that rely on investors).

These characteristics have led media professionals to conceptualize the Chinese newspaper landscape through various dichotomies: national vs. local media; official (Party-run) vs. market-oriented media; media from economically developed vs. underdeveloped provinces; and media published in provinces considered more "liberal" vs. those in provinces deemed more "orthodox" (Wang et al., 2016).

Despite the rise of the internet, newspapers remain a major source of information in China. Although digital platforms have enabled the emergence of numerous content producers, the production of original news—particularly political news—continues to be dominated by professional journalists and institutional

media, due to the basic institutional framework. Online news websites are closely tied to traditional media and frequently repost articles from newspapers (Stockmann, 2012).

In the era of social media, Chinese scholars have further categorized media actors on the internet into distinct types: professional media—namely, traditional party organs and mass media—and institutional media (Zhang & Tang, 2018). The term “institutional media” refers to new media accounts established by Party committees, government departments, mass organizations, or state-owned enterprises and institutions. These entities use social media platforms such as WeChat official accounts or Weibo public accounts to disseminate information related to their organization or sector. A defining characteristic that distinguishes institutional media from professional media is the lack of journalistic authority to produce and edit original news content (Zhang & Tang, 2018).

Notably, the new news ecosystem has given rise to a distinctive form of news product that Chinese scholars refer to as the “1+X” model (Zhang & Tang, 2018). This hybrid format integrates the personal branding features of individual media with the operational mechanisms of institutional media. In this model, “1” represents a self-media IP—typically a core individual figure—while “X” denotes a small team that supports content creation and brand management. A prominent example is the Southern Media Group’s launch of 25 so-called “mainstream internet celebrities,” and its operation through a branded newsroom studio (Zhang & Tang, 2018). These individuals differ from grassroots influencers in that they possess formal news production rights and are often supported by professional news teams. This model represents one of the outcomes of traditional Chinese media’s efforts to promote media convergence and transformation.

3.1.3 News resource investment and regulation

One notable feature of China’s reform era has been the rapid expansion of the private sector alongside large-scale privatization across many state-owned enterprises. However, the country’s officially stated commitment to socialism has imposed ideological boundaries on the scope and pace of privatization. In the media

sector, while the Chinese government has significantly reduced its financial subsidies to media outlets and increasingly positioned the media and cultural industries as arenas for profit generation and capitalist development (Zhao, 1998, 2008), it has simultaneously maintained strict limitations on private capital participation (Zhao, 2011).

During the reform process, the state actively fostered the entertainment function of the media and accommodated the commercial logic of private capital, which tends to prioritize profit over political expression. To manage this tension, a complex and differentiated regulatory framework was established to govern private investment in the media and cultural sectors. Despite these market-oriented developments, the ownership of news-producing institutions—such as newspapers and broadcast stations—has remained under complete state control, due to the perception of news and information dissemination as ideologically sensitive and politically sacred. At the same time, the state has selectively opened adjacent sectors—including film production, television entertainment, advertising, and audiovisual distribution—to both domestic and foreign private capital. Through this strategy, the government retains strategic control over the media system and its ideological orientation, while ceding monopolistic control over production and circulation in less politically sensitive areas, especially those related to entertainment, lifestyle, and consumer culture (Zhao, 2008, 2011) .

As of 1989, the Chinese newspaper landscape remained highly centralized, with only 69 newspapers in circulation nationwide—all of which were sponsored and operated by the Party and government institutions (Shirk, 2010). A significant shift began in 1978, when the Chinese Communist Party, during the Third Plenary Session of the 11th Central Committee, eased restrictions on the flow of information both domestically and internationally. This policy shift aimed to encourage initiative, innovation, and economic development. Within this broader context of economic reform and opening-up, local media outlets began to explore alternative sources of funding beyond state subsidies (Stockmann, 2012). A symbolic milestone occurred in 1979, when advertising was first introduced through Shanghai Television and the Jiefang Daily in Shanghai (Stockmann, 2012). The appearance of advertising signaled the beginning of a broader historical transformation of Chinese media—from state-funded propaganda tools to mass

media outlets that increasingly integrated both political messaging and commercial entertainment objectives (Zhao & Guo, 2005b).

On the eve of China's reform era, all newspapers and television stations were state-owned, with media operations and finances entirely managed by the government. Employees were not involved in the management or financial aspects of media institutions, which relied wholly on state subsidies. Following the onset of reform, the central government initiated a process of economic decentralization that led to a redistribution of wealth from central authorities to local governments, enterprises, and individuals. As a result, the proportion of central government revenue declined. By the early 1990s, government funding covered less than 10% of the technological development needs of the newspaper industry (Zhao, 1998; Stockmann, 2012).

Some newspapers had already lost all government subsidies by the early 1980s (Zhao, 1998). Soon after, businesses were able to purchase advertising space on nearly any page of a newspaper. In July 1993, the government further cut subsidies and ordered the financial restructuring of all major Party-run media (Hong, 1994). By the late 1990s, most media outlets had not only achieved financial self-sufficiency but were also generating profits (Stockmann, 2012). Advertising became the lifeblood of China's television system (Zhao, 2005). By 1999, commercial advertising accounted for over 85% of total revenues in the radio and television sector, with television ads making up 90% of all advertising income. The most profitable broadcaster was China Central Television (CCTV), whose market dominance was bolstered by its monopoly status at the central level (Zhao, 2005). In 2023, total advertising revenue for radio, television, and new media nationwide reached 343.536 billion yuan (approximately 49.08 billion USD).

The newspaper industry underwent structural reorganization during the 1990s. As the sector expanded in scale yet became increasingly fragmented, the General Administration of Press and Publication (GAPP) promoted the formation of newspaper groups to consolidate organizational control. By 2021, China had established 43 newspaper groups, collectively generating 41.44 billion yuan (approximately 6.43 billion USD) in main business revenue (National Press and Publication Administration, 2021). Though internal structures varied across groups, they typically adopted a hierarchical model with the Party-run media at the top

(Song, 2004; Zheng, 2003). This structure allowed the Party to reassert control over an increasingly dispersed newspaper landscape and to enhance its political influence over mass-oriented publications (Stockmann, 2012). Additionally, media conglomeration enabled commercially successful mass-market newspapers in some regions to cross-subsidize Party newspapers, whose profitability was often lower than that of their more market-oriented counterparts.

Chinese newspapers are deeply embedded within the broader political structure of the country and are subject to the authority of both the General Administration of Press and Publication (GAPP) and the Propaganda Department (PD). GAPP is responsible for drafting and enforcing media regulation policies, including licensing, investigations, and the prosecution of illegal publications. By deciding when, where, by whom and how many newspapers are founded, the CCP is able to determine the organizational structure of the newspaper industry and its connection to the political structure (Stockmann, 2012). In addition to the administrative body GAPP, which is part of the state bureaucracy, the CCP has also established Propaganda Departments (Xuanchuanbu) under the Party committees at various levels of government. These departments constitute the core of China's propaganda apparatus. The PD is a highly opaque institution; its internal structure and decision-making processes remain largely inaccessible to the public. Broadly speaking, the PD is tasked with guiding and planning the ideological development of the country (Brady, 2008).

At the individual level, GAPP has been responsible for issuing press credentials since 1987. In both 1989 and 2004, all journalists legally employed in China were required to reapply for journalist credentials issued by GAPP. To obtain these credentials, journalists were required to undergo training in official ideology, media policy and regulations, professional journalistic ethics, and the theory of Marxist-Leninist communication (Zhao, 2008). Although the Chinese Constitution formally guarantees citizens' freedom of speech, the country lacks a media law that explicitly protects press freedom. In practice, legal and regulatory frameworks impose restrictions on broad categories such as national security and state secrets. Moreover, regulations governing the administration of newspapers explicitly require publications to uphold the principles of the Party. Within this institutional context, the authority of GAPP and the PD is further reinforced (Stockmann, 2012).

Most censorship in Chinese media occurs prior to publication. Journalists and editors often rely on their political awareness and the accompanying sensitivity to determine whether to cover a topic and how to frame it (Stockmann, 2012). Scholars have noted that directives issued by the Propaganda Department are constantly adapted in response to China's rapidly evolving political, social, and economic conditions. Since media personnel cannot obtain official approval for every piece of news coverage, they primarily learn the boundaries through retrospective assessments. There exists a degree of uncertainty regarding how the News Department will handle the publication of individual reports. To navigate this uncertainty, journalists tend to rely on shortcuts or heuristics to assess the likelihood of a report—or the media outlet as a whole—facing repercussions (Stockmann, 2012).

Political sensitivity functions as a kind of intuition that allows media professionals to make informed guesses about which issues and topics should be restricted, in the absence of a clearly codified set of rules. This intuitive sense of political sensitivity governs the daily news practices of Chinese newspapers, encouraging journalists to act in particular ways and deterring them from others—what scholars refer to as journalistic norms and routines (Stockmann, 2012).

Based on the guidance of PD officials (IFJ, 2010), scholars have identified three categories of topic sensitivity. The first category consists of highly sensitive, taboo topics—subjects considered too politically sensitive to be reported on at all. The PD refers to these taboo areas with instructions such as "stop reporting" or "do not report." Media outlets are encouraged to submit internal reference reports (*neican*) to relevant authorities for such topics. The second category includes closed topics, which are relatively sensitive. While these topics may be reported on, restrictions apply to the timing, framing, and scope of the coverage. In such cases, the PD instructs media to "follow official information," "report positively," or "use Xinhua wire copy" (IFJ, 2010). The third category comprises open topics with low sensitivity, which editors and journalists are generally free to cover in any manner. This constitutes the third and final layer of journalistic regulation. Typically, closed topics require self-censorship to comply with directives from PD, whereas open topics do not.

Through content analyses of a range of topics and interviews with media professionals, scholars have identified a distinctive pattern in Chinese news reporting (Stockmann, 2012). First, not all political issues are treated as sensitive. When the government's stance diverges from audience interests, officials tend to tighten restrictions on news coverage. Conversely, when market dynamics do not pose a threat to the Chinese Communist Party's (CCP) policies and objectives, officials may permit greater openness in the news sphere. Second, although closed topics are expected to be reported in alignment with the standards of Party media, there are no explicit rules confining such topics solely to official newspapers, nor are open topics strictly limited to commercial outlets. Generally, commercial newspapers are more attuned to audience preferences, but they do not deviate from the central government's political positions. Party media reports are consistently more aligned with the official stance than those of commercial media. Third, the more politically sensitive a topic is, the more closely the sentiment of news coverage aligns with the government's official position. When journalists operate without direct intervention from the propaganda departments, they are more likely to cater to audience demands. Fourth, even with open topics such as social issues—including labor law—various types of media tend to adopt similar reporting approaches. This uniformity in tone is the result of the combined effects of institutional constraints and market forces, which work together to keep news coverage within acceptable boundaries.

3.1.4 The Influence of China's Environmental Governance on Journalism

China's "green revolution" and the development of its environmental journalism differ from those of most developing countries. In the view of Chinese investigative environmental journalists, environmental issues have primarily been associated with pollution. In recent decades, the rapid economic development of China has come at a tremendous environmental cost. Meanwhile, topics such as climate change and global warming were, for a period, regarded by journalists as external and global issues, rather than domestic concerns (Tong, 2015b).

Prior to the 1970s, the concept of “environmental protection” was unfamiliar to most Chinese citizens. At that time, China was under the control of radical leftist political forces. The public was told that environmental pollution in the West was incurable, while being unaware that environmental degradation was also occurring in China (Li, 2020). From the 1950s through the 1970s, environmental topics were largely limited to agriculture and disaster-related issues. For example, China experienced both the under-supply and overuse of pesticides, as well as typhoons that led to the collapse of hydropower stations (Schmalzer, 2016). In 1975, a typhoon caused the failure of 62 dams in China, resulting in an estimated death toll ranging from 85,600 to 230,000 people. However, the event remained a state secret for years, and even after the founding of the China Environmental News in Beijing in 1984, disasters such as the Banqiao dam failure were never publicly mentioned (Kovarik, 2020). In early periods, the Chinese government refrained from publishing critical news about environmental disasters.

After the 1970s, a turning point emerged in how the government handled environmental issues. Chinese society underwent a “cognitive revolution” regarding pollution: citizens were no longer motivated by a purely ecological imperative to “save the endangered environment,” but instead began to “pursue social justice and protect the ecological foundations necessary for human survival” (Jing, 2003). Politically, two incidents in 1972 prompted senior State Council policymakers to establish the first national committee for investigating and managing environmental problems, led by Premier Zhou Enlai. One was a red tide (toxic algal bloom) near the coastal waters of Dalian in northeastern China, which caused a massive die-off of shellfish; the other was the discovery of high levels of toxic chemicals in fish sold in Beijing markets (Muldavin, 2000). That same year, China participated in the influential United Nations Conference on the Human Environment in Stockholm (Edmonds, 2011), which catalyzed the first National Conference on Environmental Protection in Beijing the following year (Muldavin, 2000). Subsequently, environmental principles began to be codified into a series of national environmental laws, policies, and planning documents (Geall, 2018).

In the 1990s, the Chinese government launched a major environmental publicity campaign titled the China Environmental Protection Century Tour (Zhonghua Huanbao Shiji Xing). The campaign was covered by over a thousand

journalists, signaling the government's willingness to open the door to environmental policy discourse and media reporting. Consequently, environmental issues began to gain increasing attention from both the media and the public.

During this period, numerous environmental non-governmental organizations (NGOs) emerged, many of which were founded by former environmental journalists (Geall, 2018). Notable examples include Ma Jun, a former investigative journalist for the *South China Morning Post*, who founded the Institute of Public and Environmental Affairs (IPE); Wang Yongchen, a former broadcaster who established Green Earth Volunteers; and Feng Yongfeng, a former journalist at *Guangming Daily*, who founded Nature University (the grassroots environmental NGO). Scholars have noted that in the early 21st century, a discursive shift occurred in China's environmental narrative, which was described as a "green discourse" (Yang & Calhoun, 2007). This narrative emphasized the fragility of the environment and the necessity of its protection. It was fueled by the rise of green NGOs and contributed to the formation of a more diverse and pluralistic "green public sphere" (Geall, 2018).

According to Horsley (2017), the Chinese government sought to modernize its governance tools and institutions through environmental governance reform. These reforms aimed to create a "more law-based, transparent, participatory, and accountable" government in order to enhance both its effectiveness and legitimacy (Horsley, 2017). At the heart of these early 21st-century reforms were calls for increased transparency, expanded public participation, and the promotion of environmental law. Key developments included the Environmental Impact Assessment Law (2002), the Interim Measures for Public Participation in Environmental Impact Assessments (2006), the Regulations on Open Government Information (2008), and the accompanying Measures on the Disclosure of Environmental Information (2008) (Geall, 2018).

Some scholars have observed that the central government's shifting stance on environmental issues during this period was, in part, a direct response to growing public dissatisfaction with the inaction of local governments on environmental matters (Shapiro, 2012). While much of this discontent was expressed through non-confrontational means by environmental organizations, a significant number of protests were also triggered by localized environmental disputes (Chen, 2017). In

the early 2000s, the central government responded to rising public anger by vertically managing and disciplining local officials, thereby providing an outlet for social pressure. Gu's analysis of regional environmental protests in China shows that local governments, fearing political escalation and intervention from higher authorities, often made concessions to protesting communities (Gu, 2016).

In addition to a limited amount of grassroots concern for environmental issues. The government introduced the concept of ecological civilization in response to the significant environmental costs incurred during the country's rapid economic development. This concept has become central to China's environmental discourse (Chen & Zhao, 2022). Ecological civilization serves both as an ideal vision of sustainable development and as a guiding framework for environmental policymaking. Since 2007, it has been explicitly adopted as a political objective by the Chinese Communist Party and has been integrated into China's governance frameworks, propaganda strategies, and blueprint for eco-socialism (Chen & Zhao, 2022). The inclusion of ecological civilization in the Chinese Constitution in 2018 further signifies its increasing importance in shaping environmental policies, legislation, and education (Hansen et al., 2018).

Some scholars argue that China exhibits a model of "authoritarian environmentalism," referring to how an authoritarian regime defines environmental problems, governs the environment, and implements stringent regulatory measures to achieve its goals (Eaton & Kostka, 2014; Gilley, 2012; Guo et al., 2023; Li & Shapiro, 2020). For instance, Jiang (2022) analyzed the nationwide waste-sorting campaign initiated in 2018. The concept was first proposed during an official inspection tour by the national leader in Shanghai, which subsequently became the first city to implement mandatory waste separation. Within four years, nearly 300 cities across China had adopted various forms of waste-sorting policies. The study revealed that waste classification, as an environmental measure aimed at reducing waste volumes, recycling resources, and mitigating hazards, was heavily promoted and enforced. However, there was little public discussion on how the sorted waste would be processed. Jiang (2022) found that even four years after the initiative began, major cities such as Beijing still lacked the necessary infrastructure for separate collection and recycling, and the industrial chain for food waste treatment remained underdeveloped.

This indicates that while top-down collective environmental action may be implemented swiftly under this model, and the stated goals appear legitimate, the lack of supporting policies—such as infrastructure development—can hinder the actual outcomes. Jiang concluded that if environmental protection is to be a truly collective undertaking, the public must be granted greater power in decision-making and oversight, yet current levels of public participation remain insufficient (Jiang, 2022).

Finally, climate change, as a key component of environmental discourse, entered the public consciousness in China around 2007. In recent years, its prominence on the Chinese media agenda has steadily increased, making it an important part of the emerging green public sphere (Geall, 2018). The release of the 2007 IPCC report marked the first time that Chinese media explicitly linked global warming to greenhouse gas emissions (Tolan, 2007). By 2010, several prominent local organs and mass-appeal newspapers had begun to regularly feature dedicated columns on the environment, climate change, or “low-carbon” development. Social media further expanded and diversified this coverage. Platforms such as WeChat enabled the emergence of mobile groups and public accounts that addressed a wide range of topics—from the relationship between air pollution and climate change, to geopolitical concerns, and the economic benefits of energy transition (Geall, 2018).

Scholars have observed that, starting around 2012, the official discourse on “low-carbon development” began to be gradually supplanted by a narrative of “high-tech innovation” (Geall, 2018). This newer discourse placed greater emphasis on national contributions and technological achievements. Undoubtedly, this discursive shift has also shaped the media's environmental narratives.

3.1.5 The Development of Environmental Journalism in China

Environmental journalism in China began to take shape in the 1970s, when the government shifted its stance on industrial pollution, initiating environmental policies and promoting environmental protection. During this period, state-run

mainstream media played a leading role in disseminating environmental messages (Li, 2020).

In the 1980s, Chinese journalists began to conduct investigative reporting on dam construction projects undertaken by the state, initiating more critical coverage. Notably, Dai Qing, a prominent female journalist working for *Guangming Daily*, one of the largest Party newspapers in China, investigated poorly constructed dams built in the 1950s. Through interviews with scientists and engineers, she raised questions about the national hydropower development agenda. At the time, such reporting was regarded as a sign of the Chinese government's loosening of restrictions on political discourse, particularly concerning environmental issues (Kovarik, 2020). However, the political upheaval in Beijing in 1989 marked the end of this brief period of ideological openness. The environmental issues related to dam construction, which were deeply entangled with economic development strategies and high-level political decisions, became politically sensitive and were no longer allowed to be covered in the media.

In the 1990s, the development of environmental journalism continued under government involvement and guidance (Li, 2020). In 1993, a state-organized environmental journalism campaign attracted the participation of more than 6,000 journalists from both local and national news agencies. The reported content included the cleanup efforts of the Huai River and Tai Lake, as well as the enforcement of environmental laws. China Central Television (CCTV) aired the environmental program *Stories of the Earth* every evening (Kovarik, 2020).

By the early 21st century, environmental journalism gradually began to transcend the traditional reporting framework. It gained increasing attention from market-oriented media and evolved into an independent journalistic category (Li, 2020). As of 2006, there were 423 central and local environmental publications across China. Television stations and websites also featured environmental programming, and online news platforms such as the China Environment News Network, *People's Daily's* Environment Channel, and Tencent's Green Channel emerged to provide dedicated environmental coverage (Li, 2020).

Chinese journalists have increasingly recognized the necessity of broadening their environmental focus to encompass the wider impact of environmental regulations on human well-being and the economy, thereby reporting on a "larger

environment" (Yu, 2002). Environmental degradation has long been a concern in China, but the situation intensified in the early 21st century. In 2007, the coastal tourist city of Xiamen experienced public controversy over opposition to a paraxylene (PX) chemical project. Similar environmental concerns regarding chemical pollution were subsequently uncovered in other Chinese cities.

As environmental pollution worsened, investigative environmental journalism also gained momentum. Since the 1990s, environmental issues have been a central theme in China's investigative journalism (Tong, 2011, 2015a). The central government has often expected the news media to play a role in supervising and correcting illegal environmental behavior, viewing such efforts as supportive of its governance (Zhao, 2000). This expectation aligned with media organizations' market-driven incentive to attract readership and expand market share. As a result, a tradition of environmental investigative reporting has developed across national and local media outlets (Tong, 2015b). Examples include national platforms like Focus Report on China Central Television, mainstream newspapers such as Nanfang Weekend, Southern Metropolis Daily, and Caijing magazine, as well as local outlets like Yunnan Information and the Oriental Morning, all of which established dedicated sections and assigned reporters specifically to environmental issues (Tong, 2015b).

Mainstream academic perspectives argue that environmental investigative journalism in China enjoys relatively greater autonomy than reporting on other sensitive topics such as politics or broader social issues (Tong, 2015b). Despite facing censorship and restrictions (Kovarik, 2020), many journalists remain committed to alleviating environmental problems rather than simply reporting facts (Bao, 2010). This sense of mission and advocacy distinguishes environmental journalists from their counterparts in other reporting fields. Studies on Chinese environmental investigative journalism suggests that rather than adhering strictly to objectivity, environmental journalism is advocative, often involving non-objective perspectives (Kovarik, 2020; Tong, 2015b). Unlike political or other social topics, environmental journalists in China are often able to engage in pluralistic narratives and critical discussions, in the context of uncertainty in the "edgeball" politics space (Geall, 2018).

Pollution has been perceived by Chinese journalists as a native and immediate issue—one of the most severe environmental challenges facing the country. In contrast, climate change is often framed as a global and external concern. Similar to patterns observed in other national contexts, early studies have found that Chinese media coverage of climate change lacked detail, debate, and controversy (Guo et al., 2023; Jia, 2007). The voices of scientists and technocratic elites were incorporated into the media discourse to produce “correct knowledge” that aligned with government narratives on environmental matters (Guo et al., 2023).

A shift toward a more pluralistic and contentious phase in climate change reporting in China became evident in a 2010 China Central Television (CCTV) program, in which journalist Chai Jing interviewed Ding Zhongli, Vice President of the Chinese Academy of Sciences. During the interview, Chai raised sharp questions regarding China’s stance in international climate negotiations, while Ding challenged the credibility of the Intergovernmental Panel on Climate Change (IPCC) reports. He argued that the emission reduction frameworks proposed by developed nations constituted a “trap” that might constrain the economic growth of developing countries. The program sparked widespread public debate. Some viewers supported Ding’s emphasis on national and popular interests, and others criticized Chai for allegedly leaning toward Western perspectives. This debate not only heightened public attention to climate change but also reflected a growing trend within Chinese media toward more diverse and in-depth coverage of environmental issues. Notably, Ding expressed skepticism about human causes of climate change during the interview, while Chai was perceived as more supportive of the IPCC’s findings. Nevertheless, amid a backdrop of rising nationalism, Chinese audiences were more concerned with which voice better represented native interests.

Some scholars have expressed optimistic expectations for climate change journalism in China. They argue that reporting on climate change can create political space for the expression of multiple perspectives, some of which may even challenge authoritarianism and technocratic governance models (Geall, 2018). Because climate change is perceived as less politically sensitive than other environmental issues such as water and soil pollution or food safety, it offers a particularly fertile ground for public discussion and the construction of civic identity (Geall, 2018).

On the other hand, official discourse on climate and environmental issues has shifted from a previously passive stance toward a more proactive one, especially where critical coverage of China's environment has been proactively initiated by foreign media. This change has been particularly evident in the realm of national communication strategies (Lee, 2016). A central strategy of these efforts involves "telling China's story," challenging stereotypical representations in Western media, and circumventing Western discursive dominance, in an attempt to assert discursive power in the global media arena. For instance, during the 2015 United Nations Climate Change Conference, China Daily and People's Daily published special reports that emphasized the Chinese government's commitment to advancing "ecological civilization" and criticized the perceived inequities in Western countries' dominance over global carbon reduction frameworks (Chen, 2017).

Domestically, however, the political space for green civil society organizations has continued to shrink (Geall, 2018). Party leadership has intensified its repression of internal dissent, with political developments increasingly reminiscent of the leftist policies from the early years of the People's Republic. Non-governmental organizations have faced heightened restrictions, and rights activists have found themselves with limited room for resistance (Geall, 2018). These shifts in the political climate were first reflected in changes within the party's media organs.

Since 2014, many investigative journalists and hosts at China Central Television (CCTV) left their posts. The investigative program *See*, hosted by Chai Jing, was suspended and replaced with entertainment programming. This shift suggests a broader trend: investigative journalism at state-run media outlets was being displaced by entertainment-oriented content. After leaving CCTV, Chai Jing independently released her self-produced documentary *Under The Dome - Investigating China's Smog* in 2015, a sharp critique of the corruption underlying China's air pollution crisis (Kovarik, 2020). The film was uploaded to YouTube and was initially featured on the website of People's Daily for one week before being censored by the Chinese government (Mufson, 2015). According to The Guardian newspaper correspondent (Phillips, 2016), the crackdown on dissent and independent journalism around 2016 disheartened many young journalists, who were getting out of the business (Kovarik, 2020).

In recent studies, scholars have criticized that under increasing state control, China's media landscape has become more inclined toward political propaganda (Stockmann, 2012), with environmental reporting being co-opted by the state and utilized as a strategic tool to achieve political objectives (Ahlers & Shen, 2018). As the state government in environmental affairs deepens, the media have been mobilized to align businesses, elites, and citizens with governmental priorities. Moreover, environmental reporting in China has characterized the state's efforts to manage environmental problems by portraying a responsible image of the leadership to the domestic audience (Xie, 2015). By focusing on how China is tackling domestic pollution and projecting the "Green Belt and Road" initiative as a benefit to the global community, the media frame China as a confident global power capable of leading the world toward ecological civilization (Guo et al., 2023). Scholars argue that the politicization of climate change in China manifests in the way policymakers utilize the issue to legitimize authoritarian governance—through the promotion of national governance capacity and by assuming global leadership in environmental protection (Guo et al., 2023).

China's rapid economic development has condensed what took Western countries centuries during their industrialization into just a few decades. This has not only triggered intense environmental degradation over a short period but has also created a gap between the pace of economic growth and the development of social and cultural norms, with the growing of social inequality. Chinese society is still navigating its position between millennia-old traditions and rapidly emerging modern infrastructures. This inherent instability is evident in many domains, including the evolving dynamics of China's politics and media landscape. Environmental journalism in China has undergone tremendous growth over the past fifty years, yet such progress has continuously been marked by volatility and transformation. Given this context, real-time analysis and research on Chinese environmental journalism are crucial for understanding the dynamic interplay between media and policy.

3.1.6 Content Characteristics of Chinese Environmental Journalism

Chinese scholars, in comparing the evolution of environmental communication studies in China and the West, argue that the development of China's environmental communication in the past decade resembles the phase of the "mainstream environmental movement" that occurred in the West during the 1960s. That is, environmental issues in China are not merely topics of theoretical speculation; rather, they are often catalyzed by environmental events that spark social movements and subsequently enter the academic domain as research problems (Li & Cao, 2023). Although environmental communication remains a relatively niche area of study, there has been a notable surge in environmental journalism research in China since the end of 2013. Several factors contribute to this development: 1- The growing prominence of environmental issues. Beginning in late December 2013, China experienced an unprecedented wave of persistent smog, characterized by its frequency, geographical scale, and severity. This event was widely regarded as the most serious air pollution crisis since the founding of the People's Republic of China. 2- The emergence of social media platforms as new spaces for public discourse. Platforms such as Weibo and online forums enabled citizens to engage in discursive resistance on environmental issues through self-media channels. 3- The disconnect between traditional media and public demands in environmental reporting. Traditional mainstream media maintained a predominantly positive and official tone, with "elite discourses" dominated by government officials and academic experts. Meanwhile, the voices of enterprises and ordinary citizens remained largely marginalized or silenced (Bai & Han, 2018; Liu & Huang, 2016; Xu & Han, 2014).

Over the past decade, scholars have observed that the majority of environmental communication research in China has focused on the coverage of environmental issues by both domestic and foreign media. The main research concerns have included: how media content contributes to the construction and projection of national image; the sources of information employed by domestic media in environmental reporting; and the similarities and differences in the framing and positions adopted by domestic and international media (Li & Cao, 2023).

In the field of climate change journalism, by 2018, studies had revealed a notable absence of scientific knowledge dissemination on social media platforms. This lack contributed to the public's insufficient understanding of the scientific mechanisms and causes behind climate change (Hu & Zhang, 2018). Research demonstrated a significant positive correlation between the level of scientific literacy and the level of risk perception (Milfont, 2012). Specifically, most communication content focused on affirming the existence and threat of climate change, while failing to popularize scientific knowledge. As a result, the public became more susceptible to perceiving heightened risks associated with climate change.

Some Chinese scholars found that when the media frame diverges significantly from the audience's cognitive framework, increased media coverage can actually intensify negative emotions among the public, leading to greater perceived environmental risks. This insight offers a valuable contribution to the practice of environmental journalism in China. They point out that the role of mass media in risk communication should be to serve as a bridge facilitating dialogue and understanding, rather than functioning merely as a tool to defuse crises or suppress public outrage (Li, 2010).

Scholars acknowledge that in China's context—where official media function as the government's mouthpiece—the government acts as both the policymaker and the enforcer in environmental governance. Consequently, the state's discourse on environmental governance occupies a dominant position in constructing environmental narratives. However, researchers have criticized mainstream media coverage of environmental incidents for lacking a broad perspective and failing to reflect humanitarian concern. It usually tends to "discuss the governance theory itself", "essentially ignoring the environmental rights, survival rights and health rights of rights defenders and protesters, as well as victims of environmental pollution" (Fan & Lang, 2019). As a result, the media have not fulfilled their potential role as platforms for expressing the interests of marginalized groups and defending their rights (Zhu, 2012). Li and Cao (2023) further argue that the disconnect between official media narratives and public demands has exacerbated what they describe as a problem of communication failure. This failure has contributed to a widening gap between environmental reporting and public

perception, which in turn has given rise to the increasing frequency of discourse and action associated with environmental protests in recent years.

In terms of media content related to climate change, some scholars have conducted comparative analyses between Chinese and international media coverage (Hu & Ji, 2023). In terms of discursive tone, studies comparing media content from China, Germany, the United States, and the United Kingdom have shown that Chinese media tend to produce significantly fewer negative reports, with a greater emphasis on neutral or positive coverage. This aligns with the journalistic norms previously discussed regarding the Chinese media system. Moreover, Chinese media sources primarily rely on domestic governmental institutions, international organizations, and journalistic observation. Investigative reporting accounts for a small proportion of the coverage, and most of the coverage is of international events.

Some Chinese scholars have pointed out that Chinese climate change reporting tends to focus on a narrow set of topics and lacks diversity in content. Compared to environmental journalism in the West, China remains in an early developmental stage (Zheng & Li, 2010). In a comparative content analysis of the Chinese Communist Party's flagship newspaper *People's Daily* and the British newspaper *The Times*, Liu (2022) found that *People's Daily* emphasized reporting on climate-related conferences and events, with limited content devoted to climate science communication. Its coverage was also largely confined to domestic developments. In contrast, *The Times* presented more diverse topics and adopted a more international perspective, with more frequent coverage of foreign leaders than domestic ones. Over time, Liu observed a trend toward increasing diversification in *People's Daily's* climate coverage, with major thematic focuses including "cooperation and initiatives," "economy and livelihoods," "science and application," "governance and achievements," and "climate conference reports." British newspapers, by contrast, prioritized themes such as "climate positions and attitudes," "policy formulation and implementation," "economy and livelihoods," and "climate investigation and attribution" (Liu, 2022). With regard to the framing of climate change, Chinese media have tended to emphasize the "risk governance frame," "economic impact frame," "scientific fact frame," and "leader activity frame." British media, on the other hand, have more prominently featured the "risk

governance frame,” “scientific fact frame,” “conflict frame,” and “economic impact frame.”

Other studies have analyzed the climate change coverage among different domestic Chinese media (Li, 2025), focusing on the People’s Daily and the China Meteorological News—the latter being published under the auspices of the China Meteorological Administration, thus also classified as party-run media. The findings suggest that both outlets predominantly adopt a positive and affirmative tone, heavily citing official sources, with limited inclusion of perspectives from ordinary citizens. However, the China Meteorological News displays an even more positive tone and places stronger emphasis on scientific knowledge (Li, 2025). These differences are attributed to the distinct institutional roles and positioning of each outlet, although the overall sentiment and information sources are similar.

3.2 Brazil’s Environmental Journalism

3.2.1 An Introduction of Brazil’s Media System

Since the democratization process of Brazil in the late 1980s, the Brazilian media has played a significant role in political participation, social oversight, and the construction of public agendas. In recent years, the rapid development of digital media and shifts in the political landscape have reshaped the modes of media communication. The following section will outline the main characteristics of Brazil’s media system, examining its functions within a democratic society as well as the challenges it currently faces.

Since the 1990s, Brazil has been a society highly reliant on television as the primary source of news and information (Tavares et al., 2024). Newspapers had low circulation rates and a relatively small readership. As of 2000, newspaper circulation remained extremely limited, with only 60.6 copies sold per 1,000 adults. By 2005, this number had dropped to 45.3. The target audience for newspapers consisted primarily of a small urban elite (Albuquerque, 2011). Due to the limited readership and insufficient private advertising investment, Brazil’s commercial press market struggled to develop (Silva, 1991; Waisbord, 2000). To this day,

Brazilian media remains centered around television. According to a 2022 IBGE survey, 94.9% of Brazilian households owned at least one television set. Television broadcasting began in 1950, and most stations remained locally based until the 1970s. It was only with advances in communication technology and significant state investment that national television networks were established (Albuquerque, 2011).

Although the state and state-owned organizations have played a crucial role in providing financial support to media, Brazilian media outlets do not shy away from taking explicit political stances. They have followed a distinctive path in shaping political agendas that does not necessarily align with traditional party structures. Most leading news organizations seem to adopt an inclusive, market-driven approach, making deliberate efforts to distance themselves from specific political factions while seeking to increase internal diversity in political reporting (Matos, 2008; Porto, 2002).

Brazil's mainstream commercial media is dominated by a few media giants, with Global Network holding a dominant position in the Brazilian television industry (Albuquerque, 2011). Benefiting from technological advancement and commercialization, the network has also played an important role in the global market by exporting television content (Mattelart & Michèle, 1989; Porto, 2006). As early as the military regime, Brazilian television was already dominated by Globo Network, which reached approximately two-thirds of the national audience (Porto, 2012). In exchange for political support, Globo benefited from substantial government investment. With the end of the military regime, the Global shifted its position and repositioned itself as a core supporter of the new democratic government (Tavares et al., 2024).

Since the collapse of the military regime, press censorship in Brazil has nearly ended, although the new government occasionally resorts to violence to intimidate journalists (Albuquerque, 2011). In contrast, media regulation in Brazil is less stringent than in the United States, and the country has never established an independent regulatory agency. The allocation of radio and television licenses has always been monopolized by the executive branch (Porto, 2006).

As a representative of Brazil's intellectual elite, the media has its own distinctive characteristics. In the early years of the Republic, the rapid growth of urban populations in Brazil's large cities strongly influenced the intellectuals' lives

(Chalhoub, 1986) , who aspired to live by literature, with becoming a journalist being a necessary step in pursuing a literary life (Miceli, 2001). The Latin American elite "sought to enhance their authority by presenting themselves as representatives of internationally recognized standards of modernity" (Whitehead, 2006), and similarly, the mainstream media in Latin America, the "accountability institutions," adopted a comparable approach (De La Torre, 2015).

The influence of the American model played a decisive role in the transformation of Brazilian media (Albuquerque, 2011). In the 1940s, the United States deliberately sought to strengthen ties with Latin American countries by establishing the Office of the Coordinator of Inter-American Affairs (OCIAA). Through film and broadcast, the U.S. disseminated its way of life and American-biased news (Tota, 2000). The OCIAA also invested heavily in publishing news in Latin American media and funded Latin American journalists to visit the United States (Silva, 1991). After the 1950s, Brazilian media gradually shifted to a more fact-centered news model (Chalaby, 1996). Prior to this, Brazilian newspapers often acted as public mouthpieces for political groups (Albuquerque, 2011).

As Brazilian media became more commercialized, some journalists, drawn to rhetoric and techniques, launched a movement to reform Brazilian journalism, such as the *Diário Carioca* and the *Folha Project*. However, American journalistic norms and practices were largely imposed on Brazilian journalists by editors, rather than voluntarily embraced by them. Some scholars argue that while this increased the objectivity of news, it weakened the vitality of Brazilian journalism (Ribeiro, 2003).

It is worth noting that the historical and cultural differences in Brazil hamper the simple transfer of the American journalism model to Brazil (Albuquerque, 2005). Learning from the American model did not result in Brazilian media being replaced by the American model, but rather, through a process of localization, Brazilian media developed its own unique characteristics, such as changes in writing style and media values. Conti (1999) illustrates this alternative process of American journalism localization in Brazil through the example of the value of journalistic objectivity. A reporter in Rio de Janeiro, in order to complete a challenging interview, would write down the questions and answers in advance and have the politician read and sign a consent form. This technique allowed the reporter to increase the number of interviews, and the politician appeared more

eloquent due to the flowery language. Conti notes that this technique became institutionalized, with Brazilian news magazine *Veja* adopting it (Conti, 1999). What was originally a fact-centered key journalistic practice became more focused on efficiency and literary qualities in this context. Underlying this shift is a different understanding of the journalist's role in Brazilian media culture—rather than serving as a conduit between elites and the general public, Brazilian journalists often see themselves as mediators within elite political circles (Albuquerque, 2005). As a result, they are not necessarily held accountable to the audience for the form or transparency of the interview.

The Brazilian media's adaptation of the Fourth Branch rhetoric from the United States also emerged with localized features due to differences in the interpretation of the separation of powers principle (Albuquerque, 2005), as previously mentioned. Since the 1980s, the influence of economic globalization has impacted the media and intellectual circles, with the media in many countries becoming Americanized and liberal values and practices spreading worldwide (Albuquerque, 2011). Combining British and American discourses on the Fourth Estate (mainly serving as a watchdog for citizens to prevent the abuse of power) and the Fourth Branch (where the media acts as a mediator between government branches and between government and citizens), Brazil's Fourth Power originates from the "moderating power" (*Poder Moderador*) in the Brazilian Constitution, which requires a fourth power to arbitrate conflicts between the executive, legislative, and judiciary branches, ensuring that they can collaborate. The need for a fourth power to arbitrate contradictions among the three independent branches of government is a significant feature of Brazilian culture (Albuquerque, 2011). The military once played this role, but now, media organizations claim to take on this role (Albuquerque, 2005).

The creation of the *Poder Moderador* reflects a very ambivalent attitude about the liberal institutions and procedures. On the one hand, they were thought to be *sine qua non* requisites to the recognition of Brazil as a civilized, respectable country. On the other hand, there was a strong feeling that, left to their own devices, those institutions would produce anarchy and chaos. According to this view, the existence of three independent branches in the government was good in principle, but dangerous in practice, because it could generate an imbalanced government. The existence of an outside force was necessary to correct these

possible imbalances and to conciliate the actions of the three traditional branches. The Poder Moderador would be such force (Albuquerque, 2005).

Such a positioning of the Brazilian media clearly grants it greater power than that held by its American counterpart—at least from the perspective of self-perception. Brazilian media have adopted an active stance in politics while maintaining a pluralistic approach to reporting. For instance, *Folha de S. Paulo* has claimed the responsibility of "intervening" in public debate and, supported by facts and objective data, seeks to change people's beliefs and habits, thereby influencing the behavior of public or private institutions (Albuquerque & Holzbach, 2008).

From a practical standpoint, following the end of the military regime, the role of the Brazilian media was significantly shaped by the country's economic transformations. Major news companies became rooted in the market and significantly less dependent on the state (Waisbord, 2000). This allowed Brazilian journalism to play a pivotal political role. *Folha de S. Paulo* and the Globo Network were involved in the *Diretas-Já* movement in 1984 and the presidential election. Globo Network played a decisive role in the 1989 election—promoting the candidacy of a young and relatively unknown state governor, Collor—and later in his impeachment. These events demonstrated to scholars that the media could "make" a president, and likewise, "unmake" one (Tavares et al., 2024).

Throughout the 20th century's economic plans and reforms, Brazilian media often claimed, in the name of political stability, the authority to mediate conflicts between the three branches (Albuquerque, 2005). During the Lava Jato (Car Wash) operation and the 2016 presidential impeachment, Brazilian media played a crucial role in shaping the direction of events (Albuquerque, 2019). This role was not always positive. The 2016 impeachment has been regarded by some scholars as a political coup. However, several mainstream Brazilian media outlets—including *Folha de S. Paulo*, *O Globo*, *Estado de São Paulo*, and *Correio Brasiliense*—used large-scale advertising to incite support for the impeachment of the president (Albuquerque, 2019).

Scholars have criticized this behavior, noting that social tensions often arise when democratically elected governments fail to align with elite conceptions of

democracy. This dilemma became widespread across Latin America in the early 21st century following the so-called “left turn” of many governments (Castañeda, 2006; Kitzberger, 2012). In such contexts, the media and other accountability institutions may simultaneously undermine democracy while claiming to defend it—justifying their actions as necessary to protect democracy from the supposed errors of the people’s choices (Albuquerque, 2019).

Another defining feature of the Brazilian context that significantly influences the political landscape of its media is the presidential system. The separation of powers in Brazil affects not only how media organizations present politics but also the role they assume within it. Scholars have argued that Brazilian media portray politics in ways primarily shaped by two factors (Albuquerque, 2011). First, the media tend to focus on the president as an individual person—presidents literally give government a body—thereby undermining the role and visibility of collective actors such as political parties. Second, under the presidential system, media coverage tends to emphasize the executive dimension of governance rather than the dynamics of party politics.

The presidential model in Brazil has fostered a distinctive style of political leadership. Since the presidency of Luiz Inácio Lula da Silva, the country has experienced a highly personalized leadership structure (Santos & Valenzuela, 2024). In presidential systems, party alignments are often less clear than in parliamentary systems. By prioritizing the prominence of individual leaders and downplaying the importance of collective representation, presidentialism “diminishes the relevance of party platforms and party organizations across different types of parties” (Samuels, 2002).

Charismatic leaders may have been as counterweights to the power of the Brazilian media, particularly when their views diverge. Despite its broad influence, the media have not always been able to substantially shape government actions or political developments. Lula won consecutive presidential elections in 2002 and 2006, and his fellow Workers' Party (PT) member Dilma Rousseff was elected in both 2010 and 2014. Before the PT-led government took office in 2003, mainstream media had a strained relationship with the party (Albuquerque, 2019). During the PT’s tenure, mainstream media often claimed themselves as a leadership role within the political opposition (Albuquerque, 2016). Maria Judith Brito, then president of

the National Newspapers Association (Associação Nacional de Jornais, or ANJ), famously stated that “the news media was doing the oppositional role that the opposition parties were no longer able to do” (Tavares et al., 2024).

The use of the internet has significantly transformed the model of political communication in Brazil. Some scholars have observed that it challenged the dominance of mass media institutions in setting the agenda and establishing the dominant framings with respect to the political debate (Tavares et al., 2024).

In the 21st century, Brazilian scholars gradually shifted their research focus toward digital media, a transition that unfolded in two distinct phases. The first phase was marked by optimism about the potential of digital media to improve political engagement, an expectation that reached its peak around 2010 (Tavares et al., 2024). Studies found that as Brazil’s digital divide narrowed, politicians were increasingly able to expand their influence without relying on mainstream media (Braga & Carlomagno, 2018). During the mass protests of June 2013—the largest mobilization since Brazil’s re-democratization—social networks played a pivotal role in quickly organizing collective action, bypassing traditional media coverage, enabling decentralized coordination, and broadening the scope and impact of political demands. Scholars highlighted the significant potential of digital media in fostering the circulation of unmediated information and new forms of resistance (Antoun & Falcão, 2015).

However, after the presidential election held in 2014, scholars began to express concern about the growing phenomenon of polarization on social media platforms (Ituassu & Guerrero, 2024). By the mid-2010s, the initial optimism gave way to more critical perspectives, as research began to expose the risks posed by the misuse of digital media to Brazil’s democratic institutions (Tavares et al., 2024). In the following years, Brazil experienced acute political radicalization and instability. Far-right extremists gained visibility and used social media both as a tool for coordination and a means of communication with broader audiences (Tavares et al., 2024). Especially after Jair Bolsonaro’s victory in the 2018 presidential election, amid a populist crisis, public distrust toward the media intensified. Hate speech and misinformation circulating on the internet became increasingly prominent topics of discussion (Tavares et al., 2024).

During Bolsonaro's administration, the so-called "Office of Hatred" embodied a disregard for factual accuracy and journalistic work (Santos & Valenzuela, 2024). Closely linked to the presidency, his group actively produced and disseminated false information to serve the government's interests (Mello & Piva, 2021), and it promoted denialist narratives in response to the COVID-19 pandemic (Oliveira, 2021). These agendas were systematically amplified through automated (bots) and hybrid (cyborgs) accounts on social media (Jornal Nacional, 2019).

Arthur and Guerrero have emphasized that digital phenomena such as segmentation, radicalization, and equalization are reshaping the Brazilian context (Ituassu & Guerrero, 2024). Moreover, during this digital transformation, right-wing politicians in Brazil have shown greater adaptability and prominence (Ituassu & Guerrero, 2024).

3.2.2 The Structure of Brazilian Media

Brazilian media is characterized by its diversity and rapid development. It encompasses a wide array of institutions—both public and private—with varied modes and styles of dissemination. Historically, control over the Brazilian media has remained concentrated in the hands of a few powerful families. According to data from the "Media Ownership Monitor" (<https://brazil.mom-gmr.org/en/>), Brazil's media system demonstrates a high degree of concentration in terms of ownership, audience reach, and geographical distribution.

In the field of media studies, some Brazilian scholars categorize media into three main types: national media, regional media, and alternative media (Albuquerque & Pinto, 2020; Loose & Carvalho, 2023). National and regional media are generally referred to as mainstream media. These outlets are typically owned by large corporations or maintain close ties with them, and their operations are primarily driven by profit. Mainstream media hold dominant positions both economically and culturally. Their news production tends to follow a top-down model, with a strong reliance on official sources. The organizational structure of their newsrooms is often rigid and hierarchical (Loose & Carvalho, 2023).

In contrast, alternative media are smaller in scale and adopt a bottom-up perspective in their journalistic practices. They provide greater visibility to citizen sources and to groups that are marginalized or silenced in mainstream news narratives. Funded largely through public donations or temporary grants, these outlets operate with greater flexibility and are less constrained by uniform production models. This flexibility allows for more critical engagement with established political and economic systems (Loose & Carvalho, 2023). As Sarmento (2019) observes, Brazil's alternative digital-native outlets—such as *Amazônia Real*, *Coletivo Papo Reto*, and *Nós, Mulheres da Periferia*—extend the national news agenda by amplifying the voices of marginalized communities and providing coverage that challenges dominant narratives. Their production is often motivated by dissatisfaction with mainstream portrayals of social and environmental issues and seeks to “lift the veil of invisibility that covers certain social issues in Brazil” (Sarmento, 2019). Despite their small scale and fragile financial structures, these outlets play a significant democratic role by offering diverse perspectives beyond the commercial media sphere.

Although Brazil has undergone significant changes in political, economic, and technological spheres in recent years, challenging the traditional media paradigm, scholars argue that conventional media still maintain a dominant role in the country's communication landscape (Albuquerque & Pinto, 2020).

From a regional perspective, media outlets located in Brazil's "central" states—particularly São Paulo and Rio de Janeiro—have played a dominant role in shaping the national media landscape. This dynamic is rooted in historical practices of *coronelismo* and clientelist arrangements, which granted substantial autonomy to local elites (Albuquerque & Pinto, 2020). These arrangements fostered mutual support between the federal government and state-level elites, thereby allowing the central states to gradually assume leadership roles in national politics while widening their distance from other regions. Specifically, the states of Rio de Janeiro and São Paulo emerged as the country's primary economic and cultural centers and became the focal points for national advertising expenditures. For example, *Rede Globo de Televisão*, a television network developed in Rio de Janeiro, capitalized on the military government's nationwide telecommunication integration efforts during the 1960s to establish itself as Brazil's dominant television network. Rather

than diminishing during the democratic transition, Globo's influence persisted and even intensified. In fact, under Brazil's democratic regime, O Globo became more significant for politicians than it had been during the military era (Albuquerque & Pinto, 2020).

Scholar Albuquerque has examined the complex relationship between Brazil's mainstream media—which includes both national and regional outlets. Beginning in the 1960s, the consolidation of national television networks spurred the expansion of Brazilian media beyond local boundaries. Content produced in Rio de Janeiro and São Paulo began to be transmitted in real time to other states. Legal restrictions in Brazil limited the broadcasting range of commercial radio stations, making it necessary for major stations to form networks with local affiliates to ensure nationwide coverage. As a result, Rede Globo's network now reaches 99% of Brazilian cities; Sistema Brasileiro de Televisão (SBT), based in São Paulo, covers 85% of municipalities; and Rede Record ranks third in terms of national reach (Albuquerque & Pinto, 2020). The nationwide expansion of some media networks has had a weakening effect on regional media development in other parts of the country. Advertising budgets are concentrated in the production hubs, which undermines the sustainability of local markets. Furthermore, the production of region-specific content has been constrained. Within regional affiliates, news programming has become dominant, largely in response to Decree No. 88067 of 1983, which mandates that two hours of news programming be included in daily broadcast schedules (Lopes, 2015).

On the other hand, the decentralization of national economic power has stimulated the development of regional media. Over the past decades, industrial decentralization and reforms to the federal university system have helped reduce regional inequalities, enhanced the value of the domestic market, and sought to transform the productive structures of the country's poorest areas (Carleial & Cruz, 2012). Public policies have also changed. For instance, under the governance of the Workers' Party, the federal government decentralized the distribution of public advertising quotas, increasing the number of government-funded advertising placements from 499 across 182 municipalities in 2003 to 8,932 in 3,570 municipalities by 2012. In 2013, the number of registered advertising placements reached 9,663, encompassing various platforms, including 3,035 radio stations,

2,730 newspapers, 655 television stations, 1,339 magazines, 1,162 internet placements, and 742 outdoor media (Secom Brasil, 2014). These changes directly stimulated the growth of regional media.

The proliferation of digital technologies has fostered new user habits, enabling audiences to access a wider range of content than ever before, reducing their dependence on traditional media, and empowering them to play a more active role as media producers (Bruns, 2008). Alternative media outlets have emerged within this technological environment. As new technologies become increasingly widespread, they often help to balance the centripetal and centrifugal forces within regional media ecosystems (Albuquerque & Pinto, 2020). A 2024 survey (Statista) shows that the internet—including social media—has become the primary source of news for Brazilians, accounting for 74% of usage, compared to 50% for television.

Brazil's media market is distributed across five major geographic regions, each characterized by distinct socioeconomic, geographic, and demographic traits that influence both the development of media companies and the production of content. In states with stronger economies, more local media companies and broadcasters collaborate with networks to produce locally tailored content. In contrast, in states with smaller market sizes, there are fewer independent companies and affiliated stations, and more relay broadcasters—those that merely rebroadcast content without local production (Albuquerque & Pinto, 2020). For example, Brazil's South Region represents the second-largest regional media market after the Southeast, while the North Region has the smallest media market in the country (Albuquerque & Pinto, 2020; Pinto, 2015). The South has significantly more media outlets than the North, including a greater number of Globo-affiliated broadcasters. In both regions, newspapers, online portals, and radio stations are the primary sources of locally produced content, as they prioritize regional coverage and highlight region-specific issues (Albuquerque & Pinto, 2020).

3.2.3 Journalistic Norms and Content Production

In terms of journalistic norms, as previously discussed, the American "Fourth Estate" models of journalism—or some of their core characteristics, such as objectivity, impartiality, informativeness, or watchdog journalism—have exerted significant influence on Brazilian journalism (Albuquerque, 2018). Brazilian journalists assess their professional practices based on these foreign normative models and widely acknowledge a perceived lack or shortcoming in meeting those standards (Lins da Silva, 1991).

However, during the modernization of Brazilian journalism, management adopted a more top-down and authoritarian approach to implement these reforms. Newsrooms were restructured to become the core institutions of modern journalism, responsible for enforcing editorial discipline and ideological cohesion (Albuquerque & Pinto, 2020). Scholars have criticized that the growing centrality of the newsroom has substantially constrained journalists' professional autonomy (Albuquerque & Gagliardi, 2011). This top-down model of modernization became the norm in Brazil and is characterized by a paradox: while Brazilian journalists claim to be committed to liberal democratic values, they simultaneously believe that achieving those values requires authoritarian measures (Albuquerque & Pinto, 2020).

Albuquerque's research on the modernization of the Folha de S. Paulo media group illustrates this process. He argues that Folha's reforms were strategically aimed at modernization and were influenced by both neoliberalism and Leninism (Albuquerque, 2018). As a result of these influences, the rights of individual journalists were curtailed, and editorial management imposed arbitrary and authoritarian decisions to suppress prior journalistic practices and maintain control over the newsroom. Neoliberalism, in this context, emphasizes the construction of a stable market economy: journalism is understood as a commercial product whose value lies in its market potential, rather than in the journalist, their practices, or their professional ethics. Leninism, on the other hand, stems from traditions inherited from Communist Party journalists, who transformed party discipline into editorial discipline (Albuquerque, 2011). Journalism was seen as bearing a political mission, with responsibilities that included "influencing the terms of social debate, altering

beliefs and habits based on objective facts and data, and affecting the directions of both public and private institutions” (Albuquerque, 2018). These elements continue to shape the positioning and normative framework of Brazilian journalism today.

It is worth noting that Brazilian elites have demonstrated historically similar traits throughout this process of media reform. Compared to elites in other parts of Latin America, Brazilian elites have historically shown greater identification with European culture. During the colonial period, Brazil functioned primarily as a supplier of raw materials, and Portuguese control over Brazil was significantly more rigid than Spanish control over its former colonies in the Americas. At that time, Brazil had no universities, and the development of the printing industry was deliberately suppressed (Carvalho, 1996). Most of the country’s political elites received their higher education in Portuguese universities, which fostered a strong dependency on Portugal. Therefore, the elites shared a relatively unified worldview, which helped prevent the territorial fragmentation that occurred in the former Spanish colonies—despite Brazil’s vast geographic expanse, weak communication infrastructure, and substantial socioeconomic and cultural differences (Albuquerque & Pinto, 2020). The Brazilian path to national independence also differed from that of many other Latin American countries: rather than being led by Creole liberators, it was initiated by the Portuguese prince Dom Pedro. Brazilian scholars often describe such historical processes as passive revolution (*revolução passiva*)—a top-down, elite-driven form of revolutionary transformation in which political and social change appears to occur in form, yet the dominant class structures remain fundamentally intact and, in many cases, even strengthen their grip on social order.

This cultural and historical legacy continues to exert influence: Brazilian elites tend to absorb reform initiatives while deliberately avoiding mass mobilization, thereby stabilizing their own positions of power. Similar tendencies can be identified in the case of Folha’s newsroom reforms. One could interpret this pattern as evidence of a persistent characteristic among Brazilian elites—a predisposition to embrace reform, often being the first to do so, while simultaneously preserving or even reinforcing their positions of control. This form of *revolução passiva* is often more susceptible to the effects of local cultural and

contextual factors, which may lead to outcomes that diverge from the reform's strategic objectives and instead follow a distinctive, context-specific trajectory.

For journalists, the American model of journalism has contributed to a certain degree of professional autonomy in their work (Soloski, 1989). In 1969, Decree No. 972 established that, in order to be officially registered, journalists were required to hold a university degree in journalism. This regulation not only limited the influence of radical left-wing journalists, but also encouraged the development of professional identity within the academic environment, away from the newsroom itself. As a result, journalists began to believe that their work depended primarily on personal merit—as validated by university credentials—rather than on political connections or personal favors (Albuquerque, 2011). However, after 2011, Decree No. 972 was repealed, and the issuance of journalist credentials became the responsibility of media employers and unions, rather than being based on educational qualifications. This shift opened the profession to a broad range of individuals without formal training in journalism, such as photographers, social media users, and freelance writers—referred to as "multi-skilled content producers." As a result, the professional identity of journalists has become increasingly pluralized and fragmented, and formal journalism training is no longer a prerequisite for participating in news production.

3.2.4 The Development and Characteristics of Environmental Journalism in Brazil

Historically, the visibility of early environmental agendas in Brazil stemmed from the personal interest of journalists in the topic, as well as the engagement of other social actors who used media platforms to express their concerns about environmental (Tourinho Girardi et al., 2020). For example, as early as the 1950s, the environmentalist Luís Henrique Roessler contributed a weekly column to the *Correio do Povo* newspaper in Porto Alegre, advocating for environmental issues. During the 1970s, Brazil witnessed a gradual process of environmentalization in its society, with civil society beginning to defend the environment (Urban, 2001). These movements promoted a more caring attitude toward nature, which led to

increased media attention to environmental issues (Beling Loose, 2025; Beling Loose & Villar Belmonte, 2023). From this period onward, the public increasingly turned to scientists to explain environmental phenomena and propose solutions to diagnosed problems (Tourinho Girardi et al., 2020).

By the late 1980s, global attention was already shifting toward the upcoming Rio-92. In preparation for such a landmark event, a journalists' seminar on population and environment was held in Brasília in November 1989. It was organized by the National Federation of Journalists (Fenaj), and one of its main outcomes was the formation of environmental journalism centers across different states. These centers aimed to foster debate around the qualifications needed for professionals to effectively report on the 1992 Rio Conference (Tourinho Girardi et al., 2018). During this time, the volume of information related to the environment increased, and scientific sources became more diversified (Barros & Lima, 2012).

Loose and Belmonte (2023) identify four stages in the development of environmental reporting in Brazil (Beling Loose & Villar Belmonte, 2023). The first stage, covering the 1970s and 1980s, reflects the growing influence of environmental issues, beginning with grassroots civil society and gradually extending to official institutions and corporate reforms. During this period, the impact of environmental movements led to a slow but steady incorporation of environmental concerns into mainstream media. The second stage emerged in the aftermath of Rio-92, marked by the broad dissemination of sustainable development discourse. Experts from various sectors sought to align the interests of large corporations with remedial measures, attempting to reach consensus on forms of compensation or mitigation that would not deplete planetary resources. The notion of sustainable development, which posits that economic growth can be compatible with environmental protection and social justice, encouraged the media—previously reluctant—to treat the topic as a commercial opportunity.

The third stage began in 2004 with the launch of the environmental news portal *O Eco*, symbolizing the rise of alternative and/or independent journalistic initiatives focused on environmental reporting. Traditional journalistic values, such as objectivity, were challenged, and more explicit stances in support of environmental protection began to emerge. There was also a diversification of sources, with increased participation from civil society voices.

The final stage, according to Loose and Belmonte (2023), began during the Bolsonaro administration. It is characterized by the intensification of the climate crisis and the institutional dismantling promoted by President Jair Bolsonaro, which exacerbated the frequency and severity of environmental disasters. Intertwined and mutually reinforcing problems have led Brazilian environmental journalism to enter a new phase: one of recognizing climate crisis and emergency.

The themes addressed in Brazilian environmental journalism have shifted significantly over time. In its early stages, media coverage focused primarily on protest movements, pollution issues, ecotourism, cosmopolitan perspectives, and the Amazon (Beling Loose & Villar Belmonte, 2023; Belmonte, 2017; Marques, 1994; Marques, 2005; Targino, 1994; Tourinho Girardi et al., 2020). Sensationalist perspectives dominated the content, prioritizing curiosity and unexpected facts while overlooking the process of ecological deterioration and the inefficiency in the management of natural resources (Targino, 1994; Tourinho Girardi et al., 2020).

A milestone occurred in the second half of 1988, when the commercial newspaper *Gazeta Mercantil* launched a dedicated environmental section. This marked a turning point in which environmental issues began to be framed through the lens of modernization. The modernization ideology redefined environmentalism as a business-oriented concern, interpreting sustainability-related issues as opportunities to enhance competitiveness and participate in clean economic growth through market strategies (Belmonte, 2017). Consequently, the economy became the central focus of environmental information (Belmonte, 2017; Ramos, 1996).

With the widespread diffusion of the internet, the scope of environmental reporting expanded to include both local and international issues. Journalistic attention extended from international conferences and scheduled events to an increased focus on marginalized groups, such as Indigenous peoples (Tourinho Girardi et al., 2018, 2020).

During this period, Brazilian media placed growing emphasis on the environmental agenda (Beling Loose, 2025; Costa Bueno, 2013). A study analyzing approximately 1,300 environmental news articles published in Brazilian magazines and newspapers between 1973 and 2002 coined the notion of a "greening of the press" (Costa Bueno, 2013). The digital era opened new avenues for journalistic practice, fostering the emergence of alternative and independent media initiatives

committed to environmental issues, such as the creation of the O Eco website. Professionalization also manifested in academic research dedicated to this field, encompassing all regions of Brazil and enriching the diversity of journalistic perspectives and practices (Beling Loose, 2025). The thematic scope of environmental journalism has expanded to encompass social, economic, political, and everyday life dimensions (Tourinho Girardi et al., 2020).

However, scholars have pointed out that the environmental coverage still lacks frequency and, in some cases, depth (Beling Loose, 2025). Overall, despite decades of development, the media still devote relatively little attention to environmental news. Coverage typically arises only in response to major events, crises, or environmental disasters and tragedies (Colombo, 2010; Gern & Lima, 2018; John A. Hannigan, 1995). A review of Brazilian environmental reporting identified two main types of journalistic approaches: one in which journalists demonstrate knowledge of environmental issues and are committed to environmental protection, and another in which environmental topics are treated in a more indifferent or bureaucratic manner, without active engagement (Tourinho Girardi et al., 2018). Scholars argue that contemporary journalism continues to portray environmental issues in a constrained, fragmented, and decontextualized manner, often shaped by market-oriented biases (Gern & Lima, 2018).

Neutrality and objectivity remain key points of debate in the production of environmental news. Some professionals and academics argue that environmental journalism should not be limited to the mere reporting of facts; rather, it should incorporate critical perspectives committed to the sustainability of the planet (Bueno, 2017). Laws and Chojnicka (2020) reject the notion that journalism can ever be truly objective, asserting that even progressive coverage may fail to produce meaningful change if it does not confront dominant liberal ideologies.

In an analysis of media coverage of dam collapses in the state of Minas Gerais, Bueno (2017) observed that environmental disasters tend to be reported within a tension between news spectacle and civic scrutiny. The media often pay attention only after the catastrophe has occurred and material losses and human casualties have become irreparable. Over time, the inherent risks of these disasters are downplayed—especially when they are driven by corporate greed and governmental inaction. Scholars contend that the demand for journalistic

objectivity does not equate to a neutral stance. In environmental reporting, journalism should adopt an advocacy-oriented approach, one that prioritizes sustained attention to help prevent further disasters.

Brazilian media has previously devoted considerable space and time to discussions on sustainability, particularly since the release of IPCC reports and the growing public awareness of the significant impact of human activities on the Earth's climate (Bueno, 2013). Scholars have cited Lutzenberger's definition of sustainability in *Ecologia Bourdeau* as follows: "[...] in order to preserve the regenerative capacity of natural resources, as well as natural cycles and counterbalances. Moderation must prevail, as must prudence or precaution" (Lutzenberger, 2009). They argue that only by understanding abundant information can journalism stimulate citizens to participate in public debate and engage people in decision-making processes (Moraes & Fante, 2018).

Some scholars point out that in journalistic practice, conceptual errors often occur due to the lack of knowledge or training of many journalists who cover environmental issues, or because of harassment and powerful lobbying by business sectors committed to a cosmetic vision of sustainability (Bueno, 2013). It is not enough for journalists to equate development solely with economic growth. Sustainability cannot be reduced to an environmental concern viewed in isolation; rather, it must include the protection of traditional knowledge and linguistic diversity, such as that of Indigenous peoples and minority communities (Bueno, 2013).

In this regard, scholars emphasize that in journalistic practice, the green economy should not lead to the creation of institutions that merely reinforce the environmental pillar, nor should it serve as a mechanism for developed countries to shift part of their financial and technological responsibilities onto emerging nations. They highlight both the economistic interpretation of the concept and the affirmation of its environmental foundation—poverty eradication, the transformation of unsustainable patterns, the promotion of sustainable production and consumption, and the conservation and management of natural resources (Moraes & Fante, 2018).

In the Latin American context, some scholar notes that conflict-based news reporting predominates (Lima, 2023), as the media's primary interest often lies

precisely in controversy and disputes (Camana, 2018). In Brazil, examples of environmental conflicts are abundant. From north to south, countless disputes and controversies arise under the broad category of “environmental question” (Camana, 2018). Scholars examining journalistic coverage of events such as the Mariana (Minas Gerais) Samarco dam collapse and the transportation of mining waste found both exemplary and incomplete reporting. Certain cases attracted more media attention, possibly due to their magnitude and the presence of specific protest movements. However, coverage tends to emphasize conflicts arising after the disaster while neglecting the systemic failures that led to the tragedy. Overall, scholars argue that news reporting has failed to keep pace with the increasing complexity and severity of social issues—there is a general lack of substantive debate on environmental problems within the Brazilian press, particularly given that Brazil is the country with the highest number of environmental defenders killed. Between 2002 and 2013, 448 individuals lost their lives defending their land and natural resources, and this number has continued to rise: in 2016 alone, there were 66 recorded cases of such murders (Moraes & Fante, 2018).

Moreover, scholars have sharply criticized the dominant conflict-oriented coverage for its lack of depth (Lima, 2023) and for relying on limited sources (Bueno, 2013). Investigations into the motives behind the increased quantity of environmental reporting and the manner in which media covers these issues reveal that environmental disasters often receive condemnation only after escalating to tragic proportions (Lima, 2023). Additionally, news coverage focused solely on disasters fails to fulfill the media’s informational, political, and educational roles. The use of limited sources is a central point of scholarly critique: official agencies, research institutions, and NGOs dominate as primary information providers, while other groups—such as farmers, loggers, Indigenous peoples, small-scale rural producers, and even their representative organizations—appear only marginally in news reports (Costa Bueno, 2013; Costa, 2006). The problem is not merely limited sources but also the presence of a single point of view; scholars argue that official sources tend to dominate the narrative. When minority or alternative groups are included, it is only to confirm arguments already made—media offer a simulacrum of democratic discourse, in which interviewees from opposing sides appear to hold the same position, thereby creating a misleading impression of adversarial speech

(Costa Bueno, 2013). Scholars assert that journalistic reporting should provide space for diverse perspectives and the potential for conflict (Pereira Junior, 2010). This type of discussion is closely connected to the concept of environmental justice, representing a defense of civic and fundamental rights, especially those of marginalized groups (Camana, 2018).

Based on the analysis of various cases of environmental journalism in Brazil, scholars have outlined a set of core values that should guide environmental reporting: the necessity of a systemic understanding of facts, the recognition of event complexity and epistemological diversity, the need to move beyond dependence on official sources, and a commitment to the protection of biodiversity and ecological integrity. Environmental journalism should also fulfill educational, civic, and transformative roles (Tourinho Girardi, 2018). In practice, Brazilian scholars argue that environmental education in journalism must take into account a broad set of dimensions: ethics, ecology, politics, economics, society, legislation, history, culture, and aesthetics (Schwaab, 2018).

At present, Brazil still lacks public policies that provide funding (Loose & Villar Belmonte, 2023). Scholars observe that the concept of environmental journalism is still not well understood among professionals in the field, highlighting the need for more robust training and professional development for environmental journalists (Tourinho Girardi, 2018). Beyond the broader socio-political context, it is also essential to consider the editorial choices made by journalists themselves, who are often influenced by the intrinsic appeal of the content they are tasked with producing (Geraque, 2018). The field of environmental journalism is particularly susceptible to fluctuations and pressures stemming from political and economic forces (Lima, 2023).

The digital revolution has compelled journalists to navigate a range of new platforms and tools, including social media and online data. Environmental journalists today are not only expected to possess a keen eye for identifying compelling stories and the tools to investigate them, but also to develop effective strategies for disseminating their reports to readers, viewers, listeners, or online users (Bevir, 2011; Fante & Moraes, 2018; Moraes, 1999).

3.2.5 Content Characteristics of Brazilian Environmental Journalism

In the realm of environmental news production, scholars argue that contemporary journalism continues to present environmental issues in a constrained, fragmented, and decontextualized manner, often shaped by market-oriented biases (Gern & Lima, 2018). Environmental news and reporting are rarely prioritized by the media, typically gaining attention only in the wake of major events, crises, or environmental disasters (Colombo, 2010; Hannigan, 1995). Researchers have observed that Brazilian media coverage of climate change is heavily influenced by international factors. Significant events—such as the release of various Intergovernmental Panel on Climate Change (IPCC) working group reports or G8 summits—often trigger surges in national media attention toward climate change (Loose & Carvalho, 2023). Coverage is frequently driven by the publication of key scientific reports, including those from the IPCC or conferences under the United Nations Framework Convention on Climate Change (UNFCCC), as well as disasters that may be linked to climate change.

As noted earlier, the Brazilian media exhibit a high degree of dependency on traditional or hegemonic media. This results in climate change coverage being dominated by traditional media agendas, which tend to rely heavily on international news sources, exhibit a lack of journalistic specialization, emphasize international agreements, and remain disconnected from local realities (Loose & Carvalho, 2023). Scholars criticize this tendency for overlooking local and regional responses to climate change, favoring instead a focus on international politics—such as summits and official events—rather than addressing structural inequalities and dependencies. Even in alternative media outlets, there is a notable tendency to prioritize sources that already possess institutional or media significance.

Among different types of media, studies have found that national-level media reporting primarily relies on sources affiliated with the government. Scientific experts are also frequently cited. However, mainstream media tend to neglect other sources such as environmental activists, Indigenous peoples, traditional communities, and civil society actors. The political-economic framing of climate change dominates media narratives. For example, Brazilian news magazines such as *Veja*, *Isto É*, *Época*, and *Carta Capital* have emphasized the financial costs

associated with addressing climate change (Girardi et al., 2013), while Folha de S. Paulo has focused on the political decisions and disputes arising at international summits, often highlighting governmental perspectives (Rodas & Di Giulio, 2017).

Regional media serve as a crucial platform for linking climate change to the everyday lives of citizens. Research has shown that local news is more easily accepted by the public and provides greater opportunities for civic engagement in climate-related issues. A study analyzing news reports published in *Gazeta do Povo* in 2013 reveals key characteristics of climate change coverage at the local level (Loose, 2020). The analysis indicates that the overarching message conveyed is that the climate is indeed changing, and that human activity has played a significant role in accelerating this process. This narrative aligns with the position of the Intergovernmental Panel on Climate Change (IPCC), with scientific knowledge functioning as the dominant macro-frame in the newspaper's coverage. The study further finds that although the term "risk" was not frequently used explicitly, its underlying meaning was often conveyed. However, the "risk" frame typically emphasized climate-related disasters that were geographically distant from local communities—such as the melting of polar ice caps. The repeated use and reproduction of content from national and international news agencies contributed to a gap between *Gazeta do Povo*'s climate reporting and the specific realities of the state of Paraná or the city of Curitiba.

As non-commercial outlets, alternative media have historically positioned themselves in opposition to injustice and inequality, rejecting the mainstream ideals of neutrality, impartiality, or objectivity (Loose & Carvalho, 2023). In theory, these media enjoy greater freedom to report on the causes of the climate crisis and the strategies for addressing it, which also tend to amplify diverse voices and actions from the Global South and emphasize local perspectives and knowledge systems.

Scholars studying two prominent Brazilian alternative media platforms—Planet Connection (<https://conexaoplaneta.com.br/>) and Colabora (<https://projetcocolabora.com.br/>)—found that most climate-related reporting in these outlets treats science as the sole authoritative source of knowledge, mirroring the approach taken by mainstream media. Scientists wield considerable influence in the climate debates covered by these alternative media and are frequently cited

to support the arguments of activists and advocates for climate solutions (Loose & Carvalho, 2023).

Unlike traditional media, however, alternative outlets regularly report on support for climate action, including street demonstrations, celebrity endorsements, political commitments, exhibitions, fundraising efforts, and awareness-raising campaigns. Civil society sources receive more attention than official ones, especially those related to politics. Another distinguishing feature of climate coverage in alternative media is the way journalists position themselves alongside activists (Loose & Carvalho, 2023). Journalists openly express their own views, praise individuals and organizations that confront the climate crisis directly, and contrast them with governments or market actors who fail to respond adequately to the urgency and severity of the crisis. This activist-oriented approach, driven by journalists who believe in the transformative potential of environmental journalism, stands in stark contrast to the practices of mainstream Brazilian media. These journalists employ a range of rhetorical strategies—including irony, skepticism, praise, and criticism—to articulate their positions and to hold perceived perpetrators of environmental harm accountable.

Scholars have critically pointed out that Brazilian media coverage of climate change tends to focus predominantly on the global level while neglecting the national and local impacts of the climate crisis. This emphasis has contributed to the marginalization of Global South perspectives. Although alternative media offer platforms for activist voices, their reporting still lacks a truly diversified range of viewpoints. Moreover, journalists often exhibit structural blind spots regarding certain forms of power and exploitation—especially those originating from the Global North. To this day, the Brazilian economy remains heavily reliant on global market demand for agricultural and mineral commodities, sectors that significantly contribute to greenhouse gas emissions while offering limited benefits to the Brazilian population. This capitalist-colonialist system (Loose & Carvalho, 2023), identified as a fundamental driver of climate catastrophe, is rarely addressed in Brazilian media discourse.

3.2.6 The Influence of the Brazilian Government and Social Organizations on Environmental Journalism

In recent years, Brazil's environmental policies have undergone significant fluctuations and institutional changes, driven by shifts in national governance logic and the active participation of social organizations. From the weakening of state functions under neoliberalism, to the environmental policy dismantling during the Bolsonaro administration, and finally to the policy reconstruction under the Lula government, this process has deeply impacted the sources and reporting conditions of environmental journalism. At the same time, the academic community and civil society have provided strong support for the dissemination of environmental issues and public awareness through news networks, research organizations, and activist initiatives.

Scholars have discussed the process and evolution of the institutionalization of environmental issues (Bevir, 2011; Fante & Moraes, 2018; Moraes, 1999). From the 1930s to the 1960s, the government explored territorial boundaries, during which time spatial planning regulations and pioneering conservation actions were established, such as the creation of national parks and the construction of highways. In the 1970s, the government began to focus on environmental planning and management from a technical perspective, such as the establishment of the Secretaria Especial de Meio Ambiente da Presidência da República and various state agencies (1970s), which aimed to combat pollution. In the 1980s, environmental policies were dominated by biologists' perspectives, leading to the prioritization of conservation and preservation actions, such as the creation of conservation units. The 1990s marked another stage of Brazil's environmental policy, guided by the theoretical concept of "sustainable development" (Moraes, 1999).

One of the emerging trends in the early 21st century was the intensification of the deregulation of environmental public policies (Fante & Moraes, 2018). Scholars have pointed out that neoliberalism influenced the public sector's power and policies in Brazil (Bevir, 2011; Fante & Moraes, 2018). Due to the perception that the state was adopting a "paternalistic" style in maintaining general social welfare policies (which practically included rights such as employment, security,

and health), the burden on the state became overwhelming. The solution proposed by Brazilian modernist political theorists was the implementation of fiscal austerity, monetary control, and a reduction in the size of the state (Fante & Moraes, 2018). Brazil adopted neoliberal ideas, delegating the dominant role to the market and guiding social and economic life (Bevir, 2011). However, international institutions and scholars have argued that neoliberalism is the root cause of the increasing phenomenon (Fante & Moraes, 2018). In Rio Grande do Sul, Oliveira and Martins (2010) observed that since 2002, there has been a "progressive deconstruction," indicating that the state's reference role in environmental policy has been weakening (Oliveira & Martins, 2010).

After 2010, the economic crisis extended its impact to the environmental sector. At the national policy level, Mário Mantovani and Malu Ribeiro, directors of the SOS Mata Atlântica Foundation, modified the Forest Code in 2012, marking the beginning of the dismantling of Brazilian legislation (Fante & Moraes, 2018). Scholars have also mentioned the nationwide strike held during the Rio+20 Summit and the People's Summit in Rio de Janeiro in June 2012, organized by Brazilian environmental agencies. Among the environmental agencies' allegations were: the destruction of the Forest Code; the fragmentation of public environmental management, citing IBAMA, the National Environment Council (CONAMA), and tripartite commissions; the reduction of areas in eight conservation units to accommodate future hydropower plants; the PEC 215/2000, which compromises the demarcation of indigenous lands; the closure of institute units and the shortage of staff with a heavy workload for those who remain; the poor physical structure of buildings; lack of equipment, furniture, and all types of necessary materials; inadequate working conditions, from uniforms to life vests, GPS devices, vehicles, etc.; and lack of resources for research centers, among other issues.

Some studies have highlighted the growing radicalization and political turbulence in Brazilian society in recent years, which have also manifested in the field of environmental policy (Araújo, 2020; Menezes & Barbosa, 2021). During the Bolsonaro administration, Brazil's environmental governance entered a new phase of deconstruction, while the subsequent Lula administration initiated a process of policy reconstruction. Under Bolsonaro, the Ministry of the Environment (MMA) was significantly weakened. The Secretariat for Climate Change and

Forestry was dismantled, and forest management responsibilities were transferred to the Ministry of Agriculture, Livestock and Supply (MAPA) (Araújo, 2020). The Bolsonaro government appointed numerous military personnel to leadership positions within key environmental agencies, including senior roles at the Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) (Menezes & Barbosa, 2021). The number of members in the National Environment Council (CONAMA) was reduced from 96 to 23, with civil society representation slashed from 22 to merely 4 seats, thereby significantly curtailing public participation in environmental policymaking (Menezes & Barbosa, 2021).

Upon assuming office, President Lula reinstated the Amazon Fund and the National Environment Fund (FNMA) and reactivated the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm). Furthermore, the Ministry of Indigenous Peoples was established, under the leadership of Sônia Guajajara, with an explicit focus on protecting Indigenous lands and cultures. These dramatic policy shifts and institutional fluctuations have been more pronounced than in previous administrations.

Many scholars have pointed out that the establishment of environmental non-governmental organizations (NGOs) in Brazil has played a significant and positive role in the development of environmental journalism and civic education. For instance, the Brazilian Society for the Advancement of Science (SBPC), founded in 1948, and the Brazilian Association of Science Journalism (ABJC), established on September 19, 1977, greatly contributed to the progress of environmental journalism. At that time, environmental journalism was considered a subfield of science journalism, a status it retained until the late 1980s (Belmonte, 2017).

By the 1970s, more than thirty civil society associations had been founded with a focus on nature conservation issues (Urban, 2001). Some of these organizations became highly active and influential, such as the Associação Gaúcha de Proteção ao Meio Ambiente Natural (Agapan), founded in 1971 (Belmonte, 2017). In preparation for reporting on the Rio 92, the National Federation of Journalists (Fenaj) organized a seminar for journalists with the participation of 60 journalists. This initiative led to the formation of regional groups of reporters interested in environmental issues (Belmonte, 2017). Environmental journalist

centers were subsequently established in many Brazilian states, but only the Núcleo de Ecojornalistas do Rio Grande do Sul (NEJ-RS) in Rio Grande do Sul achieved sustained success and remains active (Tourinho Girardi, 2018).

NEJ-RS was the first organization in Brazil to bring together journalists engaged in environmental struggles (Beling Loose & Villar Belmonte, 2023). It also organized public-oriented events such as *Terça Ecológica*, which invited guest speakers to discuss key topics related to socio-environmental issues (Tourinho Girardi, 2018). In 1998, a nationwide network—Rede Brasileira de Jornalismo Ambiental (RBJA, the Brazilian Environmental Journalism Network)—was created with the aim of strengthening journalistic practice in the environmental area and promoting exchanges between state organizations, especially through the holding of national congresses (Beling Loose, 2025).

It is worth noting that the Environmental Journalism Research Group (EJRG) of the Federal University of Rio Grande do Sul was officially established in 2008. Due to its consistent and significant academic output, as well as its contribution to training new researchers in the field, EJRG has become a reference point in both Brazil and Latin America (Bueno, 2024). Academic research in the field of environmental journalism began to develop in this period, as studies linking journalism and the environment were still scarce before 2002 (Bueno, 2007). At the time, Portuguese-language literature was limited, with few scholars taking interest in the field, which often faced devaluation and lack of recognition (Beling Loose, 2025). Over more than fifteen years of continuous activity, the EJRG has conducted dozens of studies on environmental coverage in different types of media, employing a variety of thematic focuses and methodological approaches (Beling Loose, 2025). These studies have provided guiding contributions to the field of environmental journalism in Brazil, enriching both the depth and quality of environmental reporting.

In summary, the development of environmental journalism in Brazil has been profoundly shaped by national policies and institutional transformations, while also relying on the sustained efforts of academic communities and social organizations. Since the mid-twentieth century, environmental journalism has gradually evolved from a subfield of science journalism into a relatively specialized reporting network and research system. Despite recurring fluctuations in national policies, multiple

actors—including environmental journalists' associations, academic research groups, and environmental journalism networks—have consistently provided the public with vital information resources on ecological crises and environmental governance, forming an essential social foundation for advancing the depth and visibility of environmental public issues.

This chapter has provided a systematic review of the development of environmental journalism in China and Brazil, highlighting the significant differences between the two countries in their political systems, media structures, and news production logics. It has also revealed the profound influence of these differences on the content, reporting styles, and social functions of environmental journalism. In China, environmental journalism is deeply embedded in the state governance system, reflecting policy-driven and institutionalized functions of propaganda, education, and limited oversight. In contrast, Brazil relies on a commercialized and democratized media ecology, exhibiting diverse reporting characteristics shaped by the interplay of market logic, political radicalization, and a digitally mediated environment. These historical and structural differences influence the distinct trajectories of the two countries in topic selection for environmental news, modes of public participation, and engagement with international discourse.

Through this analysis, the chapter not only delineates the institutional and content features of environmental journalism in China and Brazil but also lays the foundation for the subsequent in-depth examination of climate change reporting. Understanding the institutional logic and content characteristics of news production helps explain the narrative strategies and discursive structures adopted by the media in both countries when addressing global climate issues. Building on this understanding, the next chapter turns to the theoretical level, introducing and applying Framing theory, to analyze the types of frames and discursive constructions employed in media coverage of climate change. This theoretical framework provides a robust foundation for the empirical case studies that follow.

4. Overview of Climate Change Media Framing Research Literature

This chapter aims to systematically examine the theory of news framing and its applications in climate change communication, highlighting its scholarly relevance in understanding how climate issues are represented in the media. As a global public concern, climate change is mediated not only by scientific evidence and policy logic but also by political polarization, cultural context, and audience cognition. In this process, the ways in which media name, interpret, and structure climate-related issues directly shape public perceptions and influence policy discourse. Understanding framing theory and its practical application in climate change studies is therefore a critical theoretical foundation for the cross-national media analysis conducted in this dissertation.

This chapter is organized into three sections. Section 4.1, Climate Change or Global Warming, discusses the scientific definitions of these two core terms, their differences in public perception, and their divergent uses in political and media discourse. This section demonstrates that even seemingly similar terminology can generate distinct framing effects and societal impacts, thereby underscoring the importance of framing research. Section 4.2, Framing Theory, reviews the academic origins and interdisciplinary evolution of framing theory, integrating perspectives from sociology, psychology, and political communication. It also synthesizes key debates regarding the conceptualization, typology, and methodological approaches of framing research. Section 4.3, Rethinking the Framing Theory and Application to Climate Change, reconsiders the functions and limitations of framing in today's digital and polarized media environment. It focuses particularly on the theoretical and practical application of framing to climate change communication and the potential for cross-cultural research.

4.1 Climate Change or Global Warming

For a long time, the public and the media have frequently used terms interchangeably about Climate Change and Global Warming (Akerlof & Maibach, 2011; Benjamin et al., 2017; Schuldt et al., 2011; Whitmarsh, 2009). Survey researchers also appear to exhibit a degree of arbitrariness in their choice of terminology—some surveys refer to the phenomenon as Global Warming, while others use Climate Change. Additionally, some surveys employ both terms simultaneously (Schuldt et al., 2011). The news media also frequently use these terms interchangeably (Leiserowitz et al., 2014); however, studies on media framing have found that differences in terminology reflect variations in public scientific beliefs (Soutter & Möttus, 2020). There is also debate about whether the public responds similarly to the terms Global Warming and Climate Change, whether they are viewed as essentially the same or as separate phenomena (Dunlap, 2014).

Global Warming refers to the overall warming of the Earth's atmosphere, which most scientists attribute to the increasing concentration of greenhouse gases in the atmosphere, primarily resulting from human activities such as the burning of fossil fuels. Climate Change, on the other hand, encompasses changes in climate conditions and the broader impacts driven by warming, including significant variations in temperature, precipitation, or wind patterns over decades or longer (Dunlap, 2014).

The label Global Warming is more likely to evoke associations with rising temperatures, extreme weather conditions, heightened concerns, anthropogenic causes, and negative impacts (Benjamin et al., 2017). Some argue that Global Warming conveys a stronger sense of human causation and is a politically charged term that tends to generate political polarization, whereas Climate Change is perceived as less polarizing (Dunlap, 2014). The climate change label, in contrast, emphasizes general weather pattern variations and the possibility of natural fluctuations, while also enhancing recollections of non-temperature-related consequences, such as increased precipitation (Benjamin et al., 2017).

Some studies have found that the term climate change leads people to be more convinced that Climate Change is occurring and will have serious consequences

(Benjamin et al., 2017). Additionally, political polarization on the issue of Global Warming is greater than that on Climate Change. Specifically, research indicates that Republicans in America are more likely to express skepticism toward Global Warming than Climate Change—though their skepticism is significantly higher than that of Democrats for both terms. However, some research showed that this pattern has not been fully established, and public interpretations of these two terms may be evolving over time (Dunlap, 2014).

Although these two terms are often used synonymously, it is important to recognize that they generate different interpretations among the public and specific groups (Benjamin et al., 2017). Schuldt and some scholars' research indicates that the choice of terminology influences survey responses, with varying effects that contribute to significant partisan differences in policy discussions and shape public beliefs about the existence of Climate Change (Schuldt et al., 2011). Given that political engagement with global climate change presupposes its reality, public belief in its existence plays a crucial role in the policymaking process (Krosnick et al., 2006). Highly complex and uncertain issues, such as climate change, necessitate stronger coherence in belief formation (Holyoak & Simon, 1999; Simon et al., 2001). Therefore, this section will explore the differences and impacts of the terms Climate Change and Global Warming across scientific, political, media, and public domains. This analysis will enhance our understanding of media framing studies in subsequent discussions.

4.1.1 The Scientific Definition and Origins of the Terms

For technical reasons, scientists generally prefer the term Climate Change, as it is considered a distinct phenomenon from Global Warming in scientific literature. The term climate change predates global warming in scholarly discourse and has been more frequently used in peer-reviewed articles for over four decades. It encompasses a broader range of phenomena beyond the mere increase in global surface temperatures (Leiserowitz et al., 2014). The term climate change was introduced by Gilbert Plass in 1956, as he theorized a close historical relationship between atmospheric carbon dioxide (CO₂), Earth's temperature, and climatic

variations. The term global warming emerged later, following Broecker's (1975) use of a simplified model to predict how global temperatures would change in response to increasing CO₂ concentrations in the atmosphere (Benjamin et al., 2017).

The United Nations Framework Convention on Climate Change (UNFCCC) defines Climate Change as "a change in the global climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is observed beyond the natural climate variability within a comparable time period." However, the Intergovernmental Panel on Climate Change (IPCC) defines Climate Change to include both natural variations and those caused by human activities (Rahman, 2013). The China Meteorological Administration (CMA) describes climate change on its website as "a significant statistical change in climate averages and climate anomalies, such as changes in average temperature, average precipitation, maximum and minimum temperatures, and extreme weather events. The commonly referred Global Warming is one of the significant manifestations of Climate Change." The reasons for these changes are explained as "climate change may be caused by natural internal processes, external forcings, or human-induced alterations to atmospheric composition and land use." Brazil's EMBRAPA agency, on its website, acknowledges that Climate Change includes both natural and anthropogenic factors, with human-made greenhouse gases accelerating climate change: "Climate Change refers to changes in the Earth's temperature and climate patterns, such as alterations in rainfall distribution and amounts, wind intensity, frost, droughts, floods, and hail. In addition to natural factors, the pace of these changes has been accelerated due to human interference with greenhouse gas (GHG) emissions across various sectors (energy, industry, agriculture, land use changes, and waste)."

Rahman's study defines these two terms from an environmental perspective. The research introduced that Climate Change encompasses several aspects, including global warming, ozone layer depletion, ice cap shrinkage, sea level rise, ocean acidification, and ocean warming. Different stakeholders describe climate change as a phenomenon exacerbated by human activities, such as the burning of fossil fuels and deforestation (Rahman, 2013).

It is worth noting that some studies, media, and the public continue to treat the two terms as referring to the same phenomenon. As the confusion of meanings has been identified (Cantril, 1944; Payne, 1951), understanding the meanings of these two terms in different literature should be determined through the context in which they are used. Given that this study is observational, we do not comment on the terminology of the observed content. We will extract and analyze both terms, but in discussing the viewpoints of this study, we tend to use the term Climate Change to describe the current climate situation we are encountering.

4.1.2 Politicization of Terms

As researchers have long recognized (Cantril, 1944; Payne, 1951), even slight changes in the wording of a question can lead to variations in the responses obtained. This insight is reiterated in the literature on framing effects in judgment and decision-making research (Tversky & Kahneman, 1981). In the politics of some countries, political parties often leverage the power of terminology to frame political issues in ways that promote ideologically consistent attitudes and beliefs (Schuldt et al., 2011).

Some studies collectively found that Global Warming and Climate Change are not synonymous—they mean different things to different people—and they evoke distinct beliefs, feelings, and behaviors, as well as varying degrees of urgency requiring a response (Leiserowitz et al., 2014).

In 2002, Frank Luntz, a Republican pollster and strategist, wrote a memorandum for the Republican Party on how to address environmental issues. He suggested that Republicans should describe themselves as "conservationists" rather than "protectionists" or "environmentalists," as the former has a more positive connotation. Secondly, he advised Republicans to use the term Climate Change instead of Global Warming, as the latter was considered more uncontrollable, catastrophic, and emotionally charged (Soutter & Möttus, 2020). In a confidential memo to the George W. Bush administration, Luntz offered the following advice on how to win the Environmental Communications Battle, including the issue of Global Warming:

“It’s time to start talking about climate change instead of global warming... Climate change doesn’t sound as scary as global warming. As one focus group participant noted, climate change ‘sounds like it’s from Pittsburgh to Fort Lauderdale.’ While global warming carries catastrophic connotations, climate change suggests a more manageable and less emotional challenge” (Leiserowitz et al., 2014).

An analysis by The New York Times found that the term Global Warming appeared in several of President Bush's environmental speeches in 2001, but after receiving Luntz’s memo, the White House continued to use the term Climate Change instead (Leiserowitz et al., 2014).

It has been suggested that these simple changes in terminology helped the Republican Party win the environmental debate. This claim has been subject to research review, particularly regarding whether there is indeed a difference in public opinion between Climate Change and Global Warming (Soutter & Möttus, 2020).

However, a study indicated that research on the use of these two terms by conservative and liberal think tanks shows that conservatives in America no longer follow Luntz's advice. Conservative think tank websites now use the term Global Warming more frequently than Climate Change. In contrast, liberal think tank websites use the term Climate Change more frequently than Global Warming (Leiserowitz et al., 2014). Some studies suggest that certain politicians, such as Republican President Donald Trump, hold a skeptical stance on climate change and use Global Warming within a mocking framework, thereby inciting doubt and influencing public belief in Climate Change. Historical studies reveal that the meanings of Climate Change and Global Warming are dynamic, sometimes changing rapidly, and through repeated usage, these terms may become synonymous, even swapping their dominant positions in public discourse (Leiserowitz et al., 2014). This shift is accompanied by changes in political and social landscapes, which will be further analyzed below.

The choice of these terms reflects certain issues: in some countries, there are partisan divides in beliefs about climate change. A study on the United States, Australia, and the United Kingdom found that conservatives are less likely than liberals to believe in environmental phenomena (Soutter & Möttus, 2020). For

example, in Australia, despite Australia experiencing the adverse effects of Climate Change earlier and more severely than most other countries, the response to this threat has been disproportionate (Leviston & Walker, 2012). In 2007, the Labor government authorized proactive leadership in addressing Climate Change (Howarth & Foxall, 2010). In contrast, the opposition Liberal Party was led by prominent climate change skeptics holding key positions (Howarth & Foxall, 2010; Soutter & Möttus, 2020; Suri & Lofgren, 2010). The research also found varying degrees of belief differences between the two parties in different countries, with the United States exhibiting the most severe polarization. The study concluded that polarization is most pronounced in the United States, influenced by the oil industry—this polarization is severe in both Australia and the United States, while it is somewhat less pronounced in the United Kingdom.

The study found that in Australia, the UK, and the US, conservatives are less likely than liberals to believe in environmental phenomena. However, the severity of this difference varies by country. For conservatives, Australians and Britons show no significant difference in their beliefs about environmental phenomena, but Americans' beliefs are noticeably lower (Soutter & Möttus, 2020).

The difference between conservatives and liberals in their beliefs about environmental phenomena seems most pronounced in the United States, where the average difference is about twice the difference between conservatives and liberals in the UK and Australia. This greater political polarization in the United States aligns with previous studies in the field (Pew Research Center, 2015). This indicates that the issue remains politically polarized despite the increasing urgency and consequences of Climate Change and Global Warming.

Beliefs about Climate Change and Global Warming are politicized, with liberals in multiple countries being more likely to believe in these phenomena than conservatives. This is problematic because, despite political belief differences, there is strong scientific evidence indicating that climate change is real (Intergovernmental Panel on Climate Change, 2018; Klein et al., 2017; Soutter & Möttus, 2020).

Many countries, including the United States, have long entered a new era of politicization of Climate Change. After the 2016 U.S. presidential election, Donald Trump and several Republican lawmakers have consistently pushed for a rollback

of environmental policies and regulations, including cutting funding for climate change work and withdrawing the U.S. from the COP21 (Paris) Agreement (Schuldt, 2017). In 2020, after Joe Biden's election, the U.S. rejoined the Paris Agreement, making it a government priority. Amid the tensions of the China-U.S. trade war, Climate Change, as an international consensus, became a focal point for political exchanges and international activities between China and the United States. Since 1990, China has gradually shifted from the stance of a Developing Country on Climate Change to the role of a global climate governance leader. Through initiatives like the Global Development Initiative (GDI), the Belt and Road Green Development Initiative, and South-South cooperation on climate change, China aims to shape its position as an international leader in the field of climate change.

Brazil's politicization of climate change issues is more similar to that of the United States, with significant fluctuations in policy between different governments. One of the biggest challenges faced by developing countries is the trade-off between environmental protection and economic development. As Brazil's Climate Change issues are closely tied to its forest resources, the policies of the Bolsonaro and Lula governments have differed substantially. The Bolsonaro administration emphasized economic development, showing a negative attitude toward forest protection and international environmental agreements. In contrast, the Lula administration actively promoted environmental policies and placed greater emphasis on international green cooperation.

Different political stances have influenced the use of Climate Change discourse by leaders and political parties. The terms Climate Change and Global Warming are used by political parties in debates concerning Climate Change (Benjamin et al., 2017). These two terms carry distinct political connotations and lead to significant framing effects in problem formulation (Schuldt & Roh, 2014; Villar & Krosnick, 2011; Whitmarsh, 2009).

The first to draw attention to the differing reactions to these two terms was Luntz (2002), who suggested that Global Warming is more emotional and fear-inducing. This argument has since been corroborated in academic research (Whitmarsh, 2009). Early studies by Schuldt and some researchers (2011) explored the usage of the two terms across political parties and found that global warming carries a one-sided connotation, making it easy to discredit during short-lived cold

spells. Global warming has become the preferred term for skeptics, deniers, and Republican-leaning states (Benjamin et al., 2017).

An analysis of political party websites revealed that Republicans favor the term Global Warming because it challenges the scientific consensus on human-induced climate change (Schuldt et al., 2011). In contrast, other political groups (Democrats, independents, or others) were less influenced by the phrasing of the issue (Jang & Hart, 2015).

In recent years, right-wing populist presidents such as Donald Trump, Jair Bolsonaro, and Rodrigo Duterte have shown similar attitudes toward climate change, exhibiting more aggressive stances than conservatives. Under their influence, the public supporting them may reflect greater skepticism, an area that requires further research. Opinion leaders, such as politicians and media, play a crucial role in shaping the beliefs of their audiences regarding Climate Change skepticism.

4.1.3 Influence on the public: Media framing and beliefs of public

Although the term Climate Change predates Global Warming, the media and government initially adopted the latter. Following James Hansen's widely publicized testimony during a U.S. Senate hearing in 1988, the term Global Warming gained widespread traction in mainstream media. In his testimony, Hansen made a now-famous statement (Leiserowitz et al., 2014):

Global Warming has reached a level such that we can ascribe with a high degree of confidence a cause-and-effect relationship between the greenhouse effect and the observed warming.

In the political sphere, certain politicians deliberately choose between these terms based on specific motivations. However, in many cases, opinion leaders do not necessarily perceive or contemplate the distinction between the two (Leiserowitz et al., 2014). At least for some media outlets, the interchangeable use of these terms may reflect an implicit assumption that they hold identical meanings

for the public and exert the same emotional and political influence. For instance, as stated by an ombudsman of the American media NPR, selecting one term over the other does not inherently prescribe any action or encourage any inaction (Leiserowitz et al., 2014).

From the public's perspective, increasing evidence suggests that different individuals use Climate Change and Global Warming for different reasons. Previous studies have shown that Climate Change skeptics tend to prefer Global Warming over the more neutral term Climate Change because the directional implication of Global Warming makes it more susceptible to criticism (Schuldt et al., 2011). Parallel to this trend, research indicates that social media users in the United States—particularly those from Republican-leaning red states—are more likely to use Global Warming rather than Climate Change (Jang & Hart, 2015). A study by Jang further demonstrated that Global Warming appears more frequently in discussions and is often accompanied by a hoax framing, whereas it is rarely associated with impact- or action-oriented narratives (Jang & Hart, 2015).

Research also indicates that Donald Trump's Twitter posts have favored the use of Global Warming over Climate Change and have frequently linked it to a hoax narrative. For example, in November 2012, Trump tweeted (Schuldt et al., 2017):

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

In January 2014, he wrote (Schuldt et al., 2017):

It's freezing and snowing in New York—we need global warming !

And later that month (Schuldt et al., 2017):

This very expensive GLOBAL WARMING bullshit has got to stop. Our planet is freezing, record low temps, and our scientists are stuck in ice.

Such rhetoric illustrates how political figures can actively shape public perceptions by framing climate change discourse through specific linguistic choices (Schuldt et al., 2017).

Beyond politicians, differences in the usage of these two terms have also been observed across party-affiliated websites and social media platforms. An analysis of U.S. think tank websites found that those classified as conservative were more likely to use Global Warming, whereas those identified as liberal more frequently used Climate Change (Schuldt et al., 2011). Similarly, an analysis of Twitter data from the summer of 2012 to 2014 indicated that Global Warming was more commonly used in Republican-leaning red states and in discussions questioning the reality of climate change or portraying it as a hoax. In contrast, Climate Change was more frequently used in Democratic-leaning blue states and in conversations focused on addressing the problem, such as discussions on its impacts and potential solutions (Jang & Hart, 2015; Benjamin et al., 2017).

These findings illustrate how skepticism-promoting framing surrounding Climate Change is widely disseminated within specific regional and political contexts (Boykoff, 2007). For example, critics argue that the public—particularly conservatives—may adopt negative stances toward climate change initiatives due to their focus on the hoax narrative, which could significantly undermine trust in scientific authority (Hmielowski et al., 2014; Jang & Hart, 2015).

When discussing different terminology and media framing, the focus extends beyond their literal meanings to examining whether and to what extent they exert different influences on society. How significant is the distinction between these two terms?

Schuldt and other scholars (2017) study demonstrated that survey respondents exhibited different reactions when asked whether Global Warming or Climate Change was real. Through a questionnaire-based study, the research explored how the American public—particularly Republicans—responded differently to these terms. The findings revealed that a higher percentage of respondents affirmed the existence of Climate Change (85.8%) compared to Global Warming (80.9%), with a nearly five-percentage-point gap between the two responses.

Early research in the United Kingdom on differences in beliefs about Climate Change and Global Warming indicated that the public perceives these terms as distinct both qualitatively and quantitatively (Whitmarsh, 2009). The study found that 27.9% of surveyed Britons believed climate change was merely a result of natural fluctuations in Earth's temperature, whereas only 16.0% held the same belief regarding global warming. Furthermore, another study revealed that the British public tended to perceive Global Warming as a more severe issue than Climate Change (Villar & Krosnick, 2011). While Global Warming and Climate Change are technically distinct concepts (Schuldt et al., 2017), British public discourse frequently uses them interchangeably. Notably, only 4.0% of respondents explicitly recognized the distinction between the two (Whitmarsh, 2009).

From the above studies, it is evident that the public's understanding of the two terms differs to some extent, though the differences are not particularly substantial from a quantitative perspective. A 2014 Gallup survey conducted in the United States also supports this observation, analyzing the general population's perceptions of climate-related issues. The results indicate a stark partisan polarization in beliefs about Climate Change. While there are slight differences in the degree of partisan and ideological divergence in responses to Global Warming versus Climate Change, these differences are not statistically significant and remain modest compared to the vast ideological gap between Americans at the two ends of the political spectrum (Dunlap, 2014).

It is important to note that beyond cross-environmental replication and generalizability, the phenomenon itself may evolve over time. Leiserowitz et al. (2014) pointed out that the connotations of Climate Change and Global Warming are dynamic, sometimes shifting rapidly. Through repeated use, these terms may become synonymous or even exchange dominance in public discourse (Soutter & Möttus, 2020). As previously discussed, shifts in the frequency of these terms' usage among conservatives and liberals in the United States have been observed since 2014. This shift is also detectable through Google Trends data.

Since Google began recording search data in 2004, Global Warming had been the term of choice among the global public, including during the period of data collection for earlier studies and much of the subsequent research. However, a significant change occurred in August 2015, when Climate Change surpassed

Global Warming in search frequency for the first time. Since July 2016, Climate Change has consistently remained the more commonly used term, with the gap in search frequency between the two terms continuing to widen.

By examining the distinctions and evolving usage of Climate Change and Global Warming across different groups, we gain insights into how the discourse on climate science is communicated within scientific, political, media, and public spheres. The choice between these two terms is closely tied to narrative construction, and different narrative approaches yield different effects, evolving dynamically over time. This evolution must be considered within the broader context of political structures, economic frameworks, and other influencing factors. This chapter highlights the impact of discourse beyond the nuances of terminology and framing. Even seemingly minor linguistic distinctions can shape public beliefs and influence policy directions.

This study aims to examine the current political landscape and international environment to better understand the contextual factors underlying present-day discourse framing. This will provide a foundation for further research into media framing. It is essential to emphasize that this section is an observational study, focusing on describing the development of these trends rather than critiquing the terminology itself. Future research will extract and analyze both terms systematically. However, in discussing the findings of this study, we lean toward using Climate Change as the overarching term to describe the broader climatic conditions we currently face, including Global Warming phenomena.

4.2 Framing Theory

4.2.1 Origins and Definitions of Framing Theory

Framing theory, a key component of media effects research, has interdisciplinary roots spanning sociology (Gamson & Modigliani, 1987, 1989; Goffman, 1974), psychology (Kahneman & Tversky, 1984), linguistics (Lakoff & Johnson, 1981), as well as economics, law, political science, and other fields. Across these diverse disciplines, the concept of framing has been employed to raise

distinct—and at times overlapping—questions (Lecheler & de Vreese, 2018). One prominent characteristic of this body of research is its significant levels of conceptual obliqueness (D. A. Scheufele & Iyengar, 2014). For instance, in political science, scholars have focused on how elites communicate and the effects of elite framing (Chong & Druckman, 2007; Zaller, 1992). In sociology, attention is given to how experiences are constructed (Goffman, 1974) and how framing is related to the concept of power (Vliegenthart & van Zoonen, 2011). Framing has also been applied in psychology and economics to explain decision-making behavior (e.g., Kahneman & Tversky, 1984). Due to this interdisciplinary complexity, it is essential to establish a clear understanding of how framing theory is conceptualized and applied within the field of communication studies.

Framing and frames serve as the principal mechanisms through which individuals interpret and navigate the complexities of the world (Entman et al., 2009). Walter Lippmann, a foundational figure in framing theory, noted that for most people, “the world that [they] have to deal with politically is out of reach, out of sight, out of mind” (Lippmann, 1922). In other words, citizens’ political knowledge rarely derives from direct personal experience. Rather, they get most of their information from the media and the elites the media portray (Entman et al., 2009). Given that people rely on frames to organize their understanding of even simple, everyday events, it is unsurprising that they are especially responsive to framing when interpreting distant or complex political developments (Entman et al., 2009).

The application of framing theory in contemporary political communication research can thus be traced back to foundational research in sociology and psychology (Lecheler & de Vreese, 2019).

The sociological approach to frame analysis draws heavily on the assumptions found in attribution theory (Heider, 1959) and in Erving Goffman’s seminal work *Frame Analysis* (Goffman, 1974). Heider’s experimental research (1959) demonstrated that humans, when dealing with complex information in everyday life, tend to simplify social perception by making causal attributions. He defined attribution as the perceived link between observed behavior and its potential causes. Responsibility for the behavior observed could be attributed to personal factors or to social or environmental conditions (Heider, 1959). In this vein,

Iyengar's (1991) study on episodic versus thematic framing in political news illustrates the distinction between attributions of individual and environmental responsibility (Iyengar, 1991).

Goffman's (1974) research on frames of reference represents an independent but related intellectual tradition that became foundational for sociological approaches to framing, which were later expanded into communication theory by Gamson and his collaborators (Ferree et al., 2002; Gamson, 1985, 1992; Gamson & Modigliani, 1987, 1989). Unlike simple causal attributions, individuals rely on broader interpretive schemas known as primary frameworks (Goffman, 1974). These primary frameworks are typically described as relatively stable, socially shared classification systems that humans use to categorize new information. In this sense, they resemble the notion of "radical categories" and related concepts in cognitive linguistics (Lakoff, 1996).

Some scholars argue that primary frameworks are significant to communication research in two main ways (Oliver et al., 2020). First, they represent socially constructed classification systems that serve as crucial tools for citizens in processing information. Second, public and media discourses are often tailored around specific primary frameworks with the intent of shaping audience interpretations.

The psychological origins of framing effects have been summarized in research on frames of reference (Sherif, 1967) and prospect theory (Kahneman, 2003; Kahneman & Tversky, 1979, 1984). In his experimental studies, Sherif (1967) demonstrated that all individual judgments and perceptions occur within specific frames of reference. Thus, it is possible "to set up situations in which appraisal or evaluation of a social situation will be reflected in the perceptions and judgments of the individual" (Sherif, 1967).

Kahneman and Tversky's Nobel Prize-winning work (1979, 1984) extended this idea by arguing that all "perception is reference-dependent" (Kahneman, 2003). The notion of reference dependence assumes that specific information may be interpreted differently depending on the interpretive schema adopted by an individual. More importantly, differently framed information can activate distinct interpretive schemas (Oliver et al., 2020; Scheufele & Tewksbury, 2007).

This effect is especially evident in the case of ambiguous stimuli—that is, information that can be interpreted in multiple ways. A classic example is the “broken B” stimulus used by psychologists Jerome Bruner and Leigh Minturn in the 1950s. The stimulus consisted of a symbol that observers could interpret either as the number “13” or as the letter “B” with slightly separated vertical lines (Bruner & Minturn, 1955). Bruner and Minturn exposed participants to sequences of letters in one condition and sequences of numbers in another before presenting the ambiguous symbol. They found clear differences in interpretation between the two groups, showing that prior contextual exposure significantly influenced how individuals perceived the ambiguous “broken B” stimulus (Scheufele & Iyengar, 2014).

These psychological approaches to framing are based on the assumption that framing refers to the presentation of the same information in different ways. Accordingly, the information presented is substantively equivalent across different frames. This tradition of framing research is referred to by scholars as equivalence framing (Scheufele & Iyengar, 2014). In contrast, the sociological approach to framing conveys information about events or issues from different perspectives; in other words, it presents topics in varying ways through selective emphasis and salience (Guenther et al., 2024). Scholars who support the psychological framing method call the framing method extended from sociological premise the emphasis framing, because the observed framing effects represent differences in opinions (Scheufele & Iyengar, 2014), and these differences cannot be entirely attributed to differences in presentation methods, which is different from the equivalence framing. However, scholars of the sociological framing tradition interpret this distinction differently, which will be elaborated upon in the following section.

In the field of political communication research, both traditions have been carried forward (Lecheler & de Vreese, 2018). Based on differing theoretical foundations, framing functions as both a macro-level and a micro-level concept (Scheufele, 1999). As a macro-level concept, the term framing refers to the patterns journalists and other communicators use to present information in a way that resonates with the audience's preexisting mental schemas (Shoemaker & Reese, 1996). Framing serves as a valuable tool for effectively presenting relatively complex issues in ways that are cognitively accessible to the general public,

precisely because these frames align with existing interpretive schemata. As a micro-level structure, framing describes how individuals utilize issue-relevant information and presentational features when forming impressions (Scheufele & Tewksbury, 2007). Research grounded in prospect theory often focuses on these micro-level processes (Lecheler & de Vreese, 2018), and tends to be more aligned with psychological perspectives.

Regardless of theoretical orientation, framing research generally holds that the function of news framing is to guide audiences in interpreting an issue or event. News framing can exert a relatively strong influence on citizens' beliefs, attitudes, and behaviors (Oliver et al., 2020).

There exists a wide range of theoretical and empirical definitions of news frames (Vreese, 2005). Throughout the development of framing theory, scholars have engaged in prolonged debates over differing perspectives, and to date, there is no single definition that has achieved broad consensus or widespread adoption within the academic community (Scheufele, 2008). In earlier stages, this lack of agreement led some scholars to refer to framing theory as a “fractured paradigm” (Entman, 1993), or to conceptualize it as a “bridging concept” (Reese, 2007).

Scheufele (1999), viewing frames as tools for presenting and interpreting news, distinguished between two conceptual levels: media frames and individual frames. This terminological and conceptual distinction follows the suggestion by Kinder and Sanders (1990), who characterized frames as both “tools embedded in political discourse”—which corresponds to the notion of media frames—and as “internal structures of the mind,” which aligns with the concept of individual frames. Similarly, Entman (1991) differentiated individual frames as mental schemas for information processing from media frames, which he described as “attributes of the news itself”. These scholars have thus commonly decomposed framing into media frames and audience frames, emphasizing the interconnection between the two (Scheufele, 2006; Scheufele, 1999).

Gamson and Modigliani (1987) defined a media frame as “a central organizing idea or story line that provides meaning to an unfolding strip of events... The frame suggests what the controversy is about, the essence of the issue”. They referred to frames as “interpretative packages” that endow issues with meaning. By emphasizing certain elements of a topic, framing provides a way of understanding

events or issues (Vreese, 2005). Tuchman (1978) argued that media or news frames are essential tools for transforming ambiguous and unrecognizable occurrences into recognizable events. She offered a similar definition of media frames: “The news frame organizes everyday reality and the news frame is part and parcel of everyday reality... [it] is an essential feature of news”. News frames also function as part of journalists’ routines, allowing them to quickly identify and categorize information and “to package it for efficient relay to their audiences” (Gitlin, 1980). The concept of media framing may include intentional strategies by communicators, but the motivation can also be unconscious (Gamson, 1989). Cappella and Jamieson (1997) contended that frames can activate knowledge, evoke “stocks of cultural morals and values,” and create interpretive contexts. Entman (1993) provided a more detailed explanation of how media frames offer schemas for audience interpretation. For him, the key lies in the mechanisms of selection and salience: “To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described”.

Individual frames have been defined as “mentally stored clusters of ideas that guide individuals’ processing of information” (Entman, 1993). Two types of frames of reference can be used to interpret and process information: global, long-standing political orientations and short-term, issue-specific frames. Global political orientations are rooted in certain personality traits and have a limited influence on how individuals perceive and interpret political issues (Kinder, 1983). In contrast, short-term, issue-specific frames of reference play a more significant role in shaping how individuals perceive, organize, and interpret incoming information and draw inferences from it (Pan & Kosicki, 1993). Similarly, McLeod et al. (1987) applied the concept of individual frames to describe how audiences make sense of political news. They defined individual frames conceptually as cognitive devices that “operate as non-hierarchical categories that serve as forms of major headings into which any future news content can be filed”.

The strength of the concept of framing lies in its integrative potential (Lecheler & de Vreese, 2018; Reese, 2007), as it centers on the communication process. Communication is not static but rather a dynamic process involving both

frame-building—how frames are produced, and frame-setting—the interaction between media frames and audience predispositions (Vreese, 2005). Entman (1993) pointed out that frames exist at multiple locations, including the communicator, the text, the receiver, and the culture. These elements collectively constitute the frame-building process. The broader process of framing includes distinct stages: frame-building, frame-setting, and the individual and societal level consequences of framing (D’Angelo, 2002; Scheufele, 2000; Vreese, 2005, 2002).

Matthes(2010) distinguishes between four fields of framing research to describe this multi-stage process. Firstly, he refers to strategic framing as the construction of specific issue frames by political elites, social movements, lobbyists, or activists, who then attempt to establish these frames within public discourse and media narratives (Matthes, 2010). Secondly, he uses the term journalistic framing to describe a “schematic or heuristic approach—a knowledge structure activated by a certain stimulus and applied by journalists throughout the process of story construction” (Dunwoody, 1992). Journalists tend to utilize information that aligns with their frames while paying less attention to conflicting information. The third field Matthes (2010) identifies is frames in media content, which is marked by “an explosion of empirical findings and heterogeneity in conflicting conceptual and methodological perspectives.” The fourth field concerns framing effects.

News framing contributes to understanding the dynamic processes of frame-building (how frames emerge), the presence and development of frames in media content, and frame-setting (the interaction between frames and citizens) (Lecheler & de Vreese, 2018).

Among them, as Scheufele (2006) explains, journalistic frames can be conceptualized at two levels: the individual level (i.e., personal frames held by journalists) and the newsroom level (i.e., frames shared among journalists within a news organization). Framing scholars argue that journalists tend to select information that is consistent with their existing journalistic frames (Scheufele, 2006). In everyday reporting practices, these frames are applied to the incoming flow of information. Consequently, information congruent with existing frames is more likely to be used in the construction of news stories than information that is incongruent. However, critical events can alter or even replace pre-existing journalistic frames. Unlike other factors that influence news selection and

production—such as news values—journalistic frames are subject to change and transformation following such key events (Brosius & Eps, 1995; Entman et al., 2009; Scheufele, 2006). These frames lie at the core of journalistic professionalism and should be distinguished from the frames manifested in media texts. The professional frames in media content resemble scripts or menus that guide topic selection and the construction of news stories (Dunwoody, 1992). Tuchman (1976) described journalistic frames as practical tools used by journalists to manage the overwhelming flow of information.

According to prior research on news production and selection, scholars mentioned that there are at least five factors that may influence how journalists frame specific issues: broader societal norms and values; organizational pressures and constraints; external pressures from interest groups and policymakers; professional routines; and journalists' own ideological or political orientations (Oliver et al., 2020; Shoemaker & Reese, 1996).

More broadly, the distinction between internal and external factors that influence the process of frame-building can be connected to the classic work by Shoemaker and Reese (1996) on the hierarchy of influences on media content. In their model, individual, media routines, and organizational levels are considered endogenous factors—internal to the process of news production. In contrast, influences originating from outside the media and from ideology are categorized as exogenous factors—external to the news production process.

The process of frame-building can thus be conceptualized as an ongoing struggle or continuum of competing influences from both inside the newsroom (e.g., individual journalists, news values, and professional routines) and external actors (e.g., stakeholders and interest groups). The more dominant the internal influences, the more the journalistic agency is visible in the frame-building process. In certain cases, the frames advanced by stakeholders may prove to be the most powerful, ultimately shaping the actual news coverage. In other instances, however, the logic of individual journalists or media conventions may override the logic and power of stakeholder and elite actor frames (Vreese, 2005; Lecheler & de Vreese, 2018).

4.2.2 Debates and Integration within Framing Theory

Framing is a multi-paradigmatic research program (D'Angelo, 2002) that has the potential to unify diverse strands of communication research (Entman, 1993). The multifaceted nature of the concept is considered one of the strengths of its theoretical and methodological applications (D'Angelo et al., 2019; Reese, 2010). Scholars widely agree that framing is a constructivist concept—an analytical tool aimed at understanding how reality is socially constructed (Schäfer & O'Neill, 2017; Scheufele, 1999). However, a frequent criticism is that although numerous studies refer to framing effects, their conceptualization and operationalization of these effects are often inconsistent and sometimes contradictory (Scheufele & Scheufele, 2010).

The definition, conceptualization, theoretical foundations, and operationalization of framing effects remain the subject of ongoing scholarly debate (Guenther et al., 2024). These discussions frequently involve comparisons with related concepts such as agenda-setting and priming (Cacciatore et al., 2016; Scheufele, 1999; Scheufele & Iyengar, 2014; Scheufele & Tewksbury, 2007). Through a series of scholarly debates, theoretical consolidations, clarifications of foundational premises, and empirical investigations, framing theory has evolved to exhibit its distinctiveness and unique contributions to the field communication (Badullovich et al., 2020; Cacciatore et al., 2016; Entman et al., 2009; Guenther et al., 2024; Scheufele & Iyengar, 2014). These theoretical discussions enhance our understanding of the framing concept and allow for more precise operationalization, which in turn contributes to its theoretical advancement.

Some scholars have attempted to integrate agenda-setting, priming, and framing effects into a unified conceptual model (Scheufele & Iyengar, 2014). This effort stems in part from one of the early theoretical foundations of framing effects in political communication: the notion that news selection and salience are central to how framing effects function (Entman, 1993). Entman's early works on framing effects (Entman, 1991; 1993) served as a powerful catalyst for the field, laying the groundwork for a vast body of research that followed over the next three decades. However, his all-encompassing definition of framing also introduced a degree of conceptual ambiguity that continues to characterize much of the literature on the

topic (Scheufele & Iyengar, 2014). Entman's empirical research on media framing of two airline crashes provides a notable example. Under the umbrella of framing, Entman analyzed how many pages *Time* and *Newsweek* devoted to each incident. Operationally, these measures of framing—as defined by Entman—overlapped significantly with the indicators used by early agenda-setting scholars to analyze issue salience in media agendas (Funkhouser, 1973b, 1973a; McCombs & Shaw, 1972). In other words, many early efforts to operationalize framing employed measures that were functionally interchangeable with those used in agenda-setting research (Scheufele & Iyengar, 2014).

These scholars argue that mass media influence audience perceptions either by emphasizing the salience of issues (first-level agenda-setting) or by highlighting specific attributes of those issues (second-level agenda-setting, which they equate with framing effects) (Scheufele & Iyengar, 2014). This perspective aligns with Iyengar and Kinder's (1987) concept of priming, viewing priming as a consequence of agenda-setting, and considers framing effects as equivalent to second-level agenda-setting. Scholars have endorsed the concept of second-level agenda-setting, recognizing it as an advancement of the original agenda-setting hypo's (Scheufele & Tewksbury, 2007). Kim, Scheufele, and Shanahan (2002) demonstrated that second-level or attribute agenda-setting significantly influences how people perceive the relative importance of various aspects of an issue.

However, many researchers have revisited the theoretical underpinnings and challenged this integrative view—arguing that agenda-setting and priming effects do not rest on the same theoretical foundations as framing effects, and therefore should not be subsumed under an expanded agenda-setting framework (Price & Tewksbury, 1997; Scheufele, 2000; Scheufele & Tewksbury, 2007). Price and Tewksbury (1997), as well as Nelson, Clawson, and Oxley (1997), contended that the primary function of framing effects is to make particular pieces of information, images, or ideas applicable to a given issue. These conceptual differences have been summarized by scholars as the distinction between accessibility effects and applicability effects (Scheufele & Tewksbury, 2007).

From a psychological standpoint, agenda-setting and priming effects are considered accessibility-based effects (Iyengar, 1990). Media coverage influences the public's perceptions of salience—either of specific issues (Funkhouser, 1973a,

1973b) or of issue attributes (Kim et al., 2002). Enhanced salience implies that related nodes in an individual's cognitive network are activated, and this activation spreads to associated concepts (Collins & Loftus, 1975). Consequently, when individuals are called upon to evaluate candidates or policy options, these activated sets of nodes are more readily accessible and are more likely to be retrieved from memory (Zaller & Feldman, 1992; Zaller, 1992), thereby exerting greater influence on attitudes and evaluations (Iyengar, 1991; Scheufele & Iyengar, 2014). Agenda-setting and priming theories assume a temporal sequence in which media coverage facilitates easier access to certain issues or aspects of issues (i.e., makes them more readily retrievable), thereby shaping the standards individuals apply when forming attitudes toward candidates and political issues (Scheufele & Tewksbury, 2007).

Price and Tewksbury (1997) refer to framing effects as applicability effects. The theoretical roots of this concept can be traced back to early 20th-century Gestalt psychology and later to attribution theory (Heider, 1978; Scheufele & Iyengar, 2014; Wertheimer, 1925). The notion of applicability assumes that the effect of a specific frame is strengthened or weakened depending on how applicable an individual finds that frame to their existing cognitive schemas. The applicability model is directly consistent with the well-known "broken B" experiment by Bruner and Minturn (1955), as previously discussed. When the ambiguous figure is presented in the context of a number sequence, it is more likely to be interpreted as a numeral; conversely, when presented in an alphabetic context, it is more likely to be interpreted as a letter (Scheufele & Iyengar, 2014). In other words, the strength of framing effects varies depending on the congruence between the construction suggested by the frame and the information already stored in the audience's existing knowledge structures (Scheufele & Tewksbury, 2007). Another example can be found in the study by Hwang and other scholars (2007), which illustrates the significance of individual differences in the operation of media effects. They found that in a televised political debate, the influence of subject frames on audience responses varied depending on individuals' levels of political knowledge and their tendency to engage in post hoc reflection (Hwang et al., 2007).

In short, scholars who advocate for a clear conceptual distinction summarize that pre-World War II theories, such as the "magic bullet" or "hypodermic needle" model, focused primarily on persuasive communication—telling people what to

think and what to believe. In contrast, agenda-setting theory explicitly rejects this notion of direct persuasion and instead emphasizes the more subtle role media play in telling people what to think about (Cohen, 1963). Framing theory, by comparison, is viewed by scholars as neither a form of persuasion nor agenda-setting. Rather, it investigates how individuals interpret the information they receive—that is, which mental “shelf” they place the new information on (Scheufele & Iyengar, 2014).

Scholars have increasingly emphasized the role of individual-level factors and psychological processes in framing theory. Individual schemas are seen as reflections of the cultural context in which a person is embedded (Entman et al., 2009; Scheufele & Iyengar, 2014). Compared to other media effects theories, framing theory focuses more on how the media depict issues, rather than which issues are depicted.

Based on the above discussions and the distinctions between various theoretical approaches, some researchers have advocated for the complete abandonment of the overly broad use of the term framing (Cacciatore et al., 2016). They argue that previous research on framing has employed definitions that are excessively vague and often lack corresponding contextual analysis. According to this perspective, future research should focus more narrowly on the specific concept of equivalence framing—that is, the study of different presentations of the same information.

Other scholars, however, emphasize the importance of theoretical integration and defend the broader conceptualization of framing (D’Angelo & Shaw, 2018; Lecheler & de Vreese, 2018). They suggest that news frames are often deliberately constructed by journalistic institutions and are typically designed to be broadly applicable across different issues, rather than being limited to particular ones. These frames are not strictly equivalent in nature; they highlight different aspects of an issue or event, but do not provide entirely different information (Lecheler & de Vreese, 2018). Early framing theorists also argued that in journalism and communication research, the notion of perfectly equivalent framing may be too restrictive, as news framing inherently involves presenting issues in varied ways (Vreese, 2005). Differences in news coverage often cannot be reduced to the interpretation of a single character or number but instead involve broader elements

such as the differential emphasis placed on various aspects of a given issue (Lecheler & de Vreese, 2018; Vreese, 2002; Zaller, 1996).

Despite ongoing disagreements, most scholars acknowledge that accessibility and applicability should not be viewed as entirely separable constructs (Scheufele & Tewksbury, 2007; Oliver et al., 2020). The model proposed by Price and Tewksbury (1997) suggests that both phenomena jointly influence whether a particular mental construct is activated in a given context. This raises a key question for the field: does preserving this distinction offer theoretical or empirical rewards? Indeed, debating the boundaries of framing theory can help enhance its precision. Moreover, the accessibility effect is more sensitive to the passage of time than the applicability effects. Maintaining the conceptual distinction between accessibility and applicability is thus beneficial for understanding and predicting the influence of dynamic information environments (Scheufele & Tewksbury, 2007).

Some studies have emphasized the necessity of multi-level analysis and have conducted empirical investigations to support this approach (Brüggemann & D'Angelo, 2018; Lecheler & de Vreese, 2018; Scheufele, 1999). Scheufele (1999) proposed that to analyze the roles played by both the audience and mass media within this constructivist framework, it is essential to bridge the macro- and micro-levels of analysis. Brüggemann and D'Angelo (2018) called for a multi-level approach to news framing and, using climate change as an example, proposed integrating equivalence framing with generic frames to analyze media content. From a psychological perspective, Lecheler and de Vreese (2018) identified several fundamental mediating mechanisms that influence the effects of media frames: (1) accessibility change, (2) applicability or belief importance, (3) belief content change, and (4) emotion. Among these, accessibility change may function as a critical (pre-)process in framing effects (Lecheler & de Vreese, 2018). Applicability, or belief importance, refers to the way frames alter “the weight of particular considerations in a person’s mind” (Nelson et al., 1997). Frames do not make certain personal beliefs associated with the frame more salient, but rather they increase the weight given to those beliefs. The belief content change model refers to the addition of new beliefs to a person’s belief system. In this view, political news framing is expected not only to operate through changes in belief importance but also to provide individuals with entirely new beliefs (Lecheler & de Vreese,

2018). Furthermore, Lecheler and de Vreese (2018) emphasized that emotion functions as a mediator in news framing effects, operating in ways that are distinct from other mechanisms, and this has been empirically validated. For instance, frames that elicit anger or enthusiasm have been shown to influence framing effects, whereas emotions such as satisfaction or fear do not appear to have the same impact.

4.2.3 Theory Categorization and Research Methods in Media Content Studies

Framing analysis has become a highly active and important methodological approach (Entman et al., 2009). Regarding how to investigate the theory and practice of framing, political scientist Edelman (1993) proposed method based on the concept of categorization. In Edelman's view, the purity of social reality depends on how issues are framed and interpreted. He argues that this concept is rooted in his understanding of a constantly evolving social world, in which shifts in observation results are influenced by changing methods of framing and categorization (Samsudin, 2019). Edelman suggests that the distinct characteristics, causes, and consequences of phenomena result from the changes in what is emphasized or neglected, particularly in the categorization of observed outcomes (Edelman, 1993; Samsudin, 2019).

As discussed earlier, Entman (1993) pointed out that frames exist at multiple levels: the communicator, the text, the receiver, and the surrounding culture. These positions reflect that frame construction is a process composed of different stages: frame-building, frame-setting, and the consequences of framing at both individual and societal levels (D'Angelo, 2002; Matthes, 2012; D. A. Scheufele, 1999; Vreese, 2005). News framing contributes to understanding the dynamic processes of frame-building (how frames emerge), the presence and development of frames in media content, and frame-setting (the interaction between frames and citizens) (Lecheler & de Vreese, 2018). Matthes (2010) further distinguished four areas of framing research to describe this multi-stage process: strategic framing, journalistic framing, frames in media content, and framing effects.

Framing research in political communication generally stems from two traditions: the sociological tradition (e.g., Gamson & Modigliani, 1989; Goffman, 1974) and the psychological tradition (e.g., Scheufele & Iyengar, 2014). This duality is commonly summarized as frames in texts, visuals, or news (sociological frames) versus frames in individuals' minds (psychological frames) (Borah, 2011). Psychological framing is usually further divided into equivalence framing (Tversky & Kahneman, 1981) and emphasis framing (Scheufele & Iyengar, 2014).

It is worth noting that in the field of political communication, the concept of emphasis framing has been extended. Scholars argue that news frames often present issues in different ways, emphasizing various aspects of a problem or event without necessarily providing entirely different information (Lecheler & Vreese, 2018). Emphasis frames are considered to be more aligned with "real" journalistic reporting, and they present "qualitatively different yet potentially relevant considerations" (Chong & Druckman, 2007; Lecheler & de Vreese, 2018).

Moreover, regardless of the specific framing approach adopted, researchers in the field of news framing generally distinguish between two types of frames: issue-specific frames and generic frames (Vreese, 2005; Guenther et al., 2023). Vreese (2005) proposed a typology or classification system based on the nature and content of the reference frames. Issue-specific frames are tied to particular topics or events, which means that each issue is associated with its own distinct set of frames (Entman et al., 2009). In contrast, other types of frames transcend topic boundaries, can be identified across various themes, and in some cases are relevant across different temporal and cultural contexts. These are referred to as generic frames (Vreese, 2002).

The issue-specific framing approach allows for a high degree of specificity and detail concerning the topic or event under investigation. However, this strength may also represent an inherent limitation. The high sensitivity to issue context makes it difficult for analyses based on issue-specific frames to be generalized or compared across cases, thereby limiting their usefulness for theory-building and empirical generalization (Lecheler & de Vreese, 2018).

Studies employing issue-specific frames have addressed topics such as uprisings (Cohen & Wolfsfeld, 1993), the internet (Rössler, 2001), the women's movement (Terkildsen & Schnell, 1997), labor disputes (Simon & Xenos, 2000),

and climate change (Metag, 2016). While this approach emphasizes specificity, certain global and cross-cutting issues such as the internet and climate change have increasingly prompted researchers to apply issue-specific framing in broader comparative studies

Generic news frames, by contrast, are not bound by the specificity of topics. They can be identified across diverse issues and contexts, and some may even span across temporal and cultural boundaries (Lecheler & de Vreese, 2018). These are also referred to as consistent frames (Borah, 2011) and are considered applicable across a wide range of issues (Iyengar, 1991), they are not dependent on the thematic focus of the research (Guenther et al., 2023).

Studies on generic news frames can be broadly categorized into two types. One type focuses on political reporting, particularly electoral campaigns. For example, Cappella and Jamieson (1997) examined the effects of strategic news frames on political cynicism, and Patterson (1993) analyzed the prevalence of "game" or "horse-race" frames in U.S. election coverage (Vreese, 2005). Common examples of such frames include the game frame (Patterson, 1993) and the strategy frame (Cappella & Jamieson, 1997; Lecheler & de Vreese, 2018).

Another line of research focuses on structural generic frames that are rooted in journalistic routines. These studies link news frames to broader features of news production, such as journalistic conventions, norms, and values. Semetko and Valkenburg (2000), for instance, proposed five generic frames commonly found in news coverage: conflict, human interest, attribution of responsibility, morality, and economic consequences.

A further classic example of generic framing is Iyengar's (1991) distinction between episodic and thematic frames. When news is presented in an episodic frame, social issues are portrayed through specific events or individual cases, without providing a broader context. This shifts attention away from public solutions. For example, Iyengar's experiments revealed that audiences exposed to episodic reporting were more likely to attribute responsibility for personal misfortunes to individuals (e.g., blaming poverty on a lack of personal motivation). In contrast, thematic framing emphasizes broader patterns or societal context. Iyengar found that audiences exposed to thematic reporting were more inclined to

assign social or systemic responsibility (e.g., attributing poverty to economic hardship) .

Research aimed at identifying frames in news texts typically relies on two methodological approaches: deductive and inductive (Lecheler & de Vreese, 2018; Vreese, 2005). The inductive approach is more commonly used because it avoids the imposition of predefined frame categories during analysis. This method allows frames to emerge organically from the material under investigation (Gamson, 1992; Neuman et al., 1992). While the inductive method offers rich insights into the framing of current issues, it poses challenges in terms of generalizability and replication (Lecheler & de Vreese, 2018; Vreese, 2005). A second approach is deductive in nature and investigates frames that are defined and operationalized prior to the investigation (Lecheler & de Vreese, 2018).

Frame analysis investigates issues by exploring images, stereotypes, metaphors, actors, and messages (Entman et al., 2009). Different studies employ various methods for extracting frames from media content. Matthes and Kohring (2008) proposed four primary approaches: a qualitative approach, a manual-holistic approach, a manual-clustering approach, and a computer-assisted approach.

Framing is regarded as a process, and some scholars have described it as a "bridging concept" (Reese, 2007; Lecheler & de Vreese, 2018). Since frames can exist at multiple levels or locations (Entman, 1993), researchers have suggested that framing studies can serve to connect macro- and micro-level analyses (Scheufele, 1999). From this bridging perspective, research on media frames can be further divided according to whether frames are treated as dependent or independent variables (Scheufele, 1999). When frames are treated as dependent variables, the focus is on the various factors that influence the creation or modification of frames. At the media level, journalists' construction of frames may be affected by a range of social structures or organizational variables (Shoemaker & Reese, 1996), as well as individual or ideological predispositions (Tuchman, 1978). At the audience level, research treating frames as dependent variables typically conceptualizes them as direct outcomes of how mass media construct and present issues (Price et al., 1997).

Some scholars have also discussed how frames can be identified. In a widely cited definition of framing, Entman (1993) argued that frames in news can be detected through "the presence or absence of certain keywords, stock phrases,

stereotyped images, sources of information and sentences that provide thematically reinforcing clusters of facts or judgments.” Gamson and Modigliani (1987) introduced the concept of framing devices, which serve to condense information and offer a media package for interpreting an issue. These devices include: (1) metaphors, (2) exemplars, (3) catchphrases, (4) depictions, and (5) visual images.

Cappella and Jamieson (1997) critiqued the tendency to treat any verbal or visual characteristic as a potential news frames, arguing that this approach is overly broad. Instead, they proposed four criteria that a news frame must satisfy: First, a news frame should have identifiable conceptual and linguistic characteristics. Second, it should be commonly observed in journalistic practice. Third, it must be reliably distinguishable from other frames. Fourth, a frame must possess representational validity—that is, it should be recognizable and meaningful to others, rather than being merely a construct of the researcher.

Tankard (2001) proposed a comprehensive empirical approach by identifying eleven framing mechanisms or focal points that can be used to detect and measure news frames. These include:

1. Headlines
2. Subheads
3. Photos
4. Photo captions
5. Leads
6. Source selection
7. Quotes selection
8. Pull quotes
9. Logos
10. Statistics and charts
11. Concluding statements and paragraphs.

In summary, scholars who adopt empirical methods to measure frames generally agree that frames consist of specific textual and visual elements—often referred to as framing devices. These elements are essentially distinct from the rest of the news report, which can be considered the core news facts. For instance, Price et al. (1997) operationalized news frames by altering only the introductory and

concluding paragraphs of news articles—sections that carried frame-specific content—while keeping the rest of the article constant. Similarly, Neuman et al. (1992), in their content analysis, divided news articles into parts that contained the “frames” and parts that contained the “facts.” In most framing effect studies, the distinction between core elements and framing devices has been effectively applied to the operationalization of news frames (Cappella & Jamieson, 1997; Iyengar, 1991; Price et al., 1997; Vreese, 2005).

4.3 Rethinking the framing theory and its application to climate issues

4.3.1 Rethinking the framing theory

Since the last century, the field of media effects has been characterized by a Kuhnian (Kuhn, 1962) pattern of disruption, oscillating between paradigms of strong and weak media effects (McQuail, 2005). The study of media effects began to mature in the 1980s and 1990s (Cacciatore et al., 2016). Concepts such as priming, agenda-setting, and framing effects suggest that mass media can exert a potentially powerful influence on attitudes and information processing. Among these, framing effects particularly emphasize the role of individual factors and cultural contexts.

In the current era, the increasing complexity of media systems, the radicalization of political parties, shifts in citizens’ political loyalties, and changes in media consumption habits all signal that media effects have entered a new phase. Blumler (2016) argued that we have moved into the fourth age of political communication, characterized by complexity, multiplicity, variety, and crosscurrents.

Scholars observing the digital age have voiced numerous concerns. We are facing a disrupted public sphere (Bennett & Pfetsch, 2018), exemplified by phenomena such as online “filter bubbles,” political polarization, confirmation bias, the rise of populism, and the erosion of institutional legitimacy—all of which contribute to a fragmented and disjointed communicative environment. Van Aelst et al. (2017) identified at least six major disruptive elements in the political

information landscape: the decline in the supply and diversity of quality information, fragmentation and polarization in media content and usage, growing relativism in public debate and opinion, and increasingly selective news consumption by citizens.

Bennett and Kneuer (2024) described this as an unfree public sphere, where exclusive and deviant forms of public communication are beginning to erode the space for rational and free expression. Divisive and extremist ideas have become embedded in everyday discourse, touching on themes such as race, immigration, gender, “deep state” conspiracies, climate change denial, and various imagined threats to health and lifestyles posed by science, government, and “globalist” elites.

Scholars have further analyzed contemporary media effects and the digital public opinion environment from both technological and institutional perspectives (Bennett & Livingston, 2025). There is considerable evidence indicating that illiberalism is on the rise in many countries, with similar discursive and institutional patterns of erosion observed across contexts (Bennett & Kneuer, 2024; Papada et al., 2023; Štětka & Mihelj, 2024). Emerging research suggests that these patterns are the result of an intersection between institutional and communicative factors.

In addition to technological and institutional considerations, some scholars emphasize that digital media should be understood as cultural artifacts rather than deterministic forces. Their use and interpretation are shaped by the local political culture and broader socio-cultural context, reflecting the co-evolution of communication infrastructures and political culture (Canclini, 1995; Carey, 2005; Ituassu et al., 2023; Pfetsch, 2020). This cultural perspective highlights that the social and political consequences of digital technologies are contingent on the ways in which global communication technologies are embedded within specific societal contexts.

On the institutional side, increasing evidence shows that transnational networking encompasses a wide range of movements, political parties, think tanks, and issue organizations (Ayoub & Stoeckl, 2024). From the communication perspective, researchers have revealed how memes and messages circulate within these transnational media networks, resulting in the emergence of similar conspiracies and campaigns across different nations (Bennett & Livingston, 2025; Heft et al., 2021).

The rise of new media and Web 2.0 technologies—including Facebook, Twitter, Instagram, and other forms of social networking—has forced communication scholars to rethink traditional effects models (Bennett & Iyengar, 2008; Bennett & Pfetsch, 2018; Cacciatore et al., 2016; Lecheler & de Vreese, 2018). Media theories such as framing and media effects must now be recontextualized to align more closely with the contemporary processes of political communication. As early as 2001, Chaffee and Metzger made a prescient observation regarding a key research trajectory in this field: “The central issue of agenda-setting theory will shift from how media tell people what to think about, to how people tell media what they want to think about” (Chaffee & Metzger, 2001). In retrospect, the same may now be said of framing theory.

At the media level, today’s hybrid and highly selective media environment (Van Aelst et al., 2017) has led to an increase in media content accessibility. Scholars argue that this magnifies patterns of selective exposure (Iyengar, 2014). Selective exposure implies that “individuals with limited political interest may avoid the news altogether, while those more politically engaged may tailor their exposure according to preexisting political preferences. Both trends imply a weakening of persuasion effects” (Iyengar, 2014; Lecheler & de Vreese, 2018).

At the audience level, the increasing selectivity in news exposure presents new challenges for journalists and issue advocates. Audiences are increasingly inclined to choose news frames that align with their preferences (Oliver et al., 2020). Naturally, issue advocates are well aware of what the news-consuming public wants to see and hear. Likewise, journalists have long trusted in the power of news values—the elements presumed to enhance audience interest and engagement (Oliver et al., 2020). They actively seek frame elements that assist them in telling stories that resonate with what audiences want to see and hear (Price & Tewksbury, 1997). However, the growing selectivity among audiences may represent a contraction of the potential frames that shape political discourse—frames that ideally describe the wide range of issues and policies citizens need to consider (Oliver et al., 2020).

Research by Cacciatore et al. (2016) highlights that the rapidly evolving media landscape, coupled with constantly shifting audience behaviors, has begun to push media effects research into a new paradigm: preference-based effects

models. Scholars argue that preference reinforcement is driven by three interconnected phenomena (Cacciato et al., 2016): (a) a motivation among media outlets to narrowcast information toward ideologically fragmented publics (Maddow, 2010) or even toward specific individuals in the case of Facebook or other social media (Scheufele & Nisbet, 2012) in order to create more lucrative advertising environments; (b) a tendency among individual audience members to not just select (Yeo et al., 2015) and interpret (Kunda, 1990) information consistently with their prior beliefs, but also to rely on highly homophilic self-selected online social networks – often labeled “echo chambers” (Sunstein, 2007) or “filter bubbles” (Pariser, 2011) – that further narrow our information diets and interpretation of new information; (c) new interface of media and audiences, such as tailored results from search engines (Ladwig et al., 2010) or personalized news aggregators, that lead to narrower and narrower information tailoring based on information infrastructures that are informed by both voluntary and involuntary user input.

Lecheler and de Vreese (2018) note that the research of news framing has now moved beyond news outlets themselves and is amplified through social media platforms and networks. Nevertheless, media effects appear to be weakening. Factors contributing to this weakening include the demise of the inadvertent audience, the knowledge gap between more and less motivated citizens widens, news avoidance, polarization gives audiences more choices, and the activeness of influencers, etc (Bennett & Iyengar, 2008).

Bennett and Pfetsch (2018) argue that for effects research to remain viable, it must account for contextual conditions such as event and issue impact, the convergence or divergence of actors and positions, and the indexing boundaries that open or restrict the flow between legacy and alternative media networks. In other words, media effects research must increasingly focus on moderating variables.

This study contends as well that rethinking framing theory should begin with the consideration of moderators. Even the earliest framing effects research recognized the importance of building a theoretical foundation by identifying both mediators (i.e., how framing effects emerge) and moderators (i.e., the potential limits or amplifiers of those effects) (Chong & Druckman, 2007). Earlier studies have examined how frames in communication influence frames in thought and

overall attitudes (Chong & Druckman, 2007), belief content (Slothuus, 2008), open-ended responses (Chong, 1993), narratives (Rhee, 1997), emotional responses (Gross & D'Ambrosio, 2004), and perceptions of public opinion (Chong & Druckman, 2007).

Lecheler and de Vreese (2018) emphasize that the news framing effects are not universally applicable; rather, they are contingent upon specific variables that determine both the strength and direction of such effects (Borah, 2011; Chamorro-Premuzic, 2008; Oliver & Krakowiak, 2009; Valkenburg & Peter, 2013). Findings often indicate that certain disadvantaged social groups are far more susceptible to the influence of media frames than previously anticipated (Baden & Lecheler, 2012; Lecheler & de Vreese, 2011). However, results that demonstrate resistance to framing, and consequently the failure to “detect” news framing effects, are equally valuable, as they can be linked to models of citizen competence and media literacy (Lecheler & de Vreese, 2018). In sum, moderators help explain how media truly functions within our informational environment (Valkenburg & Peter, 2013), offering insights into the practical relevance of framing theory in contemporary contexts.

Scholars have distinguished between individual-level moderators and contextual-level moderators (Lecheler & de Vreese, 2018). At the individual level, numerous studies have shown that the strength of news framing effects is largely dependent on a person's psychological foundations—specifically, how knowledge is structured and stored in the mind (Baden & Lecheler, 2012). Such variables include a person's issue or political knowledge (Nelson et al., 1997; Schuck & de Vreese, 2006), as well as their value orientations (Shen & Edwards, 2005). According to Lecheler and de Vreese (2018), individual-level moderators can be further classified into three types: i) Enduring traits or personality characteristics; ii) Persistent but malleable (political) beliefs, and iii) Temporary psychological states. In these states, individuals may be more or less susceptible to framing effects.

In comparison to individual-level moderators, contextual moderators have received relatively less scholarly attention. Researchers investigating contextual moderators aim to bring the study of news framing effects closer to everyday life by considering the environments in which frame exposure occurs (Lecheler & de Vreese, 2018). These variables may include the overall credibility of a source

producing a news, as well as interpersonal communication during frame exposure. Moreover, the information environment in which news framing is constructed and disseminated—such as whether it occurs online or offline—also constitutes a relevant contextual factor (Boomgaarden et al., 2013). Contextual moderators can be further categorized into: (1) situation of exposure (e.g., whether exposure occurs in group settings or individually), and (2) information environment (e.g., comparing one national context to another) (Lecheler & de Vreese, 2018).

We argue that any rethinking of framing effects—as well as contemporary framing research—must take into account the variability of such moderating conditions. In complex communication environments, analyzing specific cases and contextual features helps to more clearly reveal the practical processes involved in framing theory. In this regard, we identify several moderators that merit special attention: individuals' political knowledge, the influence of emotions, cultural background, and the asymmetric polarization observed in online spaces.

First, political knowledge functions not only as a moderator of news framing and frame processing, but also as a dependent variable that is itself influenced by framing (Lecheler & de Vreese, 2017). Studies have demonstrated that knowledge serves as a robust and observable indicator of how individuals process political information (Eveland, 2001), learn from news and politics (Lecheler & de Vreese, 2017), and engage in media and political discourse (de Vreese & Boomgaarden, 2006). As a result, a substantial body of research has focused specifically on the moderating role of political knowledge in the effects of news framing (Baden & Lecheler, 2012; Schuck & de Vreese, 2006; Slothuus, 2008).

Lecheler and de Vreese (2018) found that individuals with moderate levels of political knowledge tend to exhibit the most consistent and enduring framing effects over time, whereas the effects on both low- and high-knowledge individuals tend to dissipate more quickly. While those with low levels of political knowledge are most susceptible to immediate (forced) frame exposure and attitudinal framing effects, they often fail to fully engage with or process political information after exposure (Zaller, 1992). In the study of political news framing, individuals with high levels of political knowledge may initially be influenced; however, they are more likely to encounter competing information during the intervening period and are subsequently more capable of rejecting political arguments (Zaller, 1992). This

leaves the moderately knowledgeable group, which is characterized by a cognitive engagement with political content but lacks exposure to a wide range of potentially competing considerations (Lecheler & de Vreese, 2018).

In today's information environment, some scholars have pointed out a growing tendency among the public to avoid information and exhibit disinterest in news (Bennett & Iyengar, 2008). Such tendencies influence individuals' levels of topic-specific knowledge and, by extension, the effectiveness of framing. As previously discussed in this study, in the case of climate change discourse in China, there exists a disconnect between elite-oriented communication narratives and individuals' everyday experiences. Scholars have emphasized the importance of enhancing public perceptions of personal risk associated with climate change. In this context, political knowledge clearly functions as a moderating variable.

There is empirical evidence that emotional factors significantly alter individuals' responses to information (Lecheler & de Vreese, 2013). Emotion plays a critical role in how people react to communication, and how communicative content shapes and aggregates political outcomes (Westin, 2007). This is particularly relevant in the contemporary context of increasing individual isolation and media fragmentation (Bennett & Iyengar, 2008). Despite its importance, emotion as a variable is often overlooked in framing research (Lecheler & de Vreese, 2018).

However, long-term memory and individuals' knowledge repositories are saturated with affective content that closely shapes how political issues, events, and actors are evaluated (Price & Tewksbury, 1997). A more comprehensive perspective on how information is processed, and how knowledge is utilized in this process, necessitates recognition of emotion as a key psychological mechanism (e.g., Baden & Lecheler, 2012). This understanding aligns with the broader "emotional turn" in media and framing effect studies (Lecheler, 2018).

Different types of emotion serve different functions as moderating variables in news framing effects (Lerner & Keltner, 2001). For instance, in an experimental study, Lecheler et al. (2013) exposed participants to issue news frames with varying valences. Their findings revealed that negative news frames triggered both anger and fear, but only anger acted as a mediating variable influencing political attitudes. Similarly, exposure to positive news frames elicited satisfaction and enthusiasm,

yet only enthusiasm functioned as a mediator. Psychological research has shown that both of these emotions share a common characteristic: they provoke intense reactions and can mobilize or motivate individuals to change their positions and behaviors (Lerner & Keltner, 2001). Translated into framing effects, enthusiasm or anger can mobilize citizens either to support or to reject a given news frame (Lecheler & de Vreese, 2018).

In the context of climate change, a recent study analyzed video content on the TikTok in Brazil (Evangelista & Garcia, 2024). The findings indicated that a large proportion of public narratives adopted emotionally charged framing strategies, inducing emotional reactions such as climate anxiety and frustration. This suggests that such affective patterns are likely also reflected in broader media content.

Some of the earliest discussions of framing within the communication environment—such as those by Goffman (1974)—already presupposed that the meanings embedded in frames have implicit cultural origins. Therefore, frames do not merely transmit meaning through news content; rather, they inherently invite the audience to apply culturally endowed knowledge and meanings to understand specific events or issues (Oliver et al., 2020). This context-dependence of frames has been described as “cultural resonance” (Gamson & Modigliani, 1989) or “narrative fidelity” (Snow & Benford, 1988), both of which underscore how pre-existing cultural contexts condition the reception and effectiveness of frames (Oliver et al., 2020). Van Gorp (2007) argues that communicative efforts surrounding a concept that lacks a shared cultural foundation are unlikely to produce effective frames. Due to the familiarity of culture, this mediating factor is often overlooked (van Gorp, 2007). However, other actors within the policy arena are likely to intentionally adapt their messaging to the prevailing cultural context in order to create more successful frames (Oliver et al., 2020). Therefore, in comparative framing studies across different cultural settings, such as between countries, accounting for cultural background is essential for obtaining a realistic understanding of media effects.

Recent scholarship on communication in the digital age has identified a particularly salient phenomenon: asymmetrical polarization (Bennett & Livingston, 2025). The most prominent discussion of this phenomenon concerns the disparity in technical capacity and organizational strategies between political parties. In

many democratic countries, right-wing parties have demonstrated superior capabilities in organizing ideological support and using digital technologies for mobilization compared to their left-wing counterparts. This has also been observed in Brazil's digital landscape (Ituassu & Guerrero, 2024). This phenomenon serves as a critical moderating variable in today's information environment and deserves greater academic attention. The digital advantage of political parties is often linked to the degree of online engagement by their supporters, raising important questions: Does this indicate that certain issues receive more attention from the public in online spaces? Do topics that were once neglected or emphasized in traditional media manifest differently on digital platforms? Might some issue attributes be more resonant with digital citizens? These features introduced by digital technologies suggest the emergence of a new moderating variable in framing research, warranting deeper investigation.

4.3.2 Application of Framing to Climate Issues

Existing literature has extensively explored the complexity of climate change communication and proposed various theoretical and empirical pathways for media research. Several scholars have conducted systematic reviews of framing studies in climate change news, highlighting ongoing conceptual divergences in the field. These reviews also emphasize the potential of "framing" as a bridging concept within the communication process, encompassing the production of frames, their content expression, audience reception, and their potential effects (Guenther et al., 2023; Badullovich et al., 2020). Additionally, some studies have examined the institutional evolution of climate journalism, with a particular focus on journalistic practices in the Global South, the role perception of journalists, their relationships with sources, and the transformative impact of digital technologies on news production and dissemination (Schäfer & Painter, 2021). Other lines of research have focused on the representational forms of climate change in the news media, systematically investigating framing practices across different countries and cultural contexts. These studies often identify key drivers such as the release of authoritative reports by international organizations (e.g., the IPCC), annual climate

summits, or scandals like “Climategate,” and conduct comparative analyses of national media in terms of agenda-setting and issue salience.

Overall, research on framing in climate change communication has exhibited several notable trends in terms of theoretical application and methodological approaches (Guenther et al., 2023; Badullovich et al., 2020; Schafer & Painter, 2021). First, there has been a significant increase in the volume of research. Data show that between 2016 and 2020 alone, the number of publications in this area surpassed half of the total scholarly output historically accumulated in the field. Nevertheless, scholars have criticized the persisting conceptual vagueness surrounding “framing” and the lack of theoretical integration. Second, content analysis remains the most frequently used method, followed by surveys and interviews incorporating experimental designs. Quantitative approaches dominate the research landscape, while qualitative and mixed-method studies are comparatively rare. Third, most studies concentrate on various “framing locations” within the communication process, including frame producers (communicators/journalists), frame content (media/information), audience frames, and framing effects. However, the overall potential of framing as a bridging concept in communication has not been fully developed. Fourth, in terms of media preference, current research continues to prioritize traditional text-based media, often neglecting visual and multimodal forms of communication. Analytical samples primarily consist of newspaper articles and non-news materials (such as research reports, social media posts, policy documents, and press releases), with traditional media accounting for approximately 60%. Research on digital platforms and social media remains limited. Finally, most studies are published in peer-reviewed English-language journals, with nearly half of the first authors based in the United States, and a research focus that heavily leans toward U.S.-centered samples. It is worth noting that cross-national comparative research is on the rise, although most of it still relies on observational methods.

Within the context of climate change communication, the concept of framing is often employed as a bridging concept that connects various dimensions of the communication process, including communicators, informational content, audience responses, and broader cultural structures (Gamson et al., 1992; Guenther et al., 2024; Reese, 2007). This perspective has encouraged scholars to understand climate

communication mechanisms from a holistic, systems-oriented viewpoint. Some scholars, drawing on the notion of a “cultural framing repository,” have analyzed how frames gain salience and availability within specific cultural and cognitive environments—the competitive environment of salient and culturally/cognitively available frames (Brüggemann, 2014). However, existing reviews suggest that the logical connections between different framing locations remain underexplored, and the bridging function of frames still requires further theoretical development (Guenther et al., 2023).

Regarding the position of framing production—that is, how frames are constructed by communicators or journalism professionals—current research remains relatively limited and predominantly relies on interviews and qualitative methods (Guenther et al., 2023). This dimension mainly focuses on how public actors (e.g., politicians, NGOs, scientists, and corporate representatives) or journalists construct specific frames based on their cognitive structures, thereby influencing media content. This process is often referred to as framing strategies, which denotes the strategic behavior through which communicators deliberately shape the most commonly identified framing types are “moral duties and climate justice” and “responsibility and accountability” frames (Bolsen & Shapiro, 2018; Robbins, 2020). For instance, Robbins (2020), in analyzing discourse from Irish government representatives, identified strong expressions of morality, economic, and responsibility frames. Similarly, Moernaut et al. (2018) noted that some climate journalists tend to adopt an economic perspective in their framing practices. However, Guenther et al. (2023) point out that there remains a significant gap in understanding how frames are constructed, incorporated into media content, and received by audiences—an issue that directly limits deeper insight into the mechanisms of climate communication.

Framing content (media frames or news frames) generally refers to patterns of meaning expressed through news texts, visual imagery, or multimodal combinations (Brüggemann, 2014; O’Neill, 2013a; Rodriguez & Dimitrova, 2011; Wessler et al., 2016), which together structure how journalistic discourse organizes specific issues. Existing research on this dimension primarily relies on content analysis, mostly adopting quantitative designs, and widely focuses on thematic frames rather than generic frames. Most studies remain centered on textual content,

while relatively fewer address visual elements or audiovisual materials (Guenther et al., 2023). Among the most commonly identified frames are “climate action” and “harmful impacts.” In addition, “responsibility and accountability,” as well as “science” and “economy” frames, are frequently observed. Although content analysis of media materials reveals the diversity of frames and some cultural specificities, the lack of research on the production process of frames prevents scholars from fully explaining how these dominant frames are formed, disseminated, and widely recognized (Guenther et al., 2023).

Audience frames refer to the sets of cognitive schemas that audiences draw upon when receiving and processing information, helping them interpret, organize, and respond to the content they encounter (Scheufele & Scheufele, 2010). These frames can be activated, modified, or established through media exposure or other forms of social interaction, thereby influencing individuals’ attitudes and behavioral responses to climate-related issues (Scheufele, 2004; Scheufele & Tewksbury, 2007). Although research in this area remains limited, it typically employs interviews or focus groups and often uses qualitative and quantitative mixed-method designs, reflecting a psychology-oriented analytical tradition. Among the most frequently identified audience frames are “climate action,” “harmful impacts,” and “uncertainty and hoax.” For example, Asplund (2016) and Houser (2018), in their studies of agricultural professionals, found that “uncertainty and hoax” as well as “harmful impacts” frames significantly shaped the cognitive structures of this group.

Framing effects represent the second most widely studied dimension in the current literature, focusing primarily on how different types of media frames influence audience perceptions, values, attitudes, and even behavioral responses (Nisbet, 2009). Most studies in this area adopt experimental designs, manipulating various framing stimuli to observe their impact on audience cognition and behavior. Among the types of stimuli used, textual materials remain the most commonly applied experimental resources (Guenther et al., 2023). Moreover, thematic frames are employed slightly more frequently than generic frames in this line of research, indicating a scholarly preference for testing how issue-specific frames may activate particular cognitive pathways or attitudinal tendencies.

In terms of the construction mechanisms of climate change media frames, existing studies have examined how the media influence public understanding of climate issues through selective emphasis and the salience of specific information. For instance, research has shown that media coverage often concentrates on dimensions such as scientific certainty, economic consequences, political controversy, or human-interest narratives, thereby constructing varying interpretive structures. Furthermore, comparative studies across countries and regions have highlighted differences in framing tendencies and media preferences, noting that national political systems, levels of economic development, and journalistic cultures play crucial roles in shaping climate news narratives (Bowe et al., 2014; Han et al., 2017; Hase et al., 2021; Vu et al., 2019). Additional studies have explored the portrayal of climate skepticism in news reporting, as well as the agenda-setting function of major events, such as IPCC reports and global climate summits, in driving media attention.

Among these factors, political influences are widely recognized as critical in shaping media framing practices. A growing body of empirical research demonstrates that national political structures, policy agendas, and major political events play pivotal roles in framing choices and reporting patterns. In China, for example, the ideological control exerted by the state over the media system significantly affects both the news agenda and the types of frames employed (Pan et al., 2021). Party newspapers such *People's Daily* play a dominant role in the communication system, functioning primarily to articulate the Party's policy positions and strategic national directions (Song & Chang, 2012). Within this mechanism, news media generally align with the government's agenda in climate reporting, with government officials frequently serving as the primary sources of information (Han et al., 2017; Pandey & Kurian, 2017).

Additionally, several studies have revealed structural differences in frame usage between state-affiliated and market-oriented media outlets. In the Chinese context, Party-run newspapers like *People's Daily* tend to emphasize "cooperation" and "leadership" frames to construct a positive image of China's role in global climate governance (Han et al., 2017). In contrast, commercially driven media such as *Southern Metropolis Daily* more frequently adopt "human-interest" frames, portraying individual experiences to evoke public empathy and promote

engagement (Han et al., 2017). This divergence reflects the tension and interaction between political control and market forces in climate communication practices.

Both domestic and international political relationships have been found to exert structural influence on media discourse. As noted by Shehata and Hopmann (2012), the information sources referenced in the framing process are shaped not only by the national political system but also by patterns of interaction between international organizations and global journalism norms (Bennett, 1990; Rai & Cottle, 2007; Sparrow, 1999). In their comparative study of Swedish and U.S. media, they found that American news coverage predominantly relied on domestic governmental sources, whereas Swedish media more frequently cited international institutions such as the United Nations, the IPCC, and foreign governments as the basis for reporting (Shehata & Hopmann, 2012).

In terms of the influence of specific political events, extreme weather events and international climate summits are often viewed as critical moments for media agenda-setting. These “focusing events” are believed to significantly increase the news visibility of climate change issues (Dirikx & Gelders, 2010; Hase et al., 2021; Oleskog Tryggvason & Shehata, 2024; Schäfer & Schlichting, 2014; Schmidt et al., 2013; Wessler et al., 2016). Research has shown that media coverage tends to peak during climate summits, with news narratives frequently framing the negotiation process as a game of “success” or “failure” (Oleskog Tryggvason & Shehata, 2024). These immediate frames not only shape public perceptions of the summit outcomes but may also have lasting impacts on broader climate awareness and attitudes. In addition, some studies have investigated the impact of specific national policy debates on media framing biases. For instance, the contentious policy debates surrounding the Kyoto Protocol in the United States significantly strengthened media emphasis on economic consequence frames (Shehata & Hopmann, 2012). Similarly, in the United Kingdom and Australia, the extent of political contestation around climate issues was directly linked to the frequency with which media employed the “conflict” visual frame (O’Neill, 2013).

Economic factors also play a significant role in the construction of media frames on climate change, particularly in relation to national economic development levels, the perceived costs and benefits of climate policies, and structural interests of industries and corporations. First, a country’s overall level of

economic development may be regarded as a key predictor of framing tendencies. In a cross-national study of 45 countries and regions, Vu et al. (2019) found that in countries with higher per capita GDP, media coverage was more likely to frame climate change in terms of “scientific evidence” or within the domain of “domestic politics/regulatory processes”. In contrast, media in lower-income or developing countries were more likely to emphasize “environmental impacts” and “mitigation measures” (Han et al., 2017). For example, news coverage in some developing countries often focuses on the human impacts of climate change (Hase et al., 2021).

Second, economic costs and benefits are recurring dimensions in media reporting. In their analysis of U.S. media, Stecula and Merkley (2019) found that news coverage frequently emphasized the potential economic costs of mitigation measures, such as increased taxes, rising energy prices, job losses, economic slowdown, or diminished international competitiveness. Conversely, positive economic frames—such as green growth or employment opportunities created by investments in clean energy—were significantly underrepresented. In contrast, studies on China and South Korea found that media in these countries tended to highlight the economic benefits of climate action more than the associated costs (Pan et al., 2021; Yun et al., 2014).

Moreover, industrial and corporate interests also exert substantial influence on media framing. In the early to mid-1990s, fossil fuel companies and representatives from the automobile and electricity sectors were identified as major promoters of the “scientific uncertainty” frame, which sought to cast doubt on mainstream climate research by emphasizing uncertainty (Schlichting, 2013). By contrast, South Korean media have tended to portray climate action as an “economic opportunity” rather than a threat, reflecting the country’s export-dependent economic structure and its sensitivity to external climate policy pressures (Yun et al., 2014). In this context, the South Korean government and corporations have promoted nuclear energy and green technology exports under a “green growth” frame, which has been widely disseminated through the media. Such discursive strategies are particularly favored by conservative and business-oriented news outlets.

In addition to political and economic variables, sociocultural factors also constitute underlying conditions in the construction of media discourse.

Barkemeyer et al. (2017), in a study involving 113 mainstream media outlets across 41 countries, found that country-specific cultural norms and values significantly influence how climate change is perceived and presented in the media—particularly in terms of whether it is framed as an urgent and high-priority policy issue. Scholars argue that cultural systems shape the construction of collective identities and play an integrative role within mechanisms of social authority and recognition (Barkemeyer et al., 2017; Whitley, 1999).

Furthermore, institutional norms embedded in journalistic professionalism also affect reporting styles. Early research noted that, in the interest of maintaining journalistic “objectivity,” news stories often adopted the so-called “balance norm”—providing equal representation to opposing views on controversial issues. However, in the context of climate reporting, this norm may contribute to misinterpretations of scientific consensus. Even when mainstream scientific communities reach a clear conclusion, the media may still provide equal weight to a small minority of climate skeptics, thereby amplifying uncertainty and distorting public understanding (Antilla, 2005; Boykoff & Boykoff, 2004; Doulton & Brown, 2009).

In the realm of visual storytelling, O’Neill (2013), in her analysis of news imagery in the U.S., U.K., and Australia, observed a prevalent tendency toward “Climate Change Personified.” This refers to a media preference for humanized visual content—such as depictions of individual suffering, tragedy, or victory (e.g., the triumph of political leaders)—rather than visualizing the structural political or economic dimensions of climate change. The study suggests that with the decline in the number of specialist science journalists, climate coverage may become increasingly reliant on conflict-oriented frames and more susceptible to polarization (O’Neill, 2013).

Some studies further indicate that social variables such as ideology, religious belief, and socioeconomic conditions (e.g., unemployment rates) also significantly shape media coverage (Han et al., 2017; Bowe et al., 2014; Barkemeyer et al., 2017). For example, Bowe et al. (2014), in a comparative study of media coverage of the “Climategate” scandal in the United States and the United Kingdom, found that variations in thematic frames—such as scientific explanation and political advocacy—were partly rooted in the countries’ distinctive social, political, and

historical contexts, making certain frames difficult to transfer across cultures. Barkemeyer et al. (2017), analyzing 113 major national newspapers from 41 countries, also found that the distribution of religious belief had a small but significant influence on the level of media attention to climate issues. Moreover, socioeconomic concerns such as unemployment could displace media attention away from climate change. These findings help explain the diversity and regional variance in the types of frames, narrative strategies, and focal priorities found in climate reporting around the world.

In sum, the existing literature reveals a wide array of framing strategies and influencing factors in the construction of climate change discourse, demonstrating the broad applicability of framing theory for understanding climate communication mechanisms. Nonetheless, several research gaps remain. First, although an increasing number of studies have attempted to explore different “framing locations” within the communication process, the integrative potential of framing as a “bridging concept” has not yet been fully realized, and the mechanisms of interaction between these framing positions remain under-researched. Second, current studies are largely concentrated in Western contexts and often focus on international issues or events (e.g., climate summits, IPCC reports). Given the use of similar sources and shared exposure to global events, this has led to a degree of homogenization in global climate discourse (Dirikx & Gelders, 2010; Lück et al., 2018; Scholte et al., 2013; Shehata & Hopmann, 2012). There is thus a need to expand the research focus to include localized climate events (such as extreme weather or national policy announcements) and case studies from the Global South or developing countries, in order to better understand how cultural, political, institutional, and media-system variables mediate the construction of climate frames in different national contexts. Finally, in light of the transformations brought by the digital media environment, traditional framing research methodologies must be adapted to better account for the emerging dynamics of the digital public sphere, social media interactions, and algorithmic dissemination. Future research should promote cross-national comparisons, cross-platform integrations, and cross-frame-location analyses to deepen our understanding of the evolving mechanisms of climate communication.

4.3.3 Framing application in Chinese and Brazilian Climate Research

As previously discussed, media coverage of climate change is shaped not only by global discourses but also by the structural influence of national political systems, economic frameworks, and cultural traditions. In this context, China and Brazil—two major nations of the Global South—exhibit both shared patterns and localized framing strategies in their climate change reporting practices.

China's approach to climate governance is primarily characterized by a top-down mechanism (Li & Song, 2016; Pan et al., 2021). News media—especially Party-run outlets such as *People's Daily*—play a central role in policy dissemination and public opinion guidance, with their agendas closely aligned with national climate policy and development strategies (Pandey & Kurian, 2017; Zhao, 2011; Pan et al., 2021). An analysis of *People's Daily* coverage from COP1 to COP24 reveals a discursive shift in China's official stance—from framing climate action as an obstacle to economic development to portraying it as an opportunity for economic transformation (Pan et al., 2021). Despite this shift, the media have consistently emphasized economic growth and technological solutions, while assigning primary responsibility for climate change to developed countries—an enduring theme in official narratives.

Journalists from Party newspapers and national news agencies benefit from institutional advantages in accessing information, often securing exclusive interviews with senior government officials. As a result, their reporting tends to reflect the official governmental perspective more strongly (Han et al., 2017).

In a study of Chinese media coverage from 2005 to 2015, Han et al. (2017) found that the most frequently used frame was “the environment and human impact,” followed by “responsibility attribution” and “international cooperation.” Party-run media such as *People's Daily* demonstrated a clear preference for the “cooperation” and “leadership” frames to emphasize China's proactive role in global climate governance. In contrast, market-oriented outlets such as *Southern Metropolis Daily* more frequently adopted the “human interest” frame, employing emotional storytelling to stimulate public concern and engagement.

These studies also indicate that the most common sources cited in Chinese climate reporting are representatives from international organizations and foreign

government officials, followed by domestic authorities and non-official sources (Han et al., 2017). The use of different sources is correlated with specific frame types: domestic and international officials are more commonly associated with “cooperation,” “conflict,” “responsibility attribution,” and “leadership” frames, whereas the “human interest” frame relies more heavily on non-official voices or grassroots individuals.

Chinese media demonstrate a high level of sensitivity to key international events, especially around United Nations Climate Change Conferences (COPs) and the release of reports by the Intergovernmental Panel on Climate Change (IPCC). People’s Daily showed marked peaks in reporting during COP13 (2007), COP15 (2009), and COP21 (2015), corresponding respectively to China becoming the world’s largest carbon emitter, the failure of the Copenhagen summit, and the signing of the Paris Agreement (Pan et al., 2021).

Compared to several Western countries, Chinese media show strong support for the scientific consensus on climate change. Reports rarely question the reality of climate change, and mainstream outlets broadly endorse the authority of the IPCC and its scientific assessments (Pan et al., 2021; Yun et al., 2014).

Brazilian media also exhibit a strong acceptance of the scientific consensus on climate change. Broadbent et al. (2016) found that mainstream media in Brazil generally adopt the standards and assessments of authoritative institutions such as the IPCC, thereby rejecting the prominence of climate skepticism in news coverage.

In a cross-national comparative study by Lück et al. (2016) involving media from five countries—Brazil, Germany, India, South Africa, and the United States—the Brazilian press was found to most frequently employ the “sustainable energy” frame, which accounted for 38.6% of the coverage. In contrast, frames such as “political controversy” and “climate victims” were less prominent (Lück et al., 2016). In addition, frames such as “scientific acceptance,” “global impact,” and “support for mitigation policies” also appeared with notable frequency in Brazilian reporting, with moderate positive correlation to the use of the “global/UN politics” frame.

As a Global South country, Brazil’s media reflect structural characteristics of “developmental journalism” in their climate reporting. Studies have shown that Brazilian coverage tends to emphasize the impacts of climate change on socially

marginalized groups, as well as the roles of government and non-governmental organizations in mitigation and adaptation efforts. These stories frequently highlight policies and practices aimed at improving the quality of life for the population (Hase et al., 2021; Han et al., 2017).

Within this comparative context, Chinese and Brazilian media exhibit several commonalities in their climate change reporting. First, both countries show strong alignment with the scientific consensus. Mainstream media in both China and Brazil largely accept the legitimacy of climate science, and climate skepticism appears only rarely in news narratives. Second, both countries' media focus on the impacts of climate change. Coverage frequently highlights the direct and indirect effects of climate change on the environment and human societies. Third, international events play a significant role in driving media agendas. Global initiatives such as the UN Climate Change Conferences have a clear impact on the frequency and intensity of climate-related news in both countries.

At the same time, notable differences are evident in reporting styles and framing strategies. In terms of political and media systems, Chinese media operate under a Party-led structure characterized by a strong agenda-setting logic, with news content closely aligned with government policy discourse and emphasizing cooperation and national leadership. In contrast, Brazilian media, shaped by the tradition of developmental journalism, place greater emphasis on social development and improving living conditions. Furthermore, the structure of frames differs significantly: Chinese Party newspapers tend to emphasize "cooperation" and "leadership" frames, while market-oriented outlets highlight "human interest" narratives. Brazilian media, on the other hand, concentrate on the "sustainable energy" and "support for mitigation policies" frames. Lastly, differences also emerge in how economic logics are articulated. Chinese media often link climate action to economic growth, stressing opportunities for green development. Brazilian media, by contrast, convey economic themes through the lens of the "sustainable energy" frame, focusing on the policy and technological pathways of the clean energy transition.

In conclusion, this chapter has examined the theoretical foundations and practical applications of news framing in the context of climate change communication. It first explored the terms "Climate Change" and "Global

Warming”, revealing how subtle linguistic distinctions can influence public perception, political discourse, and media representation. It then traced the interdisciplinary development of framing theory, integrating insights from sociology, psychology, and political communication to clarify its conceptual foundations, typologies, and methodological approaches. Finally, the chapter reconsidered the applicability of framing theory in today’s complex media environment—marked by digitalization, political radicalization, and selective exposure—and demonstrated its relevance for analyzing climate change discourse across diverse cultural and national contexts.

By synthesizing these theoretical discussions, this chapter provides the conceptual and analytical framework necessary to interpret how media construct climate change narratives and how frames operate across different social and political environments. Building on this foundation, Chapter 5 transitions to the methodological and empirical components of the dissertation, detailing the comparative research design, case selection, and content analysis of Chinese and Brazilian climate change news. This moves from theory to practice allows the study to rigorously examine how framing mechanisms manifest in real-world media coverage, laying the groundwork for the study’s cross-national analysis of climate communication.

5. Methodology, results and discussion

5.1 Introduction

This chapter constitutes the empirical component of this study, focusing on how climate change is reported by the media in China and Brazil within the context of six selected domestic events. Before outlining the structure and the framing analysis of this chapter, it is necessary to briefly revisit the foundation established in the preceding chapters.

Chapters 2 through 4 provide the essential contextual and theoretical groundwork. Chapter 2 traces the historical development of climate change as both a scientific and political issue, highlighting key milestones in climate science, the rise of international institutions, and the incorporation of climate concerns into national policy frameworks. It also introduces the relevant national contexts, with particular attention to how China and Brazil have historically engaged with the climate agenda. Chapter 3 presents a comparative overview of environmental journalism in both countries, examining the institutional frameworks, professional norms, and structural characteristics that shape media coverage. Chapter 4 then explores the foundations of framing theory, emphasizing how climate change is communicated through various media frames. It introduces the typologies of issue-specific and generic news frames, which serve as the analytical basis for this study.

Building on this foundation, the present chapter conducts an empirical analysis of six climate-related events that occurred within China and Brazil. These events were selected to reflect three dimensions of climate-related discourse: international speeches by national leaders, policy developments at the national level, and the social or environmental impacts of climate change within domestic contexts. While each case is rooted in its respective national background, all are deeply connected to the broader global climate agenda. The focus on domestic rather than international events allow for a deeper examination of how climate change—a global issue originally constructed through external forces—is internalized, localized, and reinterpreted within national media discourse.

Following an in-depth investigation into the background, political implications, and media coverage of these six events, this chapter addresses the core research questions of this study:

1- What framing changes have the media undergone during the development process in these two countries?

2- What are the differences between state-owned and commercial media in reporting on climate change?

3- As developing countries, what factors influence media reporting on climate change in China and Brazil?

These questions are further refined in the following empirical section through the analysis of concrete media content: What kinds of narratives and frames are adopted by Chinese and Brazilian media when reporting on climate-related issues within their own countries? In these contexts, what factors influence media representation? Which themes dominate the discourse, and how do they shape the construction of climate-related narratives?

To address these questions, this chapter conducts a qualitative content analysis of media coverage surrounding the six selected events. The analysis draws on reports obtained through academic research and media monitoring. Using a combination of issue-specific and generic news frames, as well as sentiment analysis, the study seeks to uncover the patterns, focal points, and underlying logics embedded in media narratives.

The empirical study presented in this chapter holds both theoretical and practical significance. From a practical perspective, this research offers valuable insights for journalists and media professionals in China and Brazil. By identifying commonly used frames, overlooked topics, and narrative strategies, this study contributes to enhancing the professionalism, narrative complexity, and social responsibility of climate journalism. Moreover, as the media serve as key channels for public and policy communication, understanding how climate-related issues are framed in domestic contexts can help policymakers improve their communication strategies and promote greater public engagement with climate policy. Additionally, by analyzing the use of different framing types, the study sheds light on how the

media facilitate public awareness of climate change and contribute to the collective understanding of climate action.

From a theoretical perspective, this research enriches the existing literature on climate communication. While much of the current scholarship in this field has focused on Western democracies, media practices and discursive constructions in emerging economies—particularly those in the Global South—remain underexplored. By examining how mainstream media in China and Brazil report on climate change within domestic contexts, this study helps to foster a more diverse and globally representative understanding of climate communication. It also advances the development of framing theory by testing its applicability across different political, institutional, and media systems. By integrating local case studies with framing analysis, the study provides insights into how global discourses are recontextualized within national media ecologies. Furthermore, the comparative perspective highlights the role of institutional, cultural, and political variables in shaping media framing, thereby enriching the field of comparative media studies and contributing to broader discussions on the localization of global issues.

This chapter is divided into five sections. Section 5.2 introduces the methodology employed in the empirical study. Section 5.3 presents the findings from the case studies and media content analysis. Section 5.4 offers a critical discussion of the results in relation to the research questions. Finally, Section 5.5 summarizes the key insights and reflects on the limitations of the study.

5.2 Methodology

5.2.1 Case Selection and Research Logic

This study adopts a combined methodological approach that integrates case study analysis and media content analysis, aiming to investigate in depth how media in China and Brazil report on specific climate-related events and to uncover the underlying discursive construction processes. As a qualitative method that emphasizes the examination of complex phenomena within specific contexts, case

study analysis is well-suited for revealing the multidimensional dynamics within the socio-political communication nexus. By tracking and analyzing six representative national-level events, this research enables a cross-contextual observation of how the media internalize and present climate change issues within varying political, cultural, and institutional environments.

At the same time, media content analysis—used here as a systematic and replicable method of textual analysis—helps identify key elements such as narrative structures, framing strategies, and affective tendencies across a large body of texts. By applying framing theory to the analysis of news texts, this study not only reveals the surface-level representations of media coverage but also probes the ideological underpinnings behind them. The combination of case study analysis and media content analysis serves the overarching goal of answering the following central research questions: What kinds of narratives and frames are adopted by Chinese and Brazilian media in reporting on domestic climate-related issues? What factors influence media representations in these contexts? Which themes dominate the discourse, and how do they shape the construction of climate-related narratives? This integrated research strategy facilitates both macro-level comparative analysis and micro-level textual interpretation, making it a key methodological pathway for conducting cross-cultural and cross-institutional comparisons in this study.

The selection of the six analytical cases in this study was guided by three criteria: First, the events must hold national-level significance and involve clear political, policy, or institutional implications; Second, the events must have attracted substantial attention from mainstream media and emerged as public issues with wide social resonance; Third, the events must be temporally relevant and reflective of contemporary developments, allowing for an examination of how the climate agenda and narrative practices have evolved in China and Brazil in recent years.

On the Brazilian side, the three selected events include:

- (1) President Lula's climate speech at the United Nations General Assembly in September 2024, which demonstrates Brazil's international climate positioning;
- (2) The large-scale forest fires that broke out across multiple regions in Brazil in the same month, reflecting the direct social impact of the interaction between climate change and natural disasters;

(3) The launch of Brazil's updated National Climate Change Plan, Plano Clima, in December 2023, signals a shift in the national climate governance framework and strategic direction.

On the Chinese side, the three selected events are:

(4) The release of the 2024 Green Book on Climate Change, representing the Chinese scientific system's official interpretation and dissemination of climate trends;

(5) The early achievement of the "14th Five-Year Plan" target for wind and solar installed capacity, accomplished six years ahead of schedule, marking a significant milestone in China's climate governance efforts;

(6) President Xi Jinping's speech at the 2021 Leaders Summit on Climate, symbolizing China's climate stance in international arenas.

It is important to emphasize that the basic unit of analysis in this study is the event, with particular focus on the media coverage of climate-related themes within each case. In other words, the research centers on the climate narratives and frames constructed through news texts, aiming to uncover the institutional logic, ideological tendencies, and policy transmission pathways embedded in media production. Through the analysis of these six cases, this study seeks to reveal how the global issue of climate change is localized and reconstructed within national media discourses in China and Brazil, and how media narratives differ or converge across distinct social structures.

5.2.2 Media Content Collection

The collection of media content in this study is centered on the six events selected in the previous section. To ensure systematic and comparable retrieval across cases, a unified collection strategy was developed based on the temporal markers of each event, combined with keyword configurations, time frame settings, and platform selection (see Table 3 for details).

For Chinese media coverage, we used Baidu News, the most commonly used news search engine in China, to retrieve news reports in Chinese. For Brazilian media coverage, we used Google News to search for Portuguese-language articles.

All news data were sourced from publicly available online platforms. For subsequent analysis, all non-English texts were processed with initial machine translation, followed by manual proofreading by the researcher to ensure semantic accuracy and analytical usability.

Table 3 - Media Content Retrieval Strategy for the Six Selected Events

Item	Platform	Topics	Keywords	Search Language	Search Date
1	Google News	Event 1	Discurso Lula ONU 2024 (Which means: Speech Lula UN 2024)	Portuguese	after 2024-09-23
2		Event 2	incêndio florestal, brasil, mudanças climáticas OR aquecimento global, Setembro, 2024 (Which means: forest fire, brazil, climate change OR global warming, September, 2024)	Portuguese	after 2024-08-31
3		Event 3	Plano Clima, mudanças climáticas OR aquecimento global, Brasil (Which means: Climate Plan, climate change OR global warming, Brazil)	Portuguese	after 2023-12-19
4	Baidu News	Event 4	中国气候变化绿皮书, 2024 (Which means: China Releases the Green Book on Climate Change, 2024)	Chinese	after 2024-12-26
5		Event 5	风电和太阳能装机容量12亿千瓦, 气候变化 OR 全球变暖 (Which means: Wind power and solar power installed capacity 1.2 billion kilowatts, climate change OR global warming)	Chinese	after 2024-08-28
6		Event 6	习近平, 领导人气候峰会 (Which means: Xi Jinping, Leaders Climate Summit)	Chinese	after 2021-04-20

To effectively capture the temporal distribution and contextual variation of media reporting, all searches began one day prior to the occurrence of each event and included the day of the event as well as the days immediately following it. This approach allowed the inclusion of anticipatory coverage, real-time reporting, and retrospective accounts.

Below are illustrative examples of the specific search strategies applied to each of the six events:

Event 1 (September 24, 2024): For President Lula’s climate-related speech at the United Nations General Assembly, we searched Google News using the keywords “Discurso Lula ONU 2024” (Lula UN speech 2024), starting from September 23, 2024, to include all relevant Portuguese-language reports.

Event 2 (September 2024): For the widespread forest fires that occurred across Brazil in September 2024, we searched Google News using keywords such as “incêndio florestal, Brasil, mudanças climáticas, or aquecimento global, Setembro, 2024” (forest fire, Brazil, climate change or global warming, September, 2024), with a start date of August 31, 2024.

Event 3 (December 20, 2023): For the release of Brazil's updated National Climate Change Plan (Plano Clima), we used the keywords "Plano Clima, mudanças climáticas or aquecimento global, Brasil" (Climate Plan, climate change or global warming, Brazil), with the start date set to December 19, 2023.

Event 4 (December 27, 2024): For the release of China's 2024 Green Book on Climate Change, we searched Baidu News using the keywords "中国气候变化绿皮书, 2024" (Green Book on Climate Change, 2024), starting from December 26, 2024.

Event 5 (August 29, 2024): For news reports on China's early achievement of the "14th Five-Year Plan" wind and solar capacity targets, we searched Baidu News using keywords such as "风电和太阳能装机容量 12 亿千瓦, 气候变化 or 全球变暖" (Wind and solar power installed capacity, 1.2 billion kilowatts, climate change or global warming), with the start date set to August 28, 2024.

Event 6 (April 22, 2021): For Chinese President Xi Jinping's speech at the Leaders' Summit on Climate, we searched Baidu News using the keywords "习近平, 领导人气候峰会" (Xi Jinping, the Leaders' Summit on Climate), starting from April 20, 2021.

All news reports were categorized according to the media classification standards established in Chapter 3 of this study (see Table 4). The classification criteria are as follows:

Table 4 - Classification Scheme for Media Types in China and Brazil

Item	Country	Media Category
1	China	Party-run media
2		Mass media
3		Institutional media
4		Others
1	Brazil	Specialized media
2		Commercial media
3		Institutional media
4		Others

For Chinese media, the classification is based on editorial capacity, institutional affiliation, and platform characteristics, and includes four categories:

Party-run media: Media directly affiliated with the Party or government institutions, possessing independent editorial and reporting teams, such as People's Daily, Xinhua News Agency, and CCTV.com, etc.

Mass media: Media outlets with professional journalistic capacity that are not directly administered by the Party or government institutions, such as Beijing News, Sohu, and NetEase News, etc.

Institutional media: Platforms operated by government agencies, universities, or research institutions that lack official news production qualifications but provide authoritative content in specific fields, such as the CMA Weather and the China Government Website.

Others: Sources that cannot be classified into any of the above categories.

For Brazilian media, the classification considers the degree of specialization and the thematic focus of the media outlet, and includes four categories:

Specialized media: Independent or professional platforms focusing specifically on environmental and climate issues, such as Um Só Planeta, ClimaInfo, and O Eco.

Commercial media: Traditional national or regional commercial news organizations, including O Globo, Folha de S.Paulo, GZH, and Gazeta do Povo, etc.

Institutional media: Platforms operated by government agencies, public institutions, or academic organizations, such as Agência Brasil, SEMIL, and the Brazilian Academy of Sciences (ABC).

Others: Media or platforms that do not fall into the above categories but nonetheless publish relevant content.

By applying this retrieval strategy and classification system, this study aims to construct a media sample database that is timely, representative, and diverse, thus laying a solid foundation for the subsequent framing and sentiment analysis.

Building on the predefined keywords and timeframes, this study employed the Colab platform in conjunction with Python scripting to conduct preliminary automated filtering and data processing of media content. Specifically, by leveraging the open interface of the Google News platform, we used Python scripts to batch-scrape news links and basic metadata related to the six selected events. The process included preliminary deduplication and result validation to ensure consistency and completeness in data collection.

Due to the closed nature and technical constraints of the Baidu News platform, automated double verification via Colab was not feasible. Instead, for Baidu News, we initially used Python for partial automated filtering and then complemented this with manual search and verification procedures to supplement, confirm, and organize the source information of the retrieved news articles.

After the initial scraping and data consolidation, we manually reviewed all links to eliminate duplicates and format errors. In total, 602 preliminary news links were confirmed, covering all six events, and containing basic metadata such as URLs, publication dates, media sources, and article titles.

We then conducted an initial content screening of the 602 online items (see Chart 1) and applied the following three exclusion criteria:

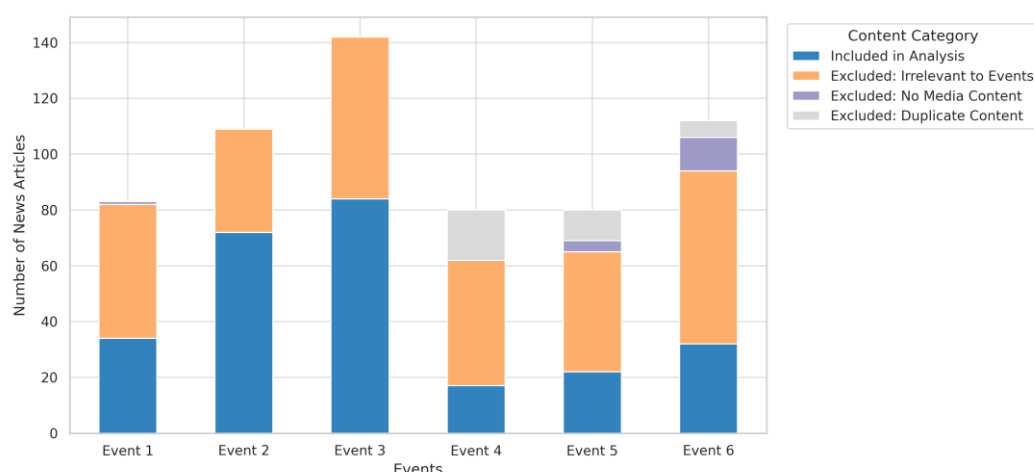
1- Lack of relevance or broken links: This included articles that were not directly related to the six selected events (e.g., content focused on unrelated activities at different time points) or links that were no longer accessible. For instance, in the case of Event 1, some reports did not focus on Lula's speech on September 24, 2024, but on other events of other date in UN; for Event 2, some articles concentrated on administrative sanctions following the fires without addressing the connection between the fires and climate change, and were therefore excluded.

2- Content without actual media reporting: Some links contained only full transcripts of leaders' speeches without any journalistic editing or narrative framing, which falls outside this study's definition of "media content." For example, full-text versions of speeches by Lula or Xi Jinping were published across several official platforms but were not considered as mediated representations and thus were excluded from the sample.

3- Identical duplicated content and unaltered reprints: If multiple links pointed to exact reprints of the same article (identical headline, body text, and formatting), only one version was retained. Preference was given to the original publication; where the original could not be determined, we prioritized the version published by the most influential or clearly identified media outlet found on the search platform. All other duplicates were removed from the analysis.

Following these four rounds of systematic screening and manual verification, a total of 261 valid news articles were confirmed as the core analytical sample for this study. These texts form the empirical foundation for the subsequent framing analysis, sentiment evaluation, and comparative interpretation.

Chart 4 - Media Content Filtering Summary by Event



This chart 4 presents the number of news articles collected and screened for each of the six selected climate-related events in China and Brazil. Articles are categorized into four groups: (1) Included in Analysis, (2) Excluded due to irrelevance to the selected events, (3) Excluded due to lack of actual media content, and (4) Excluded due to duplicate or reposted content. The final dataset consists of 261 unique and relevant news texts used for framing and sentiment analysis.

5.2.3 Framing Analysis and Coding

This study adopts issue-specific news frames as the core analytical dimension, supplemented by generic news frames and media sentiment analysis, to enable a multi-layered understanding of how climate change is reported by the media in China and Brazil.

Issue-specific frames refer to news frames that apply exclusively to a particular topic or event, with each issue possessing a distinctive framing structure and meaning-making logic (Entman et al., 2009). Given the global scope and highly politicized nature of climate change, these frames tend to show a certain degree of cross-cultural comparability and international convergence in framing patterns.

Drawing from existing literature and accounting for the media structures, social concerns, and policy contexts of China and Brazil, this study identifies 13 types of issue-specific frames. Additionally, four commonly occurring thematic

frames are further disaggregated into sub-frames to enhance the sensitivity and analytical precision of frame identification (see Table 5). Furthermore, for 12 of the issue-specific frames, a tripartite tone assessment (positive, neutral, negative) was applied. In the case of the “Domestic Politics/Regulatory Processes” category, sentiment inclination was inferred based on its sub-frame classification.

Table 5 - Typology and Definitions of Issue-Specific News Frames in Reporting

Frames Categories and Definitions				
Item	Type of Frames	Frames	Sub frames	Explanation
1	Issue-specific news frames	Transnational Reporting/Domestic Reporting	N/A	Distinguishes whether the reporting emphasizes international sources or domestic contexts. Does the article focus on transnational perspectives or nationally contextualized developments?
2		Science	Sub-frame 1: Consensus	Within a scientific view on climate change, presenting climate change as a scientifically founded, valid, real, certain, human-made problem, stressing the urgency to act.
			Sub-frame 2: Uncertainty and hoax	Expresses uncertainty or skepticism regarding anthropogenic causes of climate change, sometimes attributing changes to natural variability. Often used to delay action or minimize urgency. This often implies that we can still wait and do not need to act urgently.
			Sub-frame 3: Science	Explores the role science plays in society, with a focus on scientists, institutions (e.g., IPCC), scientific methods, studies, findings, etc.—hence, people, equipment, theories, and findings that underlie climate science. Stresses the centrality of science to understanding and responding to the issue. Does not involve the relevant topics of sub-frames 1 and 2.
3		Ecological/Natural Impacts	N/A	Ecological/Natural Impacts (e.g., melting, temperature, glaciers, sea level, weather, storms, disasters, habitats, species, etc.).
4		Social Progress	N/A	Social progress (e.g. savings, lifestyle, children, environment, ecological life, ecology, water, forests, environmental protection, education and other broad social values of the society. Value orientation, emphasizing harmony between man and nature and improvement of quality of life
5		Risk Governance	N/A	Emphasizes the actual or potential risks brought by climate change, and how governments, institutions, and society identify, manage, and respond to these risks. Emphasizes identification and governance of potential risks. Includes uncertainty, attribution of responsibility, institutional response, and participatory mechanisms. Risk Governance focuses on “cognition and governance processes”, while Climate Action focuses more
6		Climate action	N/A	Solve the problems caused by climate change: reimagine our lifestyle (social transformation), development and energy issues (alternative energy), use technology and technological progress, or ask people to reduce energy use - a series of mitigation and adaptation measures. Usually refers to the trend of reducing fossil fuel use and reducing emissions to achieve sustainable development. Focus on specific actions and strategies to solve climate change. Action-oriented, emphasizing policy, technology and systemic changes.
7		International Relations	Sub-frame 1: Climate Cooperation and Advocacy	Treat climate change as an issue of international multilateral cooperation. Report on international climate cooperation, dialogues and initiatives.
			Sub-frame2 : Power battle	Frames climate change as a site of geopolitical competition or North-South tension. Highlights strategic interests or power asymmetries. Climate reporting includes geopolitics, North-South conflict, etc.
			Sub-frame 3: International Relations	e.g., UN conferences, bilateral, multilateral, partnerships, intergovernmental, cabinets, treaties, diplomacy, aid, conferences of parties, agreements, etc. Does not involve the relevant topics of sub-frames 1 and 2.
8		Domestic Politics/Regulatory Processes	Sub-frame 1: Governance and achievements	Praise domestic politics/policies. Report on the achievements of the government in climate governance.
			Sub-frame2 : Criticizing policy/politics	Criticize domestic politics/policies. Criticize poor policies, failed responses, etc.
	Sub-frame 3: Domestic Politics/Regulatory Processes		e.g., national security, policy, political parties, conservatives, voting, greenhouse gases, politics, decision-making, laws, regulations, etc.	
9	Leader Dynamic	N/A	Focuses on the statements, actions, and symbolic gestures of political leaders regarding climate issues.	
10	Economic	Sub-frame 1: Risks of climate protection	Economic risks, harms, and challenges, competitiveness between countries, highlights economic costs, job losses, and trade-offs associated with climate protection policies. May also mention the importance of other priorities.	
		Sub-frame 2: Benefits of climate protection	Economic benefits, opportunities, investments, and divestment, emphasizes potential growth, prosperity, and advantages of tackling climate change, and that not doing anything is more costly for the economy. Could also link to new technologies.	
		Sub-frame 3: Economic	A general economic view, emphasizing development and financial management, or economic situation. Does not involve the relevant topics of sub-frames 1 and 2.	
11	Energy	N/A	e.g., oil, fuel, energy, coal, natural gas, electricity, wind energy, green energy, renewable energy, etc. Reporting on energy structure and energy transformation.	
12	Science and technology and its application	N/A	Focuses on technological innovation related to climate solutions, such as wind power, solar energy, or carbon capture technologies.	
13	Others	N/A		

In the context of environmental journalism in both countries, prior research shows that China's mainstream media tend to emphasize positive narratives and constructive language (Li & Cao, 2023), whereas Brazilian journalism is more grounded in a tradition of watchdog reporting (Albuquerque, 2019) and critical perspectives (Bueno, 2017). This study aims to explore how these distinct journalistic tendencies manifest in climate-related reporting in the two national contexts.

Generic news frames are cross-topic and cross-context analytical tools that reveal recurring narrative structures used by the media across diverse subject areas (Lecheler & de Vreese, 2018). Based on established typologies and tailored to the characteristics of climate communication, this study employs six types of generic frames (see Table 6): Power Battle, Human Touch, Economic Consequences, Moral Duties and Climate Justice, Responsibility and Accountability, and Disaster/Alarmist.

Table 6 - Typology and Definitions of Generic News Frames in Climate Change Reporting

Frames Categories and Definitions			
Item	Type of Frames	Frames	Explanation
1	Generic news frames	Power battle	Portrays climate issues as sites of political or institutional struggle, emphasizing polarization, competition, or conflict between actors, often a game among elites, nations, groups, or personalities, such as who is winning or losing the debate. Usually representing conflicting parties/individuals and their viewpoints; hence, stresses the points of divergence between opponents.
2		Human touch	Emphasizes personal stories, emotions, or human-interest angles. May include victims, everyday life, or cultural icons. Contains a human or emotional point of view, often some kind of personalization/dramatization, and this can be regular people as well as role models (e.g., Greta Thunberg), heroes, or citizen leaders. Often, this frame is more about people and their personal lives, as well as pop culture, than about the issue.
3		Economic consequences	A general economic consequences view, emphasizing development and financial management, as well as the manner in which climate change will economically affect people, assesses both the risks and benefits of climate change or its mitigation in economic terms.
4		Moral duties and climate justice	About right or wrong, moral imperatives (also for future generations). Highlights ethical imperatives or justice-related concerns, including fairness, intergenerational equity, and global responsibility. Often there is a link to people most affected by climate change, and as such, there are references to fairness and justice.
5		Responsibility and accountability	About political, industrial, but also individual responsibility (mainly for causing climate change (blame) but also to act on it); hence, the main question is: Who is responsible? May contain a link to the question if developed countries are more responsible than developing countries—and how this affects (inter)national agreements.
6		Disaster/Alarmist	Addresses all kinds of negative (future) impacts, such as on the climate (ecological/meteorological, like extreme events), on (national) security, health, migration, extinction, etc. Uses dramatic or urgent language to emphasize the catastrophic consequences of inaction, often employing crisis framing.

This system facilitates comparative analysis with other national contexts and contributes to a more layered understanding of media narratives.

To ensure consistency and methodological rigor in content analysis, a standardized coding manual was developed at the beginning of the study. This manual provided detailed definitions for all issue-specific frames, generic frames,

and sentiment categories, along with explicit coding criteria, sample expressions, and boundary-handling guidelines (see Appendix).

Given that this is a single-author study, the coding and analysis were conducted by the researcher alone. While a traditional intercoder reliability test could not be implemented, several measures were adopted to enhance transparency and reliability: Multiple rounds of pilot testing and self-calibration were conducted before formal coding to ensure the feasibility of the classification system; During the coding process, two rounds of review and correction were carried out to refine logic and ensure consistency; All coding decisions were documented and traceable, allowing for transparency and potential verification.

The study followed a systematic plan for sample selection, coding standardization, and classification design, and emphasized procedural transparency and replicability throughout the analysis. However, several methodological limitations remain:

Despite the detailed coding manual and adherence to unified standards, subjective interpretation was unavoidable, especially when dealing with ambiguous boundaries or semantically vague content. To enhance openness and transparency, the frame analysis results and media source information for each case are presented in full in the dissertation (see Appendix), allowing for public scrutiny and future revision.

Although the criteria for media classification and tone assessment were clearly defined, this research was conducted within a specific temporal context. As such, the patterns observed in Chinese and Brazilian climate reporting should be understood as situational and time bound. Future research should extend this work through longitudinal and cross-cultural studies to deepen comparative understanding.

5.3 Case Study and Results

This section presents the findings of the media content analysis conducted in this study. The analysis focuses on six major events related to climate change, each selected for its representativeness in shaping climate discourse in China and Brazil.

Each event is treated as an independent unit of analysis and is examined through two main components: (1) a contextual introduction of the event (i.e., case description), and (2) a qualitative content analysis of the associated media coverage.

For each case, the media content analysis is structured around the following three analytical dimensions:

1- Basic Characteristics of Media Coverage: This includes the number of relevant news reports, the types of media outlets involved, the format of the content (e.g., text-only, or with images and videos), and the temporal distribution of the reports.

2- Framing Analysis: This involves identifying and categorizing the issue-specific frames (e.g., Science, Climate Action, International Relations) and generic frames (e.g., Economic Consequences, Moral Responsibility, Conflict) employed in the media coverage.

3- Sentiment Analysis: This evaluates the emotional orientation or evaluative stance of the coverage, classified as positive, neutral, or negative.

Each case analysis begins with a summary chart that outlines the main findings of media reporting on the event. This is followed by a detailed interpretation of the data, supported by qualitative evidence drawn from the original news content.

This standardized analytical framework not only facilitates a deeper understanding of media reporting on each specific event, but also lays the empirical foundation for subsequent cross-case comparisons and the discussion in the following section.

5.3.1 Case 1: Lula's Climate Change Speech at the 2024 United Nations General Assembly on September 24, 2024

5.3.1.1 Case Background and Relevance

On September 24, 2024, Brazilian President Luiz Inácio Lula da Silva delivered a keynote speech at the 79th session of the United Nations General Assembly (UNGA 79), in which climate change emerged as one of the central

topics. Lula used this platform to further his foreign policy agenda of reasserting Brazil's leadership role in international affairs, particularly by positioning the country as a "green leader" in global environmental and climate governance.

In his speech, Lula emphasized that "multilateralism is the only path to overcoming the climate emergency." He condemned "climate denialism" and the "tolerance of Amazon destruction," and urged developed countries to fulfill their climate finance commitments by providing financial and technological support to developing nations. He highlighted Brazil's domestic policies and legislative efforts to protect the Amazon and curb illegal deforestation, pointed to the country's strengths in clean energy, and called for a global effort to reduce reliance on fossil fuels.

This speech holds significance for multiple reasons. Firstly, it came on the heels of Brazil's release of a new National Climate Plan (Plano Clima) at the end of 2023, signaling the country's renewed proactive stance on climate policy. Secondly, the speech closely followed a wave of forest fires that swept through multiple regions of the Amazon in September 2024, drawing international attention and pressing Lula to respond constructively on the global stage. Lastly, the address was widely interpreted as an effort to lay the groundwork for Brazil's hosting of the 2025 United Nations Climate Change Conference (COP30), which is set to take place in Belém—a strategic hub in the Amazon region.

In 2022, Lula announced "Brazil is back," marking the beginning of his third presidential term (Koenig & Kump, 2025). Historically, Brazil has demonstrated both the potential and tradition to act as a transformative leader (Burgess, Sean, 2024), especially during Lula's previous administrations. Following the presidency of Jair Bolsonaro, many of Brazil's long-standing international partners anticipated a return to more traditional diplomacy (Burgess, 2024). In many ways, Lula's third term appears to be driven by a search for leadership opportunities rooted in his political legacy. At various international summits, Lula declared that Brazil would act as a bridge between the so-called Global South and Global North (Nicole & Kump, 2025). In this UN speech, he again referenced the Global South and reiterated Brazil's commitment to serving as a voice for developing nations.

In diplomatic terms, Lula's speech also referred to the "six-point understanding" jointly offered by Brazil and China, and mentioned various

multilateral groups including the G77, G20, BRICS, CELAC, and CARICOM. These references reflect Lula's foreign policy approach of "cooperative multipolarity" (Nicole & Kump, 2025), which emphasizes the importance of a more inclusive global governance framework for achieving stability and security. From Brazil's perspective, a more equitable distribution of power among nations offers an opportunity to rebalance outdated international structures and amplify the voice of the Global South in global affairs. The emergence of a multipolar order is seen as a strategic opening for Brazil to enhance its influence as a "middle power" and diplomatic bridge-builder. Brazil's foreign policy is shaped by a tradition of independence and non-alignment, with a long-standing commitment to positioning itself as a neutral mediator in international conflicts (Nicole & Kump, 2025). This diplomatic tradition also includes a strong stance against foreign interference in the internal affairs of sovereign nations—particularly against military invasions and occupations (Burges, 2024; Kenkel & Cunliffe, 2016).

However, scholars have pointed out that President Lula's growing emphasis on international leadership in areas such as climate change also reveals the mounting pressures Brazil faces in terms of resource commitment and policy positioning. First, Lula's calls for action have not been matched by the provision of resources, lacking clear policy planning and tangible investment (Burges, 2024). Additionally, since 2010, the international landscape has shifted significantly, with escalating tensions between China and the United States, the war between Ukraine and Russia, and conflicts between Venezuela and Guyana. According to Burges (2024), in the realm of regional diplomacy—such as the Venezuela-Guyana dispute—the Lula administration has shown a tendency to prioritize ideological alignment over the advancement of core progressive values. On matters of international security, Lula's handling reflects a conceptual trap of his own making—balancing ideological commitments with foreign policy principles. He appears to have abandoned the principle of non-intervention in favor of commercial and political privilege. Moreover, while advocating for environmental protection, Lula has failed to present concrete plans for regional economic development (Burges, 2024). Scholars argue that what Lula needs is a foreign policy strategy underpinned by concrete decision-making and resource allocation, one that would enable Global South countries to gain greater influence in international decision-

making. Amid rising geopolitical tensions, Brazil's dual aspiration to act both as a global agenda-setter and as a non-aligned actor presents a significant challenge for the Lula administration (Nicole & Kump, 2025).

Addressing climate change and protecting the environment has been designated as a key foreign policy priority under the Lula government. In his speech, Lula ranked this issue immediately after the ongoing international crisis in Ukraine, making climate change the second major theme, signaling its importance in Brazil's diplomatic discourse. In the corresponding part of his address, Lula criticized "deglobalization" and the failure of financial aid mechanisms, reinforcing his role as a spokesperson for Southern and developing nations. He then addressed the impacts of domestic climate disasters, the Amazon issue, environmental crimes, and the voices of Indigenous peoples—highlighting multiple climate-related dimensions that concern his administration. Finally, he referred to the upcoming COP25, Brazil's energy transition, and the country's energy resources and structural advantages—projecting Brazil's achievements and strengths in climate policy. These elements collectively reflect the Lula administration's stance on climate change and its associated policy areas.

From the perspective of climate communication and media framing studies, Lula's speech at the UNGA represents a pivotal moment in Brazil's efforts to construct a climate narrative on the international stage.

5.3.1.2 Media Coverage Overview

In terms of general media characteristics, Case 1 triggered a considerable volume of media response within a short time frame. Overall, the coverage exhibited features of rapid dissemination, a dominance of commercial media, and a strong emphasis on visual content.

First, regarding media types (see Table 7), a total of 34 news reports related to this event were collected. Among them, commercial media held an absolute majority (62%), followed by institutional media (23%), while "others" accounted for a smaller portion (15%). No Specialized media participated in the coverage. This distribution indicates that mainstream commercial news organizations

continue to hold discourse dominance in reporting major international affairs. Particularly when President Lula speaks on behalf of the nation at a high-profile venue like the United Nations, commercial media are quick to intervene, aiming to capture public attention and traffic. At the same time, the involvement of institutional media reflects the significance attributed to the event by state or government-affiliated communication platforms. Among the “others” category, some international outlets such as BBC and DW also covered the event. In contrast, there was no participation from climate- or environment-focused specialized outlets, suggesting that this event was still primarily framed as political or diplomatic news, rather than scientific or environmental reporting.

Table 7 – Event 1 Analysis of media coverage of Lula’s Speech in 2024

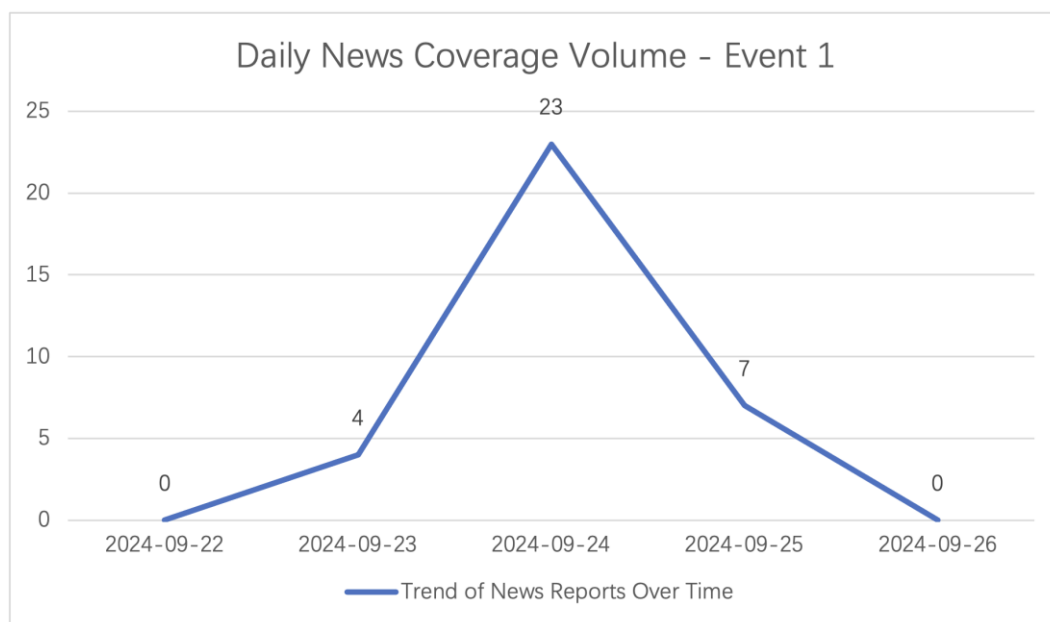
Event 1- Analysis of media coverage of Lula's Speech in 2024							
Number	Media Type			Source		Content Format	
34	Commercial media	21	62%	Original	100%	Text only	0%
	Institutional media	8	23%	Reposted/ re-edited	0%	With images	65%
	Specialized media	5	15%			With videos	35%
	Others	0	0%				

Second, regarding the origin and format of the reports (also in Table 7), all 34 articles were original pieces (100%), with no republished or reprocessed versions. This reflects the event’s nature as a “first-release” news topic—media outlets relied on their own correspondents or official sources to deliver initial coverage, rather than on secondary reporting. This contributed to the authority and timeliness of the coverage. As for the content format, 65% of the reports included images, and 35% included videos; none were plain-text-only reports. This may reflect the normalization of “image–video” formats in Brazil’s digital media ecology, where outlets tend to use on-site visuals or video materials to enhance immediacy and persuasive power.

Finally, the temporal distribution of the report volume showed strong concentration (see Charts 5 and 6). On the day of the speech, September 24, 2024, a total of 23 articles were published, accounting for 67.6% of the total, clearly indicating a peak in coverage. On the day before (September 23) and the day after

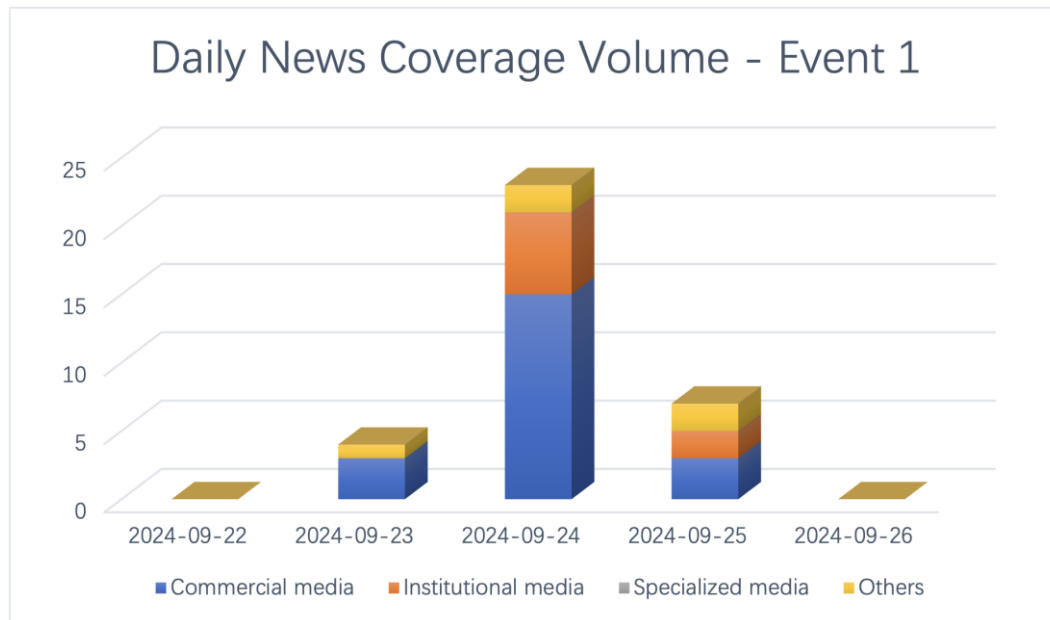
(September 25), the article counts were 4 and 7, while no reports were found in the following two days (September 26). This indicates that the media attention followed a “single-day burst” pattern, with coverage highly concentrated on the day of the event and an extremely short news cycle, lacking sustained follow-up. Such a pattern is increasingly common in today’s fast-paced digital news context, where, unless accompanied by additional controversy or updates, one-off diplomatic speeches are unlikely to maintain media visibility for multiple days.

Chart 5 – Daily Volume of News Coverage on Lula’s Climate Speech (Event 1)



A closer look at the daily distribution across different media types (see Chart 5) shows that commercial media remained dominant on September 24, but institutional and international media also responded in sync, signaling that the event received a relatively high level of attention across the mainstream media spectrum. However, there was no significant divergence among different media types in terms of subsequent follow-up coverage—all dropped sharply to minimal or zero levels after the event day.

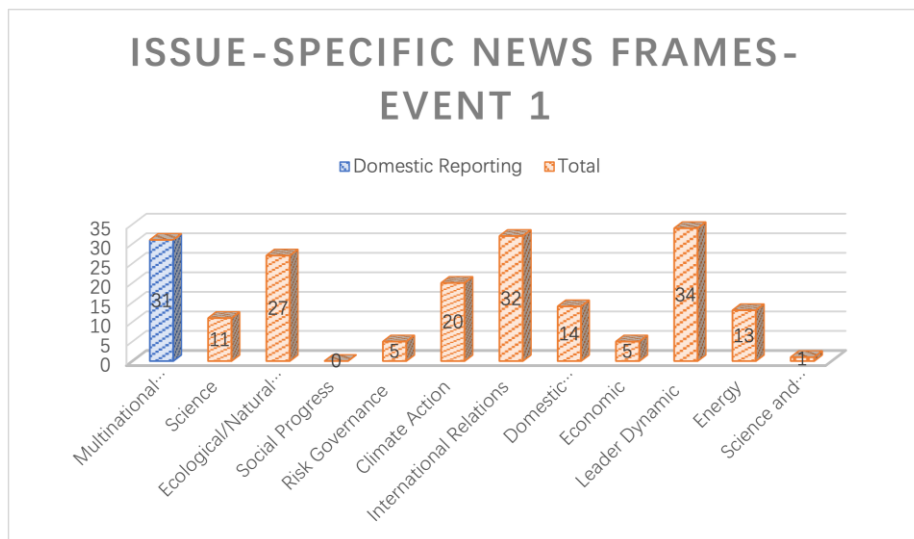
Chart 6 – Distribution of News Reports by Media Type Over Time (Event 1)



In summary, President Lula’s climate speech at the United Nations General Assembly triggered a short-term surge in media coverage in Brazil, characterized by a fast-paced cycle, dominance by mainstream commercial media, and enhanced visual content. This reporting pattern provides important contextual grounding for the subsequent framing and sentiment analysis.

5.3.1.3 News Framing Analysis

Chart 7 – Issue-specific News Frames (Event 1)



a. Issue-Specific Frames

In the media coverage of Event 1, the distribution of Issue-Specific Frames was diverse but generally centered on a political-diplomatic orientation, with limited presence of environmental or action-related perspectives (see Chart 7). Among these, Leader Dynamic (34 instances) and International Relations (32 instances) were the most frequently observed frames. This distribution closely reflects the nature of the event itself: President Lula, speaking at the United Nations as head of state, was extensively featured through on-site images and direct speech citations. Headlines often began with phrases like “Lula discursa...” (“Lula delivers a speech...”), emphasizing his dual role as both national representative and climate spokesperson.

Within the International Relations frame, 53% of the content focused on descriptions of the “United Nations General Assembly (Assembleia Geral das Nações Unidas)” agenda and proceedings. Another 41% highlighted Climate Cooperation and Advocacy, with many articles emphasizing Lula's calls for international financial support to poorer nations in tackling climate change, such as:

“urging financial aid for poor countries to combat climate change” (“chamou a atenção para a necessidade de ajuda financeira aos países pobres para lidar com as mudanças climáticas”), “stressing the urgency of global and collective action” (“ressaltou a urgência de ações globais e coletivas”), and “global leaders need to take more urgent and profound measures” (“líderes globais precisam tomar medidas mais urgentes e profundas”).

These narratives reflect the media's portrayal of Lula positioning himself as a key advocate for Global South concerns. Only 2 articles (6%) referenced Power Battle within international relations, published by international media (BBC) and institutional media (Fiocruz). These reports included statements such as:

“He wants wealthy countries—also the world’s largest polluters—to commit to paying emerging countries for forest protection services and emissions reductions” (“Ele quer que os países ricos—também os maiores poluidores do mundo—se comprometam a pagar aos países emergentes pelos serviços de proteção das florestas e pela redução de emissões de gases do efeito estufa”), “The wealthiest nations lack commitment” (“Faltam compromissos por parte das nações mais ricas”),

highlighting tensions between developed and emerging economies over climate obligations.

Given the diplomatic and political nature of Event 1, the dominance of the two aforementioned frames is not surprising. In the second tier, Ecological/Natural Impacts (27 instances) and Climate Action (20 instances) also played important roles. These relate to concurrent domestic climate disasters—forest fires and floods—that provided background context for Lula's speech. Many articles employed terms like “emergência climática” (“climate emergency”), “incêndios” (“fires”), and “enchentes” (“floods”) to frame urgency. For instance, an article from O Globo was headlined:

“Na ONU, Lula cobra ações contra mudanças climáticas em meio às queimadas no Brasil: ‘É preciso fazer mais’”
(At the UN, Lula demands action against climate change amid fires in Brazil: ‘More must be done’),
emphasizing the immediate threat of climate impacts. The Climate Action frame focused on themes like “combating illegal

deforestation,” “limited governmental action,” and “environmental enforcement.”

The international dimension of the reporting showed a markedly domestic orientation. Of the 34 articles analyzed, 91% were domestic reports, with only 3 articles (9%) offering a transnational angle—and even these focused on Lula being “overlooked” in international discourse. Media constructed narratives such as “Lula ignored by international press,” or “Milei receives more attention,” using headlines like:

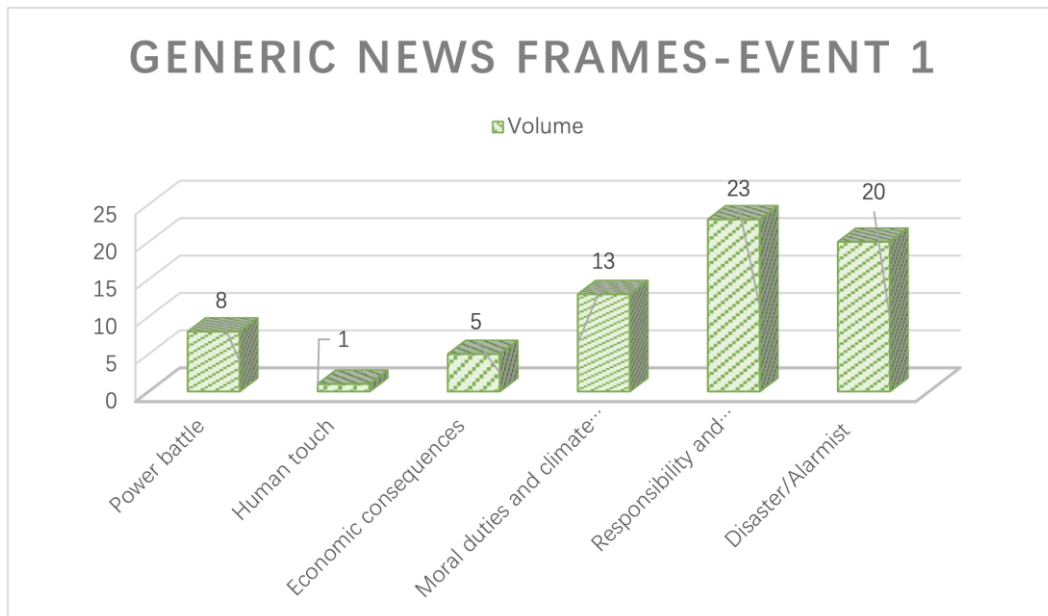
“Discurso de Lula na ONU é ignorado por boa parte da imprensa internacional” – Folha de S.Paulo
 (Lula’s speech at the UN is ignored by much of the international press),
 “Mídia internacional dá pouca atenção para discurso de Lula na ONU” – Poder360
 (International media gives little attention to Lula’s speech at the UN),
 “Milei ganha destaque na ONU enquanto Lula é ignorado pela mídia” – Gazeta do Povo
 (Milei stands out at the UN while Lula is ignored by the media).

This narrative, on the one hand, may reflect anxiety about the national image of the Lula government; on the other hand, it also reinforces the identity construction of the Global South as “underestimated voices.”

It is also notable that Risk Governance and Economic frames appeared infrequently (5 instances each), while Social Progress, Science and Technology frames were virtually absent. This distribution confirms that media coverage of the event was not shaped by technical or scientific governance logics, but rather centered on leader statements, national image, and international responsibility.

b. Generic Frames

Chart 8 – Generic News Frames (Event 1)



In terms of Generic Frames usage (see Chart 8), the Responsibility and Accountability and Disaster/Alarmist frames were the most frequently employed, appearing 23 and 20 times respectively. The media widely cited Lula’s remarks during his speech such as “developed countries must fulfill their climate finance commitments” and “the world must share responsibilities collectively”, placing the news coverage within an ethical context of accountability and international justice.

The Disaster/Alarmist frame was conveyed through expressions that emphasized the gravity and urgency of climate impacts, such as:

“trail of destruction” (“rastro de destruição”),
 “suffocated by wildfires” (“sufocado por queimadas”), and
 “the tragedy of floods” (“tragédia das enchentes”).

The Moral Duties and Climate Justice frame (13 instances) was also frequently employed, reinforcing Lula’s moral argument that “the Global South deserves more support.” This frame aligned closely with speech content emphasizing “poor countries,” “inequality,” and “lack of aid” (respectively: “países pobres,” “desigualdade,” “ausência de ajuda”).

In contrast, the Economic Consequences and Human Touch frames were extremely limited, appearing only 5 and 1 times, respectively. For instance, one article by CNN Brasil titled “Lula usa 'gravata da sorte' em discurso na ONU” (“Lula wears his ‘lucky tie’ during UN speech”) reflected a personalized, character-focused view of the leader.

The Power Battle frame appeared 8 times, primarily focusing on domestic political conflicts and perceived imbalances in international recognition. Some outlets, such as the BBC, quoted opposition critiques of the Lula administration and the Workers’ Party, such as:

“Accused by the opposition of excessive spending” (“Acusado pela oposição de gastos excessivos”).

Institutional media like Rádio Senado quoted both supporters and critics of Lula. For example:

“The speech was empty and contained contradictions between what was said and the reality of Brazil” (“o discurso foi vazio e com contradições entre o que foi falado e a realidade do Brasil”).

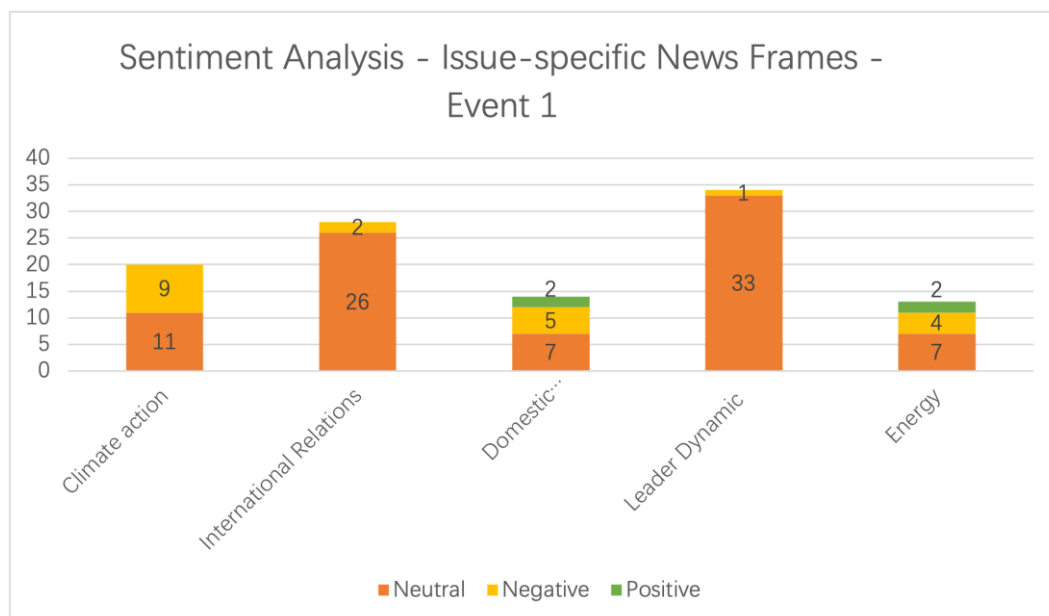
Furthermore, all three multinational reports emphasized how Lula’s speech was “ignored” by international media, while also highlighting external critiques regarding the government’s wildfire response:

“Introducing the criticisms that his government has been receiving regarding the way it has dealt with the wildfires spreading throughout the country” (“introduzir as críticas que seu governo vem recebendo em relação à maneira como tem combatido as queimadas que se espalham no país”).

These references to opposition critiques, coupled with negative international media framing of Brazil’s actions, contributed to a narrative of contested legitimacy, criticism, and strategic positioning—making them reasonably classifiable under the Power Battle frame.

5.3.1.4 Sentiment and Discursive Stance

Chart 9 – Sentiment Analysis (Event 1)



An analysis of the sentiment in media coverage of Event 1 (see Chart 9) reveals that among all issue-specific frames, only five presented distinct tonal variations. Overall, the tone was predominantly neutral, followed by negative, with positive evaluations being the least frequent. This pattern suggests that when covering high-level diplomatic speeches by heads of state, media outlets tend to adopt a descriptive and restrained linguistic approach. However, in frames related to climate policy and governance effectiveness, a higher number of critical or negative tones emerged.

Among all frames, the Leader Dynamic frame stood out for its overwhelmingly neutral tone (33 neutral vs. 1 negative). Most reports focused on Lula’s speech content, photos from the event, and the general context of the address, thereby demonstrating a media tendency to maintain a sense of “formality” and “ceremoniality” when reporting major addresses by heads of state—avoiding excessive value judgments. The single negative report came from international outlet DW, with the headline: “Lula in New York: do what I say, not what I do” (“Lula em Nova York: faça o que eu digo, não o que eu faço”), which carried a clearly ironic tone. The article, written in the first person, criticized Lula for “saying

one thing and doing another”, highlighting inconsistencies between his climate commitments and domestic policies. As the report was structured more as journalistic critical commentary than event-based reporting, it was categorized as negative under this frame.

The International Relations frame also showed a primarily neutral tone (26 neutral), though it included two reports with critical undertones. These critiques were not directed at Brazil or Lula personally, but rather at the ineffectiveness and unfairness of current international climate governance. For example, CartaCapital stated: “global governance mechanisms like the UN are collapsing” (“os formatos de governança mundial, como a ONU, estão em colapso”), expressing concern over the dysfunction of global governance systems. Similarly, BBC noted: “multiple agreements on emission targets and payment for environmental services have been systematically breached” (“diversos acordos para metas de emissões e remuneração de serviços ambientais têm sido descumpridos sistematicamente”), thus emphasizing weak implementation of climate agreements.

The Climate Action frame exhibited the sharpest tonal divergence, with 11 neutral reports and 9 negative ones—making it the frame with the highest proportion of negative coverage. Criticism spanned issues such as governance, policy execution, and delays in international action. For instance, DW asserted that “Lula has clearly not formulated a plan to end his country's ecological tragedy”; Agência Brasil and CartaCapital mentioned “unfulfilled climate agreements” and the need for “immediate global action”; Folha de S.Paulo noted how international media criticized “the government’s inadequate response to the nationwide wildfires.” These negative tones reflected both skepticism about Lula’s policy enforcement and deeper concerns over the government’s response mechanisms to climate disasters—depicting a multidimensional space of critique.

In the Energy frame, the sentiment distribution was more varied: 7 neutral, 4 negative, and 2 positive articles. Positive tone was mainly associated with Brazil’s structural advantages in energy, with outlets such as Globo and government websites highlighting keywords like “green hydrogen” and “renewable sources” (“hidrogênio verde”, “fontes renováveis”), thus emphasizing Brazil’s potential and leadership in energy transition. Negative reports, on the other hand, focused on controversial topics such as “expansion of oil exploration” and “continued fossil

fuel usage.” Outlets like BBC, DW, and Globo suggested that such policies might contradict Brazil’s climate pledges—constructing a tension between “clean energy promises” and “fossil realities.”

The Domestic Politics/Regulation frame displayed complex tonal layering: 7 neutral articles primarily focused on policy announcements and government measures; 5 negative reports raised concerns about policy implementation delays and inadequate responses. For example, Rádio Senado noted that “many of the climate policies announced during the campaign have not been adopted” (“muitas políticas climáticas anunciadas durante a campanha não foram adotadas”). Media such as Folha de S.Paulo, Poder360, DW, and Globo mentioned that “the government failed to respond quickly to natural disasters”, thereby questioning the governing capacity of the ruling party. Two positive articles, from Fiocruz and Globo, cited outcomes like “reduced deforestation” and “strengthened enforcement” (“redução do desmatamento”, “reforço da fiscalização”), indicating that some news outlets acknowledged the government’s efforts in climate response.

In summary, the sentiment of media coverage for Event 1 was largely neutral, with negative tone clustering around themes of climate action and domestic governance, and positive assessments mainly associated with energy and specific policy achievements. This sentiment distribution reveals a dual discursive orientation combining diplomatic “performance” with governance “accountability.” It also reflects the media’s framing logic when reporting national leaders’ climate statements.

5.3.1.5 Key Findings of This Case

An analysis of Brazilian President Luiz Inácio Lula da Silva’s climate-related speech at the 79th United Nations General Assembly reveals a complex interplay in media representation, where diplomatic positioning, national identity construction, environmental urgency, and framing practices intersect.

At the event level, the speech took place within a highly symbolic international context. It aligned closely with Brazil’s recent repositioning in climate policy, the occurrence of multiple domestic climate disasters (such as forest fires

and floods), and the anticipation of COP30 to be held in Brazil in 2025. Lula's emphasis on climate justice, international cooperation, and the protection of the Amazon Forest served both as a reiteration of Brazil's foreign policy stance and as a call for strengthening multilateral governance mechanisms.

From the perspective of media coverage characteristics, the event triggered a short-term yet high-intensity wave of attention. Between September 23 and 25, 2024, a total of 34 reports were published, predominantly by commercial media outlets, all of which were original content. The reports heavily relied on visual formats: 65% of the articles were accompanied by images, and 35% included video content. Coverage peaked on the day of the speech, reflecting a typical burst-style news cycle, but lacked follow-up coverage thereafter.

Framing analysis indicated that the media exhibited a strong focus on leadership image construction and international relations, suggesting that the event was not merely portrayed as a diplomatic address, but also as an opportunity to reaffirm Brazil's role in international affairs under Lula's leadership. The Ecological/Natural Impacts and Climate Action frames followed closely in frequency, showing that the speech was also interpreted in light of Brazil's domestic environmental crises. These frames often localized the speech content and embedded it into the country's contemporary climate realities. In terms of reporting orientation, 91% of the articles adopted a domestic perspective, indicating that even though the event took place on the global stage, media narratives were predominantly nation-centered. The few multinational reports mostly emphasized Lula's speech being "overlooked" by international media.

Regarding sentiment distribution, neutrality dominated, especially in leadership and diplomatic reporting. However, coverage under the Climate Action, Domestic Politics, and Energy frames was more critical, with a notable number of negative evaluations. Criticism focused on insufficient international action, the Lula government's shortcomings in environmental governance, and contradictions between climate commitments and actual policies. Positive tones were scarce and largely centered around recognition of Brazil's renewable energy advantages and achievements in reducing deforestation.

Additionally, two noteworthy observations emerged. First, several reports ($n = 6$) adopted a multi-thematic structure, reflecting the fact that Lula's speech

addressed not only climate issues but also topics such as the Russia–Ukraine war, social inequality, and democratic values. These reports situated climate change within broader discourses of global governance and justice. Second, within the Other category of issue-specific frames, some media outlets—such as Agência Gov, Agência Brasil, and Globo—referenced minority and Indigenous communities in the Amazon region. By doing so, they linked climate discourse to environmental justice and cultural inclusivity, moving beyond conventional technocratic or diplomatic narratives.

In sum, media representations of Lula’s 2024 UNGA climate speech reflected a hybrid discursive construction that blended diplomatic Image with domestic voice. In terms of reporting strategies and tonal expression, the media simultaneously reinforced Brazil’s legitimacy as a global climate actor and highlighted the multifaceted challenges it faces in visibility, responsibility, and policy implementation on the international stage.

5.3.2 Case 2: The Forest Fires Across Brazil in September 2024

5.3.2.1 Case Background and Relevance

In September 2024, Brazil experienced large-scale forest fires across multiple ecological regions, including the Amazon, the Pantanal wetlands, and the Cerrado savanna. According to data released by Brazil’s National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE), the country recorded over 80,000 fire hotspots (focos de incêndio) during this month alone—30% above the historical average for September and more than four times the number recorded in the same month of 2023. In the Pantanal region, the burned area reached its highest level since 2020, causing significant ecological damage and widespread wildlife mortality.

The background of these fires is multifaceted, involving both natural and anthropogenic factors. As reported by experts and media, the 2023–2024 El Niño phenomenon brought high temperatures and severe drought conditions to Brazil, creating favorable circumstances for fire ignition and spread. In parallel, although

the Lula administration has reinforced environmental governance since 2023, illegal land clearing through fire—primarily to expand agricultural and livestock areas—persists. In some cases, lack of enforcement by local governments has hindered the effective implementation of federal environmental policies at the local level.

This episode is considered the most severe forest fire outbreak in Brazil since 2019, destroying over 300,000 square kilometers of land—an area equivalent to the size of Italy. Approximately 60% of the fires occurred within the Amazon region. In addition to devastating native vegetation, the fires significantly contributed to greenhouse gas emissions. Earlier in June 2024, the Pantanal also witnessed massive fires, with 440,000 hectares of land burned. Scientific studies suggest that climate change has increased the likelihood of such fires by fivefold and their severity by threefold.

Beyond the historical magnitude of the fires, Brazil also experienced other extreme weather events in the same year. In May 2024, the southern state of Rio Grande do Sul suffered from severe flooding, resulting in 183 deaths, the displacement of over 420,000 people, and estimated economic losses of R\$97 billion. The combination of extreme droughts and floods has exacerbated numerous social challenges. According to the latest report from the United Nations' World Meteorological Organization (WMO), Brazil experienced 12 extreme weather events in 2023, including heatwaves, cold fronts, torrential rains, floods, and hurricanes. Among these, 9 were classified as “unusual,” and 2 as “unprecedented.” These climate-related disasters have had serious consequences for public health, food and energy security, and economic development.

The widespread fires have displaced many Indigenous communities and smallholder farmers, depriving them of land, housing, and food sources. Dense smoke has drifted into urban areas, and media outlets have reported occurrences of “black rain.” In the Amazon, the primary motivation behind fire use is still the expansion of agricultural and grazing lands. However, the fires have also negatively affected the agricultural sector itself, with sugarcane, soybean, and beef-exporting regions suffering losses due to fire damage and disrupted transportation. The tourism sector has also been impacted. Although the government deployed 1,500

firefighters to combat the fires, poor preparedness and lack of coordination rendered containment efforts ineffective.

President Lula's administration has faced strong criticism from environmental organizations, the scientific community, and segments of the media, accusing the government of being slow to react and insufficiently prepared. As Brazil prepares to host COP30 in 2025, in the Amazonian city of Belém, the fire crisis has sparked international concern and scrutiny of the country's environmental policy. International actors such as the European Union have urged Brazil to enhance its forest protection efforts in order to maintain its credibility in global climate governance.

The 2024 forest fires in Brazil not only caused severe damage to the ecological environment but also had far-reaching social, economic, and political impacts. This event underscored Brazil's vulnerability to climate change, whose effects extend across domestic social, economic, health, political, and international dimensions. From the perspective of climate communication studies, it represents a highly emblematic climate event, providing valuable material for subsequent empirical analysis on media positioning and discursive construction.

The wildfire crisis attracted nationwide attention and quickly became a headline topic across major news outlets. Mainstream media generally focused on the fires' destruction of ecosystems and threats to biodiversity, while also reporting on the government and fire services' response measures. One prominent framing in the media discourse was the "climate emergency" (*emergência climática*), emphasizing that the fires were not isolated incidents but visible symptoms of broader systemic changes in the climate.

Although the Lula administration implemented a series of emergency measures during the month—including deploying military forces to assist in firefighting, allocating funds to support affected states, and convening interministerial meetings—criticism persisted. Detractors pointed to the delayed response, uneven distribution of resources, and lack of proactive planning and intervention prior to the outbreak. The crisis revealed Brazil's governance problem in responding to extreme climate events.

5.3.2.2 Media Coverage Overview

A total of 72 climate change-related news articles were collected for the September 2024 forest fire events in Brazil. Based on the chart data, this section analyzes the basic characteristics of these reports across media type, content source, format, and temporal distribution, in order to reveal the structural features of media coverage of this event.

Table 8 – Event 2 Analysis of media coverage of Forest Fires in 2024

Event 2 - The Forest Fires Across Brazil in September 2024							
Number	Media Type			Source		Content Format	
72	Commercial media	39	54%	Original	97%	Text only	3%
	Institutional media	15	21%	Reposted/ re-edited	3%	With images	85%
	Specialized media	7	10%			With videos	13%
	Others	11	15%				

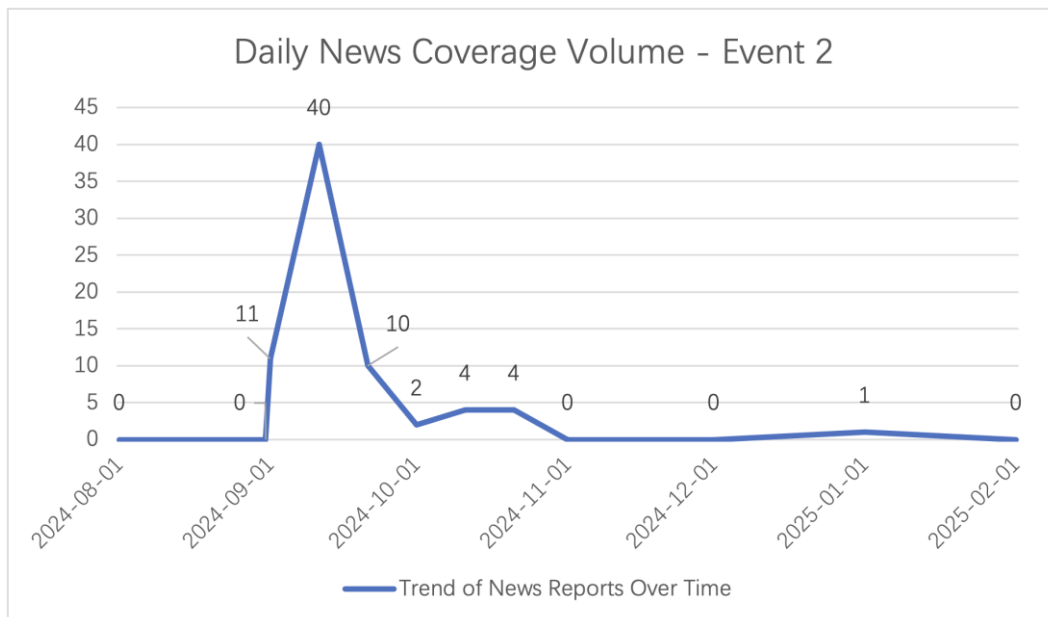
To begin with, regarding the distribution of media types (Table 8), commercial media remained dominant, accounting for 54% of the total (39 articles). This indicates that, despite the public nature of the event, mainstream commercial outlets still held a leading role in setting the agenda and controlling narrative authority. Institutional media made up 21% (15 articles), including agencies such as Agência Brasil and official governmental websites, which primarily released policy responses and official statements. Specialized media contributed 10% (7 articles), such as ((o))eco | Jornalismo Ambiental, Um só Planeta, and ClimaInfo, which focus on environmental and scientific topics still played a relatively marginal role in this case. In addition, other types of media—including blogs, international outlets, and meteorological platforms—accounted for 15% (11 articles). Overall, media coverage of this event displayed a communication structure centered on commercial media, with supporting roles played by institutional and peripheral outlets.

In terms of content sources, original reporting (Original) accounted for a striking 97%, with only 3% (2 articles) being reprints or second-hand edits. These were published by Folha de S.Paulo and CartaCapital, both republishing coverage

from Deutsche Welle (DW). This high degree of original reporting reflects the significant editorial investment newsrooms made in covering the event, and also underscores the high priority it held on the domestic media agenda.

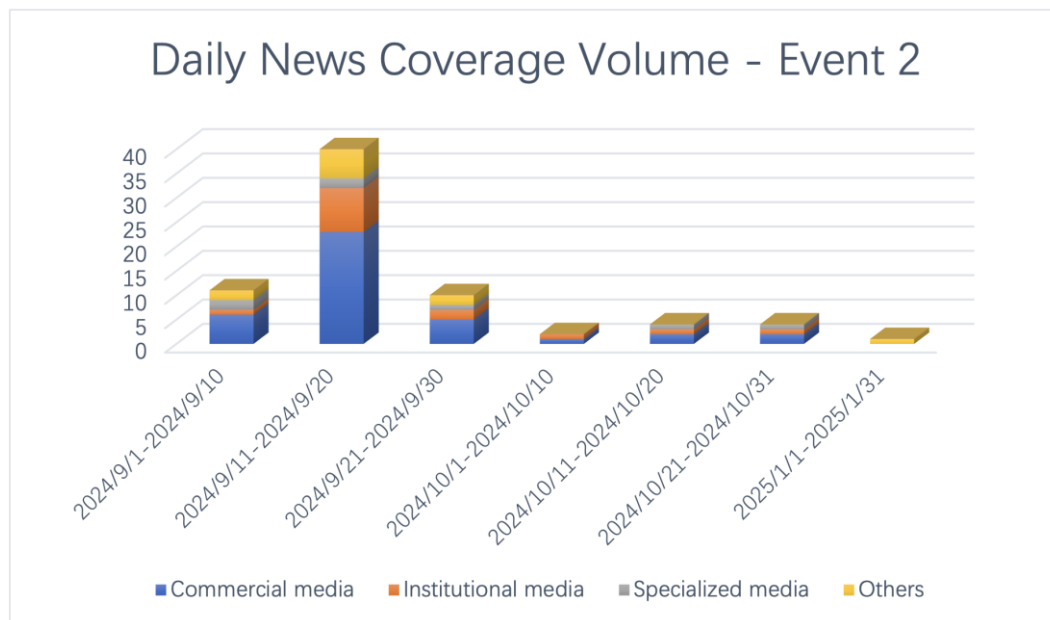
As for content format, most reports employed a combination of text and images (85%), reflecting a strong emphasis on visual impact and the intent to vividly portray the disaster scene. About 13% included video content, which enhanced the immersive and emotional power of the news, while only 3% consisted of text-only reports. This suggests that multimodal strategies have become standard in environmental disaster reporting, aimed at increasing both the visual appeal and affective resonance of coverage.

Chart 10 – Daily Volume of News Coverage on the Forest Fires (Event 2)



In terms of temporal distribution, Charts 10 and 11 reveal a clear trend of concentrated reporting. The peak period of coverage occurred between September 21 and 30, 2024, during which 40 reports were published—more than 55% of the total. Prior to that, from September 11 to 20, the fires had already begun attracting media attention, generating 11 reports. However, coverage dropped sharply entering October, with only sporadic articles (2 to 4 pieces), and by November and beyond, reporting had almost completely ceased (between 1 and 0 articles), indicating a clear “peak-to-decline” temporal rhythm of media attention.

Chart 11 – Distribution of News Reports by Media Type Over Time (Event 2)



Further examination of Chart 11 shows that during the peak coverage period, all media types were actively engaged, with commercial media dominating in terms of quantity. This indicates that commercial outlets played a central role in agenda-setting during the early stages of disaster reporting. Institutional and specialized media also participated during the peak period but in smaller numbers and with limited continuity. Notably, in January 2025, a few “Other media” sources (e.g., personal blogs) continued publishing on the fires, showing that a limited segment of the media maintained sustained interest in the issue.

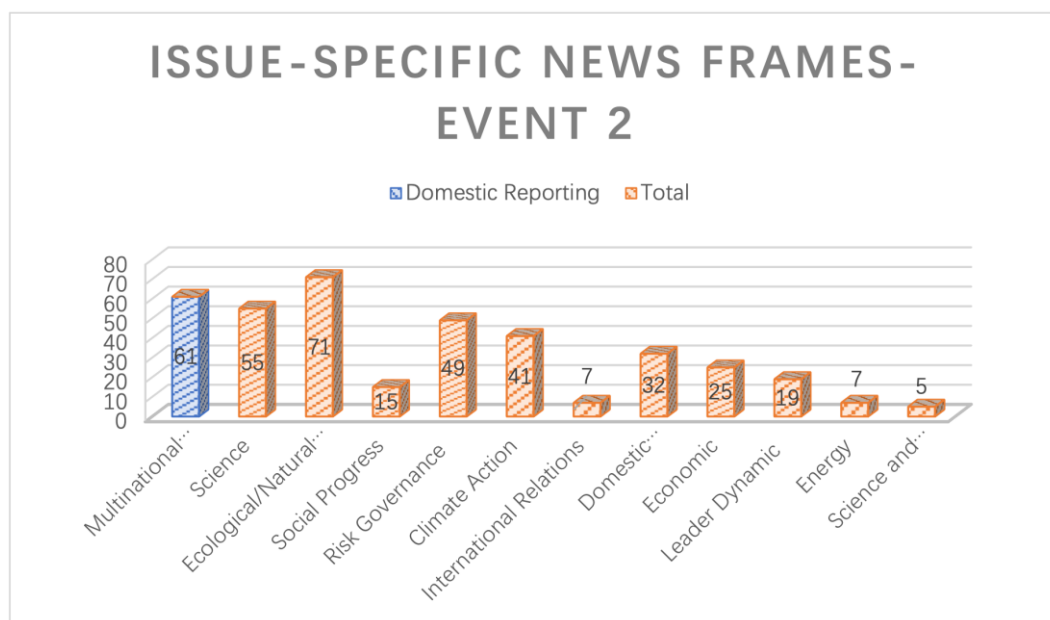
In sum, media coverage of the 2024 forest fires in Brazil was characterized by a pattern of “intensive and concentrated reporting” led by commercial media. The media responded rapidly and densely to the disaster event, displaying clear structural tendencies in their coverage.

5.3.2.3 News Framing Analysis

a. Issue-Specific Frames

Overall, media coverage of the 2024 forest fires in Brazil (Event 2) demonstrated a highly focused thematic orientation in its use of issue-specific frames. The dominant frames were Ecological/Natural Impacts, Science, Risk Governance, and Climate Action. Together, these frames constructed a multidimensional narrative logic grounded in the factual reality of natural disasters, supported by scientific data, oriented toward risk and accountability, and extended into policy response.

Chart 12 – Issue-specific News Frames (Event 2)



The Ecological/Natural Impacts and Science frames focused on biodiversity loss, ecosystem destruction, and data and warnings released by scientific institutions. Within the science frame, institutions such as INPE, Lasa/UFRJ, MapBiomias, and Cemaden were frequently cited, along with direct quotations from researchers and scientists. This emphasized the central role of scientific evidence in constructing the legitimacy and authority of media coverage. Mainstream outlets such as Estadão, BBC, Folha de S.Paulo, and Agência Brasil repeatedly cited these sources, including statements by climate scientist Carlos Nobre (Estadão), demonstrating how science shaped the discursive foundation of the news.

In the Risk Governance and Climate Action frames, different media outlets presented varied interpretations of governmental action and policy effectiveness. Platforms such as Migalhas, BBC, and Um só Planeta highlighted disaster-related

risks and threats. Their coverage included expressions such as “the air quality and river disasters may increase the number of respiratory diseases” (“a qualidade do ar e os desastres nos rios podem aumentar os casos de doenças respiratórias”), “the climate emergency has increased by 20 times the likelihood of fire conditions in western Amazonia” (“a emergência climática aumentou em 20 vezes a probabilidade das condições de incêndio no oeste da Amazônia”), and “smoke from the fires is a health hazard to humans” (“a fumaça dos incêndios é um risco à saúde humana”), underscoring the urgency of the situation.

On the climate action side, on the one hand, outlets such as Agência Brasil, Semil, and ((o))eco | Jornalismo Ambiental reported on the government's emergency response measures, emphasizing “firefighting operations” and “inter-ministerial coordination” efforts. Their coverage included images and descriptions of firefighters battling the flames, and mentioned actions such as the São Paulo state government's Operation São Paulo Without Fire (Operação São Paulo Sem Fogo) and the announcement of special loans (crédito extraordinário) for wildfire mitigation. On the other hand, other media exposed shortcomings in policy preparedness and implementation, forming a critical discourse of governmental accountability. For instance, an article from Estadão titled “Governo Lula é alertado sobre risco de seca e incêndios desde o início do ano, mostram documentos” (“Lula government warned of drought and fire risks since the beginning of the year, documents show”) pointed to government inaction and delayed response. This dual structure illustrates the dual role of the media in crisis reporting: both as conveyors of information and as actors in public oversight and discourse formation.

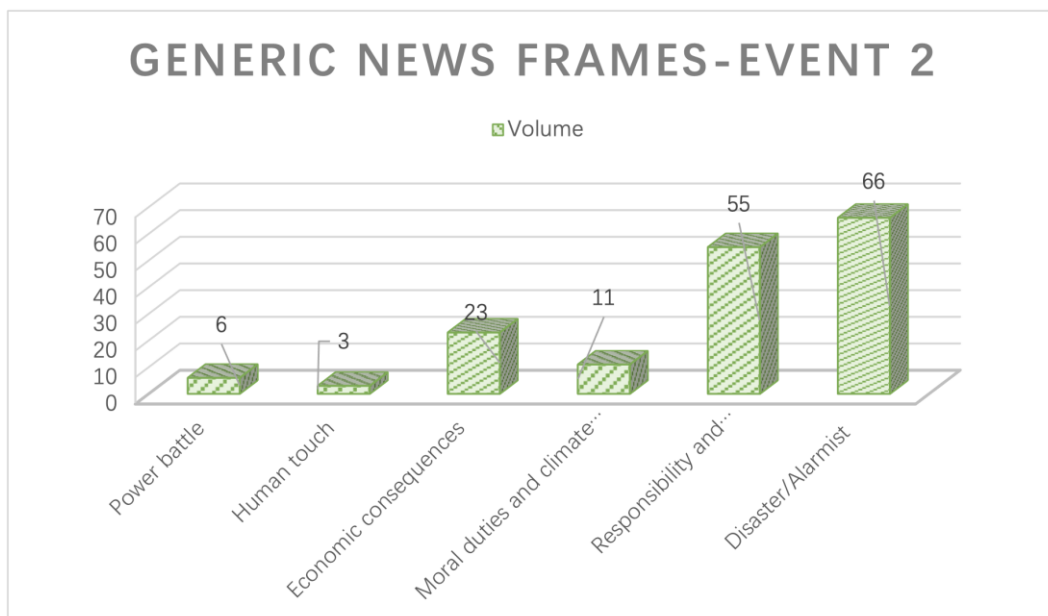
Among the second-tier frames, Domestic Politics and Regulatory Processes and Economic appeared 32 and 25 times respectively, suggesting that once the immediate impact of the fires became apparent, media attention quickly extended to institutional responses and economic costs. Some reports, such as those by Folha de S.Paulo, questioned agricultural sector compliance with environmental law and funding mechanisms. Others introduced terms like “carbon credits” (créditos de carbono – O Globo), connecting climate response to the green economy agenda. This indicates that even coverage originating from ecological events often expands into broader debates involving policy, and economics.

In contrast, frames such as International Relations, Energy, and Science and Technology and Its Application appeared infrequently—between 5 and 7 times—suggesting that media coverage prioritized socio-political concerns over technical ones, showing a clear inward-facing framing strategy. This localization is also evident in the proportion of transnational reporting: only 11 out of 72 articles (approximately 15%) qualified as transnational, most of which focused on comparing extreme weather globally or reporting fire data across Latin America. The vast majority remained centered on domestic developments and policy reactions within Brazil.

In summary, the issue-specific frames used in coverage of this event revealed a narrative chain built on “ecological disaster – scientific evidence – policy action,” while also engaging in dynamic contestation over governmental responsibility, economic implications, and public accountability. Media drew on scientific data to establish factual legitimacy and used risk and action frames to prompt societal re-evaluation of governance capacity.

b. Generic Frames

Chart 13 – Generic News Frames (Event 2)



Among the generic frames employed in this case, Disaster/Alarmist and Responsibility and Accountability were the most prominent, appearing 66 and 55 times respectively. This indicates that media coverage collectively constructed a dual narrative structure centered on urgency and accountability. The former emphasized the scale, destructiveness, and existential threat of the fires, often with urgent tone and emotional intensity. The latter focused on assigning responsibility to actors such as the federal government, state and municipal authorities, agribusiness sectors, and criminal groups. Many articles cited expert opinions or policy failure cases to interrogate the conduct or neglect of public power systems. For example, *Migalhas* stressed the shared responsibility of the federal government and subnational entities, *Globo* highlighted the culpability of arsonists in some reports, while *Estadão* criticized governmental negligence in multiple reports.

The Economic Consequences frame appeared 23 times, primarily highlighting the wildfires' impact on socioeconomic stability, agriculture and livestock sectors, exports, tourism, and infrastructure. The Moral Duties and Climate Justice frame was referenced in 11 reports, focusing on themes such as the rights of vulnerable communities and intergenerational justice, reflecting a moral dimension embedded in the broader situational construction.

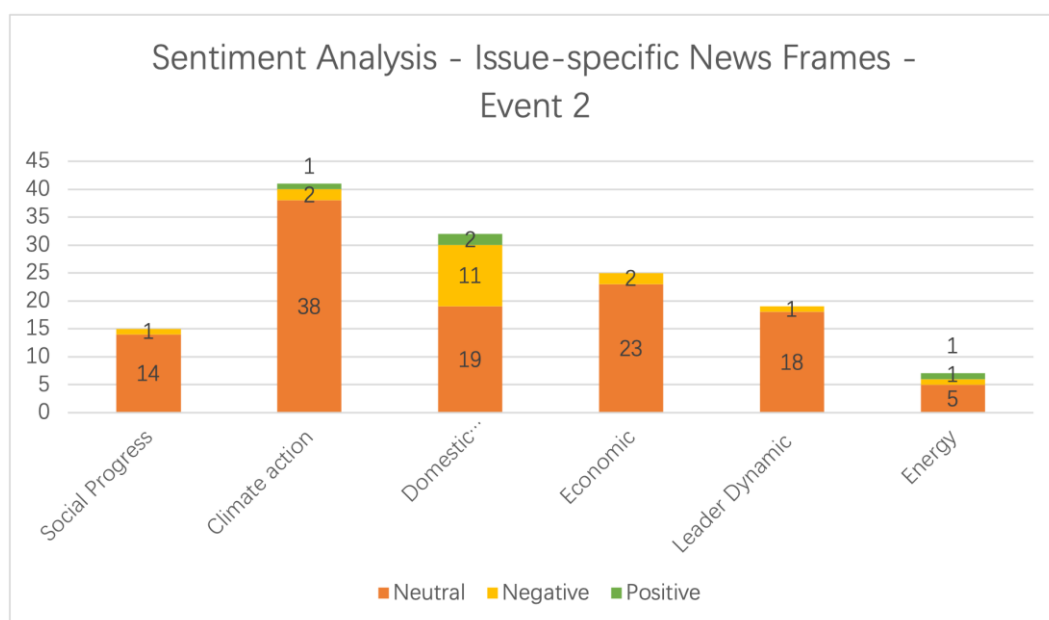
By contrast, Power Battle and Human Touch were rarely used, appearing only 6 and 3 times respectively. Despite the clear political governance dimensions of the event, mainstream media avoided constructing coverage through adversarial or personalized narratives, instead favoring structured and systemic analysis. Notably, within the Human Touch frame, only one article—from international media outlet BBC—provided a people-centered narrative by reporting from the perspective of firefighters and ordinary individuals affected by the fires.

In sum, media coverage of the 2024 forest fires in Brazil strongly favored a combination of ecological narrative and the disaster–responsibility frame structure. This framing configuration helped construct a macro-level picture of “institutional gaps in crisis” and “imbalance in natural systems.” It also reveals a tendency within Brazilian media to embed severe climate disasters into discussions of state governance and public accountability.

5.3.2.4 Sentiment and Discursive Stance

In the coverage of Event 2, compared with a neutral tone, six Issue-Specific Frames exhibited distinct emotional stances, reflecting the emotionally charged responses and value judgments provoked by the forest fires in the public discourse arena.

Chart 14 – Sentiment Analysis (Event 2)



As shown in the charts, under the Climate Action frame, 38 articles employed a neutral tone, 2 adopted a negative tone, and 1 displayed a positive tone. While the majority of the content is descriptive and paraphrastic, a few negative reports reveal strong societal criticism toward the government's delayed and underprepared response to the fires. For example, Estadão and DW cited official documents and expert statements pointing to the lack of early warning systems and inadequate resource allocation for firefighting, thereby expressing skepticism about the effectiveness of policy responses. Headlines and passages such as “...Governo focou no combate e pouco na prevenção” (“...the government focused on containment and little on prevention”) and “o país não estava preparado” (“the country was not prepared”) illustrate this. The only positive-toned article reflects institutional self-affirmation, as seen in ITAIPU Binacional’s headline: “Ações de

Itaipu reduzem risco de queimadas nas florestas” (“Itaipu’s actions reduce the risk of forest fires”).

In the Domestic Politics/Regulatory Processes frame, the proportion of negative content was the highest: 11 articles expressed negative evaluations, while only 2 presented positive perspectives. These reflect the media’s critical stance on the effectiveness of national-level governance mechanisms and legislative enforcement. Reports from outlets such as *Correio Braziliense*, *CicloVivo*, and *Nexo Jornal* included explicit criticisms, with expressions like “o Marco Temporal é uma tragédia” (“the Marco Temporal is a tragedy”), “sensação de impunidade” (“sense of impunity”), and “a legislação ainda é frouxa” (“the legislation is still weak”), highlighting the gap between policy and practice as well as the severe consequences. Conversely, the positive articles praised progress in environmental policy and law enforcement. For instance, *Correio Braziliense* acknowledged that the Lula administration “avançou em alguns pontos na pauta ambiental” (“has advanced in certain areas of the environmental agenda”), such as special loans, and *Consultor Jurídico* commended measures issued by the Poder Judiciário.

Regarding the Economic frame, 2 of the 25 articles had a negative tone. For example, *Folha de S.Paulo* openly criticized that arsonists in the Amazon “continuam sendo beneficiadas com recursos do crédito rural” (“continue to benefit from rural credit resources”), and reported the losses inflicted on economic sectors, thereby indirectly challenging the country’s broader development strategy.

Although less frequent, the Leader Dynamic and Social Progress frames also included negative evaluations. In the Leader Dynamic frame, an article from *Mar Sem Fim* criticized political leaders’ statements and the government’s delayed actions. Under the Social Progress frame, one article quoted activists criticizing the disasters caused by human activities.

Even though Energy was a secondary frame in this case, it still included both one negative and one positive-toned article. The positive article praised ITAIPU Binacional’s efforts to protect water resources; the negative article, from a personal blog, pointed to the ecological risks posed by oil exploration.

In summary, although most of the media coverage adopted a neutral tone toward the forest fire event, negative tones were particularly concentrated in the frames of domestic regulation, climate action, and economic issues—areas closely

tied to national policy effectiveness. This indicates that media coverage of natural disasters not only focuses on their environmental and social impacts but also incorporates evaluative discourse on political governance, institutional execution, and social justice.

5.3.2.5 Key Findings of This Case

An analysis of media coverage related to Event 2 — the forest fires across Brazil in September 2024 reveals several key characteristics of climate change communication in this case, particularly across dimensions such as media structure, framing preferences, tone distribution, discursive pathways, and reporting depth.

First, in terms of media structure, this event demonstrated a clear “commercial dominance – original mainstream” configuration. Commercial media outlets published over half of the total articles, asserting their dominance in the coverage. Institutional and specialized media played a more complementary role. Moreover, 97% of the reports were original content, indicating a high level of proactivity and editorial investment from media organizations in response to disaster events. Most reports adopted a multi-modal format—combining images and/or videos—enhancing the immersive and transmissive power of the disaster narratives through visual representation.

Second, regarding agenda construction, the media adopted a highly focused framing strategy. At the level of Issue-Specific Frames, coverage was predominantly built around Ecological/Natural Impacts, Science, Risk Governance, and Climate Action, forming a typical narrative chain of “natural disaster – scientific evidence – policy response.” Based on this foundation, coverage extended into domains such as Domestic Politics/Regulatory Processes and Economic issues, demonstrating the media’s capacity to couple environmental disasters with broader questions of national governance, fiscal mechanisms, and development models. Additionally, within the Other frame, we observed that Health concerns appeared in 26 articles, particularly focusing on the impact of wildfire smoke on human health, indicating that health emerged as a sustained sub-topic within the broader narrative.

Within the Generic Frames, Disaster/Alarmist and Responsibility and Accountability emerged as the most prominent frames, constructing a discursive mechanism of “accountability within the crisis field.” The frames of Economic Consequences and Moral Duties and Climate Justice were also present, particularly when referencing the carbon credit system, the livelihoods of Indigenous communities, and intergenerational injustice, revealing a moral dimension in media agenda-setting.

In the sentiment and discursive stance analysis, although most reports adopted a neutral tone, negative tones were significantly more prevalent in frames closely tied to policy performance, such as Climate Action, Domestic Regulation, and Economic issues. The media frequently criticized delays in policy implementation, deficiencies in governance capacity, and lax regulatory enforcement. This highlights how climate-related disasters are increasingly becoming key moments for public assessment of political system effectiveness. Meanwhile, positive tones were primarily found in reporting on financial policy advances and the results of environmental programs, although such instances were relatively rare.

It is worth noting that although ecological and scientific frames occupied the central position in the coverage, the sources cited were highly concentrated around official institutions, research organizations, and government experts. Only three articles included voices from environmental activists or Indigenous representatives. Across the entire sample, only two articles were written from a reporter’s personal perspective, and just one article featured a defense from the agricultural sector. This concentration of information sources indicates that mainstream media coverage was still largely grounded in institutional and expert-authority perspectives, offering limited space for grassroots voices, marginalized communities, or civil society actors.

In conclusion, the media coverage of the September 2024 forest fires in Brazil demonstrates a communication model characterized by “scientific-ecological grounding, policy-centered responses, accountability-focused criticism”.

5.3.3 Case 3: The Launch of Brazil's New National Climate Plan Plano Clima in December 2023

5.3.3.1 Case Background and Relevance

On December 20, 2023, the Brazilian federal government officially launched the new National Climate Change Plan (Plano Nacional sobre Mudança do Clima), abbreviated as Plano Clima. The plan was led by the Ministry of the Environment and Climate Change (MMA) and represents the first comprehensive revision of the original 2009 version. It marks a key initiative of the Lula administration to rebuild international credibility on climate issues and reinforce Brazil's national mitigation commitments.

The new Plano Clima is closely aligned with the global objectives of the Paris Agreement, and it integrates Brazil's Nationally Determined Contributions (NDCs) and its long-term carbon neutrality strategy. The plan sets a target of significantly reducing greenhouse gas emissions by 2035. Specifically, it commits to cutting net emissions by 59% to 67% compared to 2005 levels by 2035, which would lower total emissions to between 850 million and 1.05 billion tons of CO₂ equivalent by that year.

The plan is built on two strategic pillars: the National Mitigation Strategy, which focuses on reducing greenhouse gas (GHG) emissions as their high atmospheric concentration drives global warming; and the National Adaptation Strategy, which aims to make natural and human systems more resilient to climate change impacts, reducing the vulnerability of cities, sectors, populations, and natural environments, and ensuring national capacity to cope with extreme climate events.

In addition to these two strategies, Plano Clima includes Sectoral Plans—seven for mitigation and sixteen for adaptation. It also introduces Cross-cutting Strategies for climate action, which define implementation mechanisms such as financing, governance, and capacity building, and establish measures for a just transition.

The development of Plano Clima has been coordinated since 2023 by the Interministerial Committee on Climate Change (CIM), composed of representatives

from 23 ministries, in collaboration with the Rede Clima and the Brazilian Forum on Climate Change (FBMC) (Fórum Brasileiro de Mudança do Clima).

The planning process emphasized broad public participation. From June 5 to September 17, 2024, the plan received citizen contributions via the “Brasil Participativo” digital platform. Approximately 1,300 proposals were submitted, and the most-voted ones were selected for federal government review. In addition, eight in-person plenary sessions were held across Brazil’s biomes to discuss climate actions with society. In November 2024, the National Adaptation Strategy underwent public consultation, and other parts of the plan are expected to follow.

Scholars have analyzed Plano Clima as an instrument to foster green innovation policies, arguing that the transition to a low-carbon economy represents a strategic opportunity for Brazil (Cavalcante, 2025). Some researchers highlight that Brazil’s entrapment in the middle-income trap stems from a lack of innovation-driven, value-added production models, which hampers the country’s path toward developed-economy status (Eichengreen et al., 2013). While the plan advances the establishment of climate governance mechanisms, Brazil still faces structural barriers to climate transition, such as excessive bureaucracy, fiscal constraints, limited capacity for implementing effective public policies, and insufficient investment in research, development, and innovation—factors that may impair Brazil’s competitiveness in the international arena (Cavalcante, 2025).

As a precursor document to COP30, which will be held in Belém, Brazil in 2025, the release of Plano Clima carries not only technical policy significance but also clear diplomatic and communicative intent. It seeks to signal to the international community Brazil’s “return” from the environmental isolation experienced under the Bolsonaro administration and its renewed willingness to assume a responsible role in global climate governance. The plan provides the textual foundation for the Brazilian government to reclaim narrative leadership in shaping its national climate discourse.

5.3.3.2 Media Coverage Overview

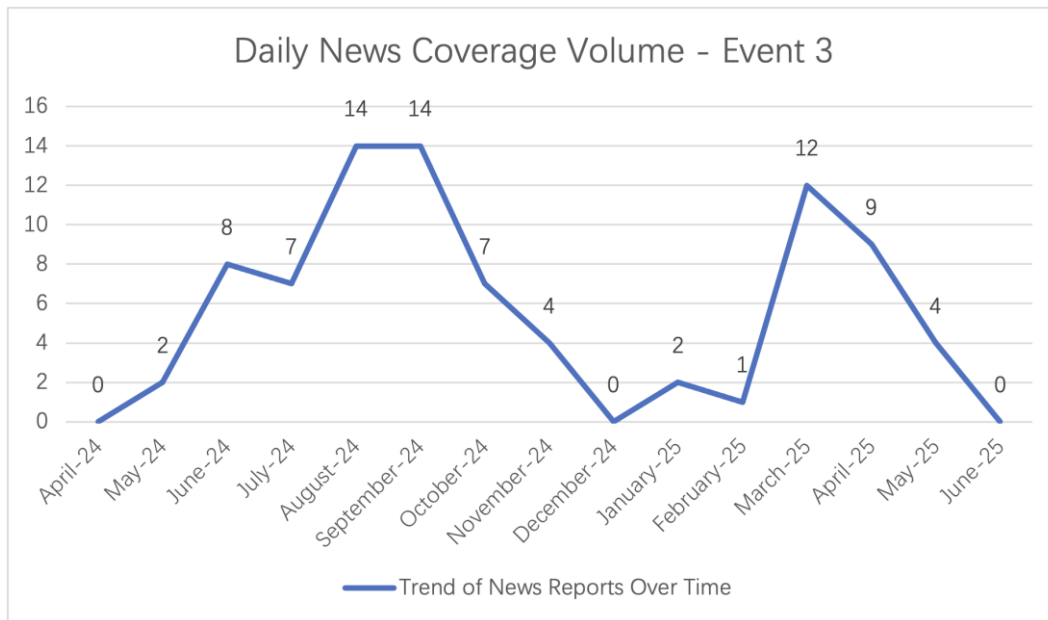
A total of 84 climate change-related news articles were analyzed regarding the release of Brazil's new National Climate Plan (Plano Clima). Based on charted data, this section examines the structural characteristics of media coverage from the perspectives of media type, content source, reporting format, and temporal distribution.

Firstly, in terms of media type distribution (Table 9), Institutional media clearly dominated the coverage, publishing 58 articles, accounting for 69% of the total. This group includes platforms such as Agência Brasil, Semil, and Greenpeace, which are primarily responsible for issuing official statements and policy responses. Commercial media represented 29% of the coverage (24 articles), while Specialized media accounted for 2% (2 articles), including outlets focused on environmental and scientific topics such as ((o))eco | Jornalismo Ambiental and ClimaInfo. Notably, there was no participation from "Other" media in this case.

Table 9 – Event 3 Analysis of Media Coverage of the Climate Plan

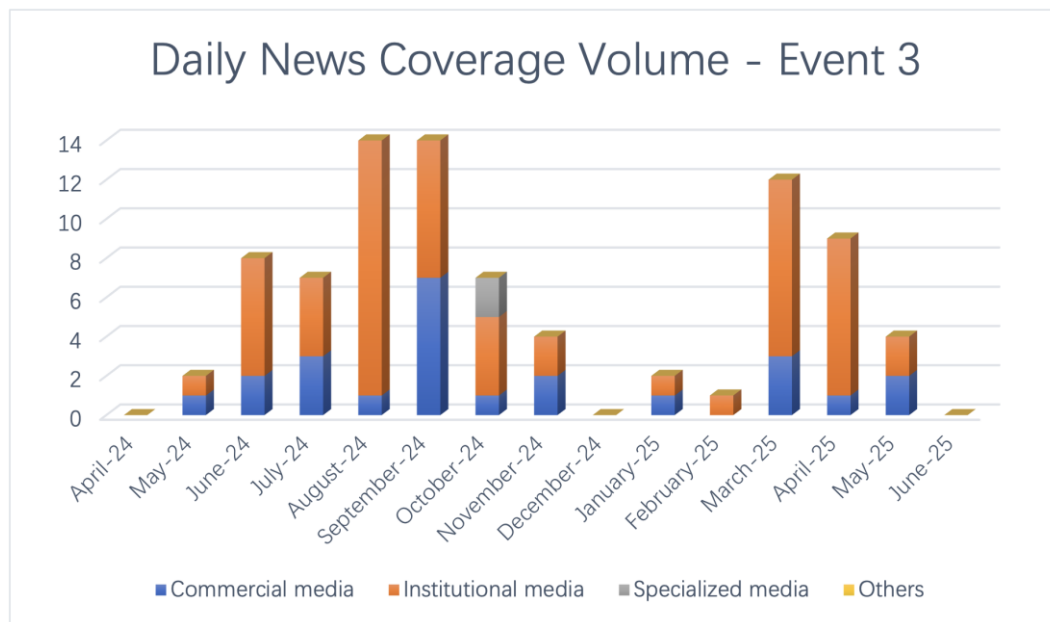
Event 3 - The Launch of Brazil's Climate Plan in December 2023							
Number	Media Type			Source		Content Format	
84	Commercial media	24	29%	Original	99%	Text only	0%
	Institutional media	58	69%	Reposted/ re-edited	1%	With images	94%
	Specialized media	2	2%			With videos	6%
	Others	0	0%				

Chart 15 – Daily Volume of News Coverage on the Climate Plan (Event 3)



Regarding reporting trends, the release of the new Plano Clima attracted sustained attention from the press. As shown in Chart 15, media interest gradually increased starting in June 2024, with initial peaks in August and September (14 articles each). The number of reports gradually declined thereafter, reaching a low point between December 2024 and February 2025. A second spike emerged between March and May 2025, with a secondary peak in March (12 articles). This fluctuation closely correlates with the government’s staged launch of public consultations (*consulta pública*) for different sectors. Overall, the coverage followed a “double-peaked” temporal distribution, indicating that Plano Clima possesses both short-term topicality and longer-term communicative relevance.

Chart 16 – Distribution of News Reports by Media Type Over Time (Event 3)



From the perspective of media type participation over time (Chart 16), Institutional media maintained a consistent leadership role in coverage, serving as the backbone of Plano Clima dissemination, especially during peak periods in August, October, and the secondary peaks in March and April. This reflects institutional media's sustained interest in environmental governance topics and their strong agenda-setting capacity. Commercial media also played an important role, contributing significantly to the coverage in June, July, and September. In contrast, Specialized media had minimal visibility overall, with activity recorded only in October, which was not sufficient to exert major influence in the communication landscape.

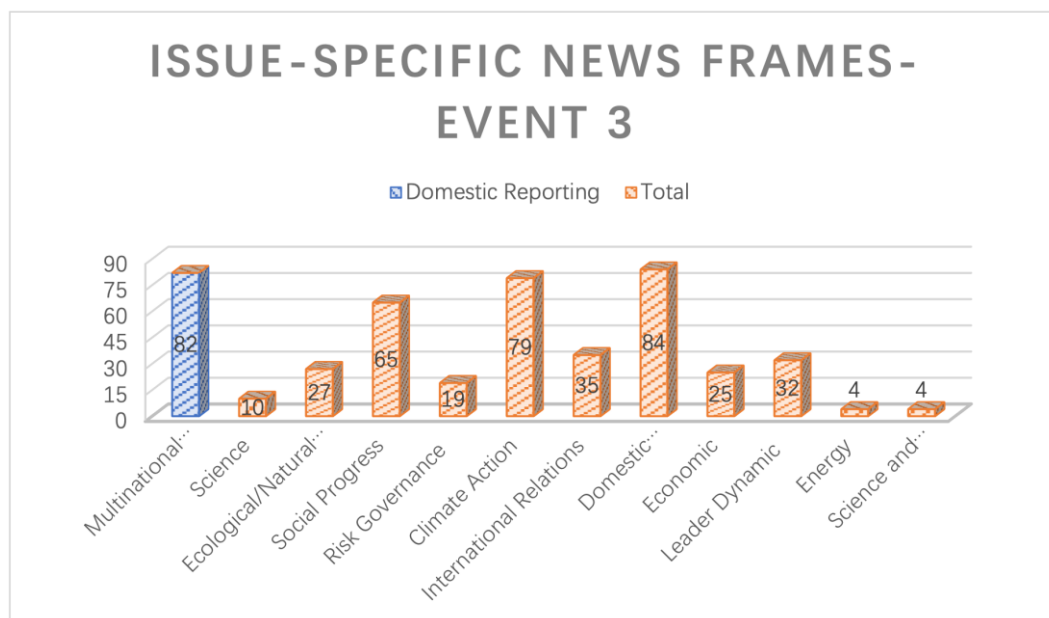
In summary, Plano Clima, as a national-level climate policy document, experienced a typical media dissemination cycle, beginning with policy-driven news generation, transitioning into agenda-building, and later experiencing a topical resurgence. The rhythm of media coverage was strongly shaped by government-led policy actions, revealing the structural responsiveness of the Brazilian media system to climate-related topics.

5.3.3.3 News Framing Analysis

a. Issue-Specific Frames

As shown in the chart 17, in the case of the December 2023 release of the Plano Clima, Brazilian media displayed a highly concentrated topic distribution, primarily structured around three dominant frames: Domestic Politics/Regulatory Processes, Climate Action, and Social Progress. Among them, the frame of Domestic Politics/Regulatory Processes appeared most frequently, with 84 instances, closely followed by Climate Action with 79 instances. This structure indicates that the Plano Clima was mainly framed as a significant institutional reform of national climate governance, while also being portrayed as a key policy document through which the Brazilian government seeks to enhance its internal governance capabilities in response to climate challenges.

Chart 17 – Issue-specific News Frames (Event 3)



In terms of specific content, media widely emphasized the participatory mechanisms and institutional design of the plan. For example, Brasil de Fato published an article titled "Governo federal cria plataforma para participação social no enfrentamento à emergência climática" ("The federal government creates a

platform for social participation in addressing the climate emergency”), highlighting that the plan incorporated extensive public input via the “Brasil Participativo” platform, thereby reinforcing the democratic legitimacy of climate governance. Agência Brasil also paid close attention to the policy formulation process, continuously reporting on developments such as “Plano Clima: consulta para adaptação de setores econômicos está aberta” (“Plano Clima: consultation for the adaptation of economic sectors is open”), further demonstrating that the event was regarded by the media as an institutional and systemic governance attempt.

The Social Progress frame (65 instances) emphasized the practical pathway of collaboration between government and the public in addressing climate challenges. Reports focused on civic engagement, representation of vulnerable groups, and local actions in the Amazon region. For instance, Portal Agro2 reported on climate training activities organized by the federal government; ND Mais and FecomercioSP noted the participation of various social actors in policymaking; Tapajós de Fato highlighted mobilization practices within Amazonian communities. These reports constructed an image of whole-of-society cooperation in climate governance, granting the policy broader social grounding.

International Relations (35 instances) and Leader Dynamic (32 instances) exhibited a clear diplomatic narrative. CNN referenced Vice President Geraldo Alckmin’s announcement of Brazil’s new NDC targets. Agência Gov and Agência Brasil repeatedly aligned Plano Clima with the Paris Agreement and the United Nations Framework Convention on Climate Change, stressing Brazil’s compliance with international mitigation commitments. Such reports also used symbolic acts of political leaders in public ceremonies to reinforce the nation’s position in climate politics. For example, piaui government and Brasil de Fato highlighted Environment Minister Marina Silva’s participation in the launch event, emphasizing both symbolic leadership and the connection between citizens and national policies.

Ecological/Natural Impacts (27 instances), Economic (25 instances), and Risk Governance (19 instances) were less frequently used but still representatively covered. Valor Econômico’s article titled “Mudança do clima e desenvolvimento socioeconômico. Dois lados de um mesmo Plano” (“Climate change and socioeconomic development: Two sides of the same Plan”) explored the relation

between green investment and development strategy. The official government website (Gov) connected “ecological transition” with “climate investment,” suggesting that Plano Clima not only responds to environmental pressures but also seeks institutional pathways for national economic transformation. Regarding ecological impacts, Brasil de Fato’s article “O Brasil e o mundo em chamas e sob fumaça tóxica” (“Brazil and the world in flames and under toxic smoke”), as well as Portal Agro2 and Agência Brasil, pointed to the urgency of extreme heat events, indirectly reinforcing the relevance of risk response under the governance framework.

Science (10 instances), Energy (4 instances), and Science and Technology and Its Application (4 instances) were among the least used frames but still reflected an embedded logic of knowledge authority. Media such as Agência Pública and FecomercioSP cited data and research from IPCC, UNEP, AdaptaBrasil, and the Coordenação-Geral de Ciência do Clima, emphasizing the scientific basis and policy logic behind the formulation of Plano Clima.

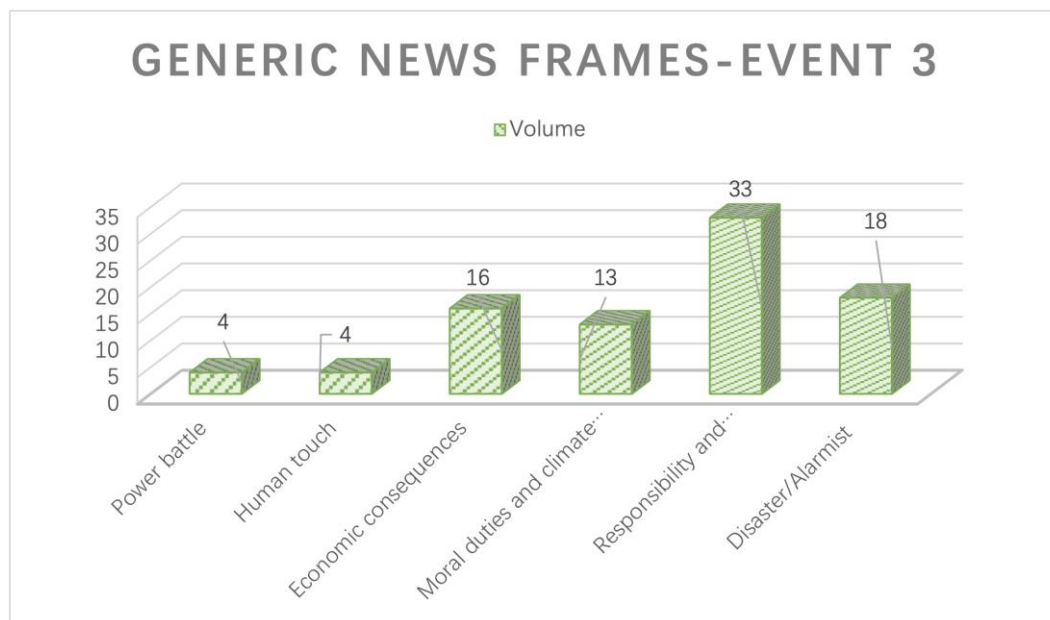
In terms of geographic attribution, Domestic Reporting overwhelmingly dominated, with 82 reports (98%). Only 2 were Transnational Reporting. For example, Valor Econômico referenced the U.S. elections in the context of climate policy, and the Senado website cited foreign experiences in a report on sustainable urban development. This indicates that, although Plano Clima has explicit international policy orientations, media narratives tend to prioritize national governance, legal implementation, and social mobilization within a domestic political logic.

In sum, Plano Clima, as a key national-level climate policy document, was framed with a strong emphasis on domestic institutional mechanisms and social mobilization. While international narratives are present, they are secondary to themes of institutional execution and civic participation. Media coverage predominantly reconstructed the plan around its mechanisms, public relevance, and legitimacy, emphasizing the state's responsibility and governance efficiency in the climate change response.

b. Generic Frames

As illustrated, Generic Frames in the coverage of this event show a clearly structured distribution, with the Responsibility and Accountability frame (33 instances) standing out as the dominant theme. This frame was widely used to delineate the duties of government, corporations, and the public in addressing climate change. For example, Agência Brasil reported on supporting measures related to climate policy and legislative reform; Brasil de Fato noted that “Somente oito estados brasileiros têm plano de adaptação às mudanças climáticas, aponta estudo” (“Only eight Brazilian states have adaptation plans for climate change, according to a study”), thereby highlighting institutional responsibility distribution.

Chart 18 – Generic News Frames (Event 3)



The Disaster/Alarmist frame (18 instances) was commonly used to describe extreme phenomena resulting from climate change, such as heatwaves, droughts, or air pollution. For example, Portal Agro2 and Agência Brasil used terms like “temperaturas extremamente altas” (“extremely high temperatures”) to reinforce the urgency of policy responses and raise awareness of a national governance crisis.

The Economic Consequences (16 instances) and Moral Duties and Climate Justice (13 instances) frames also appeared prominently, demonstrating a dual concern with policy outcomes and ethical grounding. Valor Econômico and the Gov

website emphasized the pivotal role of green finance and sustainable development investment. Tapajós de Fato revealed the voices of Amazonian Indigenous groups criticizing the lack of policy implementation in their region, while the Gov website reflected climate actions by the Ministry of Women and the Ministry of Indigenous Lands to promote a just transition.

Power Battle (4 instances) and Human Touch (4 instances) frames appeared less frequently but still included some representative examples. For instance, CNN reported a voice for expanding the plan's coverage of high-emission sectors and noted internal coordination challenges within the government—an archetypal “power conflict” narrative. *Gazeta do Povo* published a critical piece titled “Plano Clima: Brasil corre risco de assumir compromissos inalcançáveis” (“Climate Plan: Brazil risks making unachievable commitments”), questioning the plan's feasibility. Under the Human Touch frame, Greenpeace, *Brasil de Fato*, and AMA-AL appealed to public engagement through personalized narrative, while Agência Brasil cited individual stories and public opinions from consultations, adding interactivity and public resonance to the coverage.

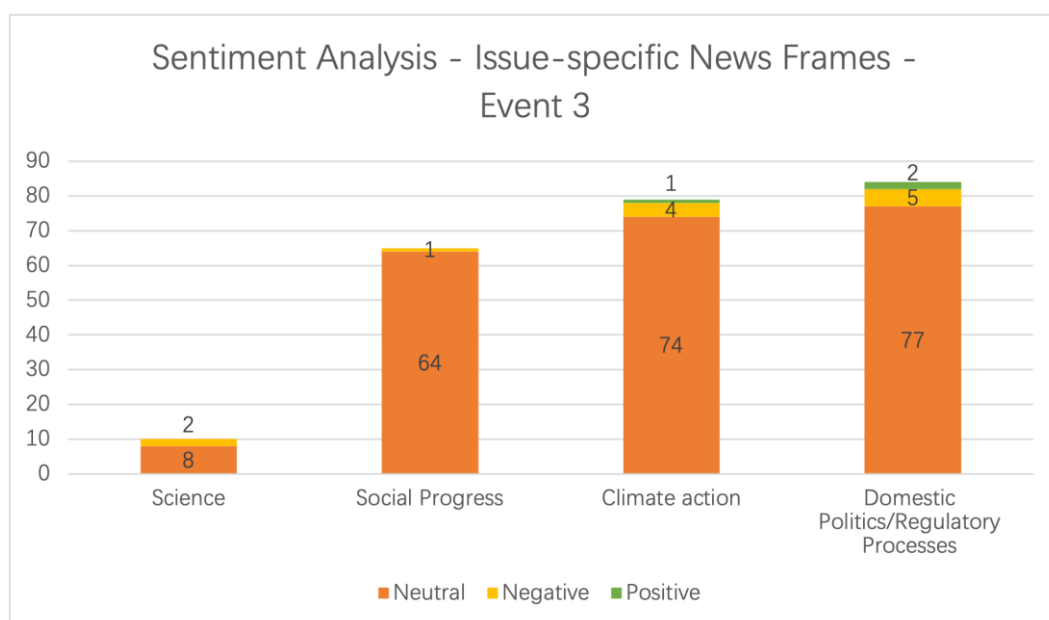
Overall, the use of Generic Frames further reinforced the institutional positioning of Plano Clima. Media constructed the legitimacy and justification of the policy through a triadic structure of “Responsibility – Crisis – Economy,” while also attributing deeper social meaning via moral and justice-related lenses. This framing configuration not only underscored the necessity of government action but also enhanced public receptivity to the policy's content.

5.3.3.4 Sentiment and Discursive Stance

Regarding the tone distribution of media reports in Case 3 (the launch of the Plano Clima), the analysis presented in Chart 19 shows how sentiment appeared within the 4 Issue-Specific Frames: Science, Social Progress, Climate Action, and Domestic Politics/Regulatory Processes. This section does not concentrate on the number of neutral-tone reports (despite their overwhelming majority), but instead emphasizes the identification and analysis of positive and negative tones in order

to reveal how the media evaluated policy positions, governmental actions, and societal participation in the coverage of this event.

Chart 19 – Sentiment Analysis (Event 3)



From an overall perspective, negative tone appeared across several key frames, though its total number remained limited. Within the Domestic Politics/Regulatory Processes frame, 5 instances of negative tone were identified; 4 were found in the Climate Action frame, 2 in Science, and 1 in Social Progress. These negative tones mainly reflected criticisms of policy vagueness, weak implementation capacity, or the performative nature of participatory mechanisms. These critiques were primarily present in Commercial media. For example, *Gazeta do Povo* and *Agência Pública* highlighted issues regarding policy execution, with headlines such as “Você sabia ... que nunca foi aplicado pelo governo?” (“Did you know ... that it has never been implemented by the government?”), “A falta de uma participação real” (“The lack of real participation”), and “...Brasil anuncia nova meta climática, mas não diz como vai alcançá-la” (“...Brazil announces new climate target but does not explain how it will be achieved”). Similarly, *CNN Brasil* and *Terra* pointed out flaws and weaknesses in the plan and its mechanisms, with references such as “Brazil’s commitment to stabilizing global warming does not match”.

It is also noteworthy that a negative tone appeared for the first time in the Science frame. Reports from *Gazeta do Povo* and *Terra* mentioned criticisms from the agricultural sector, which pointed out that climate models developed by domestic Brazilian institutions did not align with IPCC standards, making it more difficult for the country to achieve its emissions reduction targets.

By contrast, positive tone appeared only in a few reports, within just two of the dominant frames. In the Domestic Politics/Regulatory Processes frame, 2 instances were found, while the Climate Action frame contained 1 instance. These came exclusively from the official government website (Gov), and emphasized the government's active measures, and the effectiveness of new policies. For example, reports described low-carbon solutions introduced by the government as potentially becoming a “polo de referência global” (“global reference hub”), and celebrated the decline in deforestation rates.

It is important to emphasize that neutral tone was the overwhelmingly dominant sentiment throughout this case's media coverage. For instance, within the Domestic Politics/Regulatory Processes frame, 77 reports were neutral in tone; for Climate Action, the number was 74; and for Social Progress, 64. This reveals that the media largely adopted a descriptive or procedural narrative style, avoiding overt value judgments in most reports. Such a tonal strategy may reflect an intent to maintain informational objectivity and institutional credibility when covering state-led climate initiatives.

In conclusion, although neutral tone predominated in the media coverage of the Plano Clima, the presence of negative tone served a critical accountability function, primarily raised by commercial outlets. Meanwhile, the few positive-toned reports presented affirmative expectations for government action by highlighting innovative governance mechanisms and policy responsibility. Together, these tonal orientations helped shape a discursive space that simultaneously expressed state-driven climate ambitions and institutional performance concerns. This sentiment configuration also illustrates how Brazilian media navigate the complex dynamic between policy communication efficacy and public feedback in national climate narratives.

5.3.3.5 Key Findings of This Case

Based on the quantitative analysis of media coverage related to Case 3—the Brazilian government’s launch of the Plano Clima in December 2023—this case demonstrates a prototypical example of state-led climate narrative construction in the media.

First, in terms of reporting structure, this case includes a total of 84 climate-related reports, presenting a three-stage communication rhythm of institutional initiation, then public participation, and media feedback. The media agenda was highly synchronized with the timeline of governmental policy actions. Regarding media type, institutional media dominated with 69% of the reports, indicating the central role of official communication platforms in disseminating policy information and guiding the issue agenda. Commercial media played a complementary role, particularly in providing oversight and responding to public concerns. In terms of temporal distribution, media attention followed a dual-peak pattern, with reporting surges aligning with different stages of public consultation. This indicates that Plano Clima was not treated as a one-time event, but rather as a long-term topic embedded in Brazil’s climate governance process.

Under the Issue-Specific Frames, media discourse was highly focused on Domestic Politics/Regulatory Processes (84 instances), Climate Action (79), and Social Progress (65), forming the thematic core of state governance, policy implementation, and social mobilization. This framing structure clearly reveals that Plano Clima, as an instrument of national climate governance, was narrated by the media as a manifestation of institutional restructuring, rather than merely an environmental policy. Reports widely referenced participatory mechanisms, deliberative democratic procedures, and regional mobilization efforts, reflecting the policy’s symbolic significance in governance. In addition, secondary frames such as International Relations, Leader Dynamic, Ecological/Natural Impacts, Economic, and Risk Governance were also present, enriching the interpretive layers of the policy text. Notably, four reports mentioned Health in relation to extreme heat and public health concerns. Although relatively few, this indicates that the media has begun to integrate health risk assessments into the social impact dimension of climate policy.

Within the Generic Frames, coverage was concentrated around Responsibility and Accountability (33 instances), Disaster/Alarmist (18), Economic Consequences (16), and Moral Duties and Climate Justice (13), constructing a narrative space interwoven with accountability, risk, interests, and justice. It is worth noting that 23 articles published by government institutions served primarily an informative and administrative function, lacking explicit issue framing and thus were not categorized under any Generic Frame. These reports usually described meetings, consultation arrangements, or program launches, embodying a transmissive communication style rather than a journalistic narrative one.

From the perspective of sentiment analysis, neutral tone overwhelmingly dominated the four major frames (e.g., 77 out of 84 instances in Domestic Politics/Regulatory Processes), indicating that Brazilian media generally adopted a procedural-descriptive style when covering state-led climate policies. However, in the 12 reports with negative tone, commercial outlets such as CNN Brasil, Gazeta do Povo, and Agência Pública focused on issues like policy ambiguity, weak implementation capacity, and formalized participation mechanisms, questioning the actual effectiveness of the climate plan. In contrast, positive tone appeared primarily in reports from government platforms, which emphasized the strengths of institutional design and the effectiveness of state action.

In summary, Plano Clima was not only a critical national climate policy document but also a discursive platform in the media space. Its media construction highlighted three intersecting goals: institutional transformation, broad social engagement, and climate action. The resulting narrative structure reveals a distinct institutional orientation in Brazilian media coverage.

5.3.4 Case 4: China's Release of the Green Book on Climate Change (2024)

5.3.4.1 Case Background and Relevance

In December 2024, the Green Book on Climate Change (2024) (中国气候变化绿皮书 (2024)) was jointly released by the Joint Simulation Laboratory of the

Chinese Academy of Social Sciences and the China Meteorological Administration, in collaboration with the Social Sciences Academic Press. Every year, the China Meteorological Administration publishes both a Green Book and a Blue Book. In contrast to the Blue Book on Climate Change, which emphasizes scientific monitoring, the Green Book functions as a policy research-oriented report, focusing on systematic evaluations of China's climate governance and strategic policy pathways. Since its inception in 2008, the series has been published annually, centering on the implementation of China's Nationally Determined Contributions (NDCs), the progress of carbon peaking and neutrality strategies, local government climate actions, and evolving dynamics of international climate negotiations. It plays a significant role in guiding policy and shaping public discourse. The series emerged in response to the rising pressure on China to address climate change in the late 2000s, highlighting the need for scientific data transparency and global accountability within its policy framework.

The 2024 edition contains critical chapters such as the general report, new understandings in climate science, international climate processes, domestic policies and actions, sectoral transformation, and urban evaluations. It stresses the increasing severity of climate change and calls for strengthened international cooperation in green and low-carbon development. The report emphasizes that China will continue to deepen reforms in its ecological civilization framework, improve mechanisms for green development, and accelerate a comprehensive green transformation of its economic and social systems.

The 2024 Green Book reflects multiple dimensions of China's climate policy implementation during the 14th Five-Year Plan period. It particularly highlights the advancement of China's policy system for achieving carbon peaking, along with experiences from local "dual-carbon" pilot cities. The report also analyzes the shifting landscape of global climate governance and calls for enhanced cooperation among Global South countries. It includes illustrative local policy cases and explores mechanisms for energy restructuring and green finance, providing references for other regions across the country.

The Green Book complements the Annual Report on China's Policies and Actions for Addressing Climate Change published by the Ministry of Ecology and Environment. While the latter emphasizes annual data and compliance reporting,

the Green Book is more strategic and forward-looking, offering interpretive analysis. Together, they form the core of China's climate governance discourse. In contrast to the more technical presentation style of the Blue Book, the Green Book adopts a communication-oriented language better suited for dissemination among policymakers, researchers, and the media.

However, some limitations deserve critical attention. Although the Green Book was reported by major mainstream outlets such as Xinhua News Agency and China Environment News, the full text has not been made publicly available online. Currently, it is accessible only through commercial bookstores, and no open-access version exists. This closed-release model implies that the report primarily serves the policy and expert communities, with limited avenues for public access and participation. The lack of transparency for such an important policy document may undermine its public communication function and reduce policy transparency, thereby weakening the public support base for climate governance. The non-disclosure of the 2024 Green Book should not be viewed as merely a technical oversight, but rather as an indication of its intended positioning as a strategic communication tool for policy elites, rather than as a public-facing educational text. This reflects a broader "inward governance logic" in China's current climate change communication efforts—prioritizing the construction of consensus networks among government and academic actors, while remaining relatively conservative in activating or responding to public discourse.

Nonetheless, the China Climate Change Green Book reflects broader trends in the governance and communication of climate change within Chinese society. It also demonstrates the government's proactive stance in enhancing policy transparency and strategic foresight. Its discursive construction and content selection offer important contextual background for this dissertation's analysis of how China constructs climate discourse and develops its media dissemination pathways. At the same time, the limitations exposed in its dissemination channels and accessibility serve as a valuable lens through which scholars can observe the tensions between policy discourse construction and public participation in China.

5.3.4.2 Media Coverage Overview

A total of 17 media reports were collected and analyzed in relation to China's release of the Green Book on Climate Change in December 2024. Although the total number of reports is relatively limited, an examination across multiple dimensions—including media type, source attribution, content format, and temporal distribution—reveals several structural characteristics and communication patterns within the Chinese media landscape surrounding this event.

Table 10 – Event 4 Analysis of Media Coverage of the Green Book

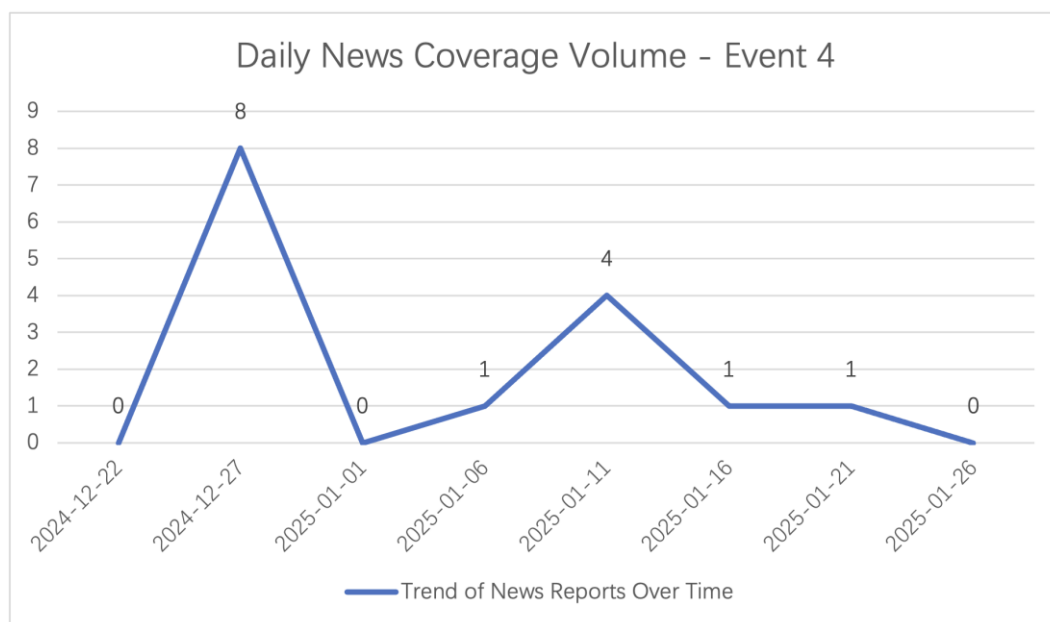
Event 4 - China Releases the Green Book on Climate Change (2024)							
Number	Media Type			Source		Content Format	
17	Party-run media	6	35%	Original	76%	Text only	47%
	Mass media	8	47%	Reposted/ re-edited	24%	With images	47%
	Institutional media	3	18%			With videos	6%
	Others	0	0%				

First, regarding the distribution of media types (see Table 10), Mass media held a relatively dominant position, publishing 8 reports (47% of the total). Party-run media followed with 6 reports (35%), while Institutional media contributed 3 reports (18%). No reports from Other media were identified. This distribution indicates that while party-affiliated media remained highly engaged, mass media outlets were more actively involved in disseminating information about this policy event.

In terms of report source attribution, 76% of the reports were classified as Original, while 24% were reposted/re-edited. Among the reposted articles, four came from two mass media outlets, one party-run media, and one institutional media. The original sources of these reposts included two institutional media, one party-run media, and one mass media outlet. Although these reports were reposted, they were subject to editorial revision and thus were included in this study's analysis. This type of editorialized redistribution reflects a dynamic interaction between information originators and disseminators, as well as a mechanism of secondary construction in the communication of policy-oriented texts.

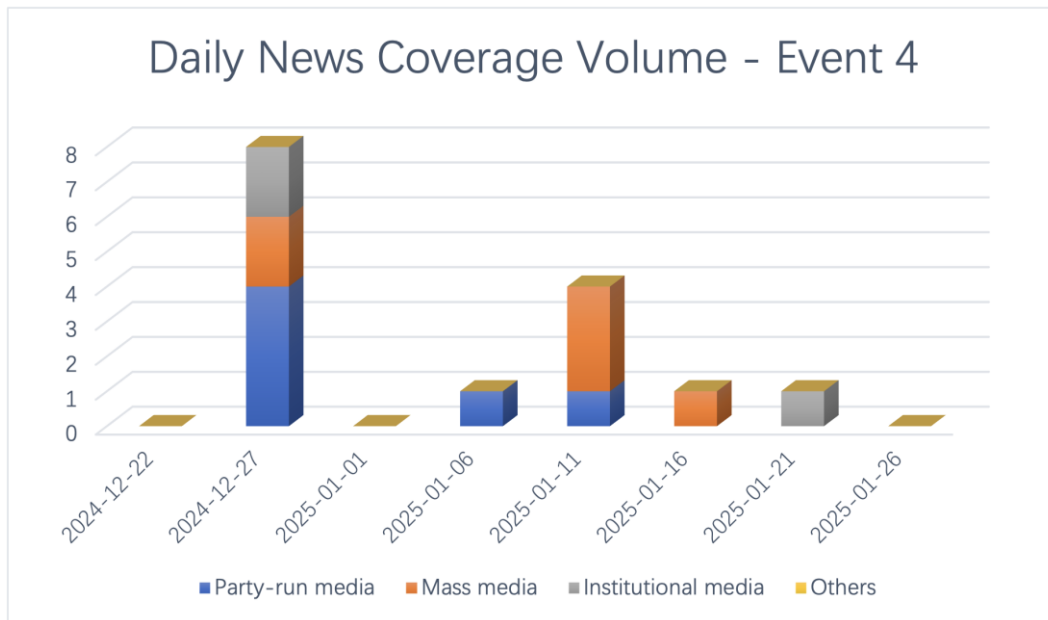
Regarding content format, 47% of the reports were text only, another 47% featured text with images, and only 6% were video-based. This result indicates that coverage of the Green Book was predominantly conveyed through traditional text-based formats. While image-supported storytelling was relatively common, the use of video content remained extremely limited, reflecting the continued dominance of information-dense textual communication in the dissemination of policy-related topics.

Chart 20 – Daily Volume of News Coverage on the Green Book (Event 4)



From a temporal perspective (see Chart 20), the distribution of reports followed a distinct pattern of “initial release peak – rapid decline – minor rebound – stable tail.” The highest peak occurred on December 27, 2024, with eight reports published on the day of the book’s official release. This was followed by a swift decrease in coverage, with a secondary peak (four reports) appearing on January 11, 2025, before entering a stage of scattered reporting. The entire communication cycle lasted approximately one month, concentrated around the release of the policy document and subsequent reactions or commentary. This exhibits a typical “windowed reporting” pattern in Chinese policy communication, wherein most media attention is concentrated within a short time frame following the official publication.

Chart 21 – Distribution of News Reports by Media Type Over Time (Event 4)



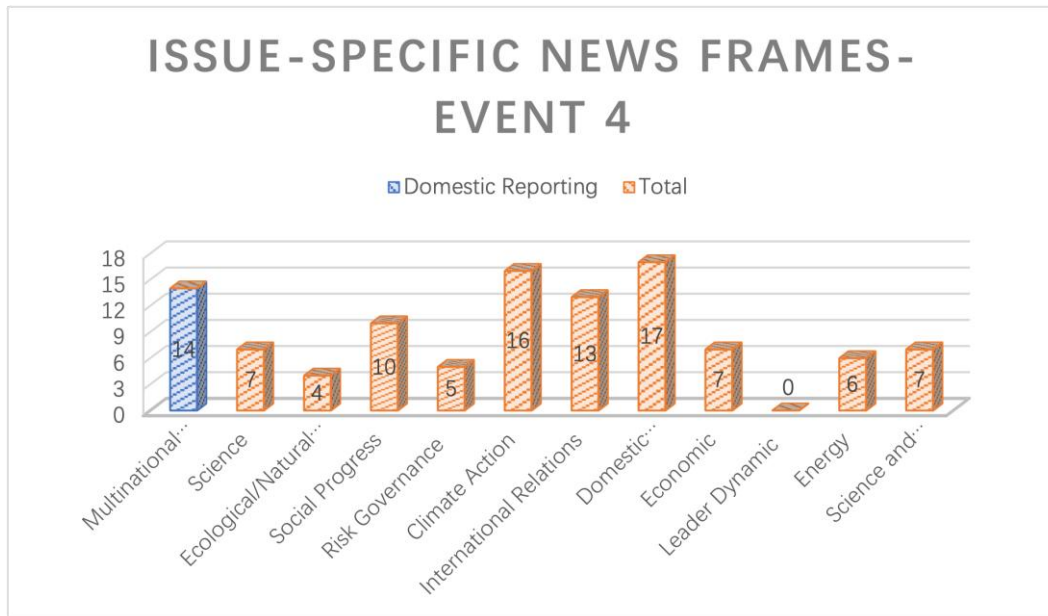
Further analysis of the cross-distribution between reporting volume and media types (see Chart 21) shows that Party-run media, Mass media, and Institutional media jointly comprised the primary reporting entities during the initial peak on December 27, 2024, publishing four, two, and two reports respectively. At the secondary peak on January 11, 2025, mass media again demonstrated high activity, indicating their supplementary role in interpreting policy and reshaping the media agenda. Meanwhile, institutional and party-run media maintained low-frequency involvement in the post-peak period.

In summary, the media coverage of the Green Book on Climate Change (2024) in China exhibited a “policy-driven, concentrated release, rapid decline” communication pattern. In terms of media types, the proactive involvement of mass media, alongside the coordinated engagement of party-run and institutional media, formed the backbone of this event’s coverage. With regard to information sources, original reporting dominated, while edited reposts played a secondary role in facilitating reinterpretation and content integration. In terms of content format, text-based communication remained central, with video content underutilized. This reflects the continued reliance on text-based dissemination pathways for climate communication in contemporary Chinese media.

5.3.4.3 News Framing Analysis

a. Issue-Specific Frames

Chart 22 – Issue-specific News Frames (Event 4)



In the media coverage of China's release of the Green Book on Climate Change in 2024, a relatively diverse set of Issue-Specific Frames was observed. Overall, the coverage displayed characteristics of a policy-action orientation and a national strategy axis. According to the data (Chart 22), media reports were highly concentrated around four primary frames: Domestic Politics/Regulatory Processes (17 mentions), Climate Action (16 mentions), International Relations (13 mentions), and Social Progress (10 mentions), forming the core narrative network of this event.

Under the Domestic Politics/Regulatory Processes frame, mainstream media highlighted government strategies and implementation paths in the context of the national dual carbon goals (carbon peak and carbon neutrality), emphasizing policy rollout, regulatory advancement, and institutional outcomes. Media outlets such as People's Daily Online, Xinhua News, and Sohu.com underscored the urgency of the "dual carbon" policies by focusing on the act of releasing the Green Book itself, thereby reinforcing the document's policy legitimacy and significance. For instance, the China Meteorological Administration noted that to "cultivate new quality productive forces driven by the dual carbon targets" ("以'双碳'目标为驱动，培

育发展新质生产力”), repeatedly emphasizing the Green Book's guiding and referential policy functions.

The Climate Action frame was marked by action-oriented language emphasizing China's tangible efforts and achievements in emission reduction and green transition. For example, Beijing News stated that “remarkable results have been achieved that have attracted global attention, with the ‘dual carbon’ initiative as an important lever” (“以‘双碳’工作为重要抓手, 取得了全球瞩目的积极成效”), followed by detailed descriptions of adjustments to the energy structure and emission reduction efforts, thus reinforcing a causal relationship between policy action and visible outcomes.

The International Relations frame extended the narrative into the global climate governance arena. For example, China Environment News linked the Green Book to China's commitments under the Paris Agreement, while mass media outlets like Tanjiaoyi(碳易家) cited phrases such as “deepening international cooperation” and “participating in global governance systems” (“深化国际合作”, “参与全球治理体系”), underscoring China's responsibilities and standing in the global climate regime.

The Social Progress frame focused on systemic societal themes such as “green development” and “ecological priority.” For instance, China Chemical Industry News reported that “there is a close interconnection between water, energy, food, and ecosystems” and emphasized the green development philosophy of “adhering to ecological priority” (“水—能源—粮食—生态系统之间存在密切联系”“坚持生态优先”), linking climate policy to broader societal and ecological structures.

Among the mid-frequency frames, Science (7 mentions), Economic (7 mentions), Science and Technology Application (7 mentions), and Energy (6 mentions) formed a second tier of media attention. These frames reflected media interest in the scientific underpinnings of climate policy, the logic of green technological transition, and the evolving energy structure. For instance, China Weather Network noted that “China leads globally in the manufacturing of photovoltaic modules and wind turbines” (“中国在光伏组件和风机制造领域位居全球领先”), while China Chemical Industry News emphasized that “artificial

intelligence is being applied to forecasting and scheduling” (“人工智能在预测与调度中的应用”), shaping a discourse centered on green technology.

By contrast, frames such as Ecological/Natural Impacts, Risk Governance, and Leader Dynamic appeared less frequently. This suggests that media prioritized systemic institutional transformation and national governance over themes like ecological disaster, political leadership, or governance risks. This selection logic aligns with the Green Book's positioning as a “policy guidance document” rather than a “crisis narrative text.”

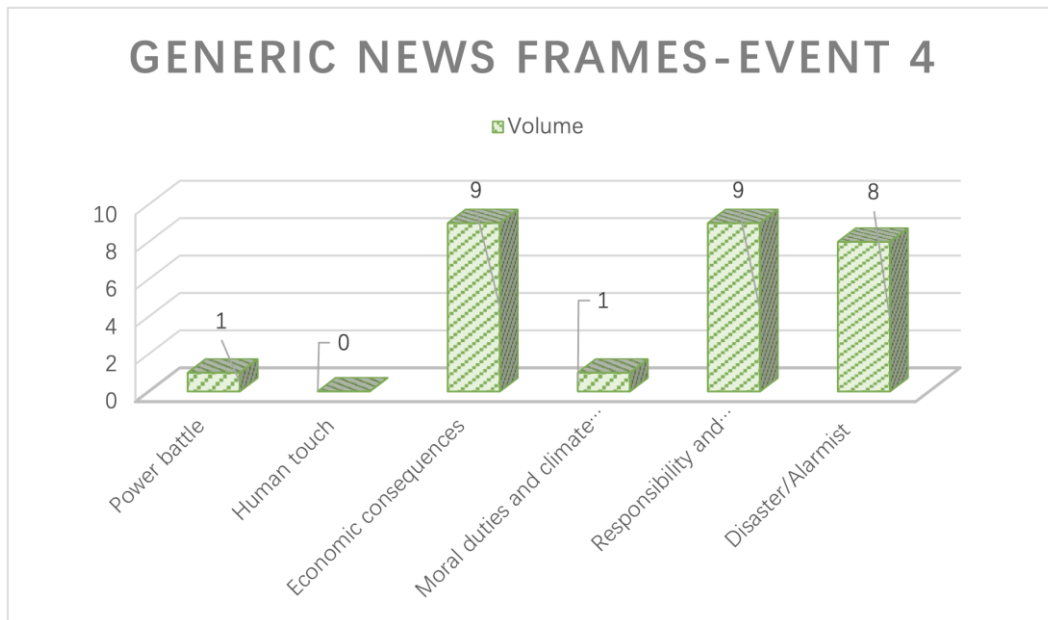
Additionally, in terms of geographic scope, Domestic Reporting dominated with 14 articles (82%), while only 3 reports qualified as Transnational Reporting. For instance, in a report presenting China's AI forecasting technologies, the China Meteorological Administration referenced climate threats in Africa and international aid efforts. Beijing News mentioned other countries' new emission targets as contextual background. China Weather Network included perspectives from Chinese researchers commenting on global competition in low-carbon technology and energy transitions in Europe and the U.S.

In sum, the media framing of the Green Book on Climate Change emphasized a structure centered on national institutional logic, the legitimacy of climate action, the construction of international discourse, and the promotion of social progress.

b. Generic Frames

At the level of Generic Frames (Chart 23), the media predominantly employed the Responsibility and Accountability (9 mentions) and Economic Consequences (9 mentions) frames, forming the main narrative pathways for this event. This framing configuration reflects a typical discursive orientation toward “legitimizing national responsibility” and “economizing green development.”

Chart 23 – Generic News Frames (Event 4)



Under the Responsibility and Accountability frame, both institutional and mass media outlets stressed China’s institutional responsibility and strategic leadership in global climate governance. For instance, the China Meteorological Administration stated in a report subtitle that “China’s practice demonstrates China’s commitment” and that the country will “contribute more to building a beautiful China and a clean, beautiful world” (“中国实践彰显中国担当”, “为建设美丽中国、共建清洁美丽世界作出更大贡献”), clearly conveying a governance responsibility narrative. Media Sohu, in covering the decarbonization efforts of the textile industry, also referenced “social responsibility and humanistic care” (“社会责任与人文关怀”), highlighting the multi-stakeholder involvement of businesses and sectors in climate action.

The Economic Consequences frame manifested through the frequent use of terms such as “green and low-carbon development” and “comprehensive green transformation of the economy and society” (“绿色低碳发展”, “经济社会全面绿色转型”), constructing a positive narrative that green transition drives economic development. This framing aimed to garner social support for policy objectives and enhance the perceived market logic and practical rationality of the policy.

The Disaster/Alarmist frame (8 mentions) was notably present in reports by specialized media such as China Meteorological News. These reports included

language like “the challenges brought by climate change are becoming increasingly severe” (“气候变化带来的挑战日趋严峻”) and highlighted extreme weather events, contributing a tone of risk alertness.

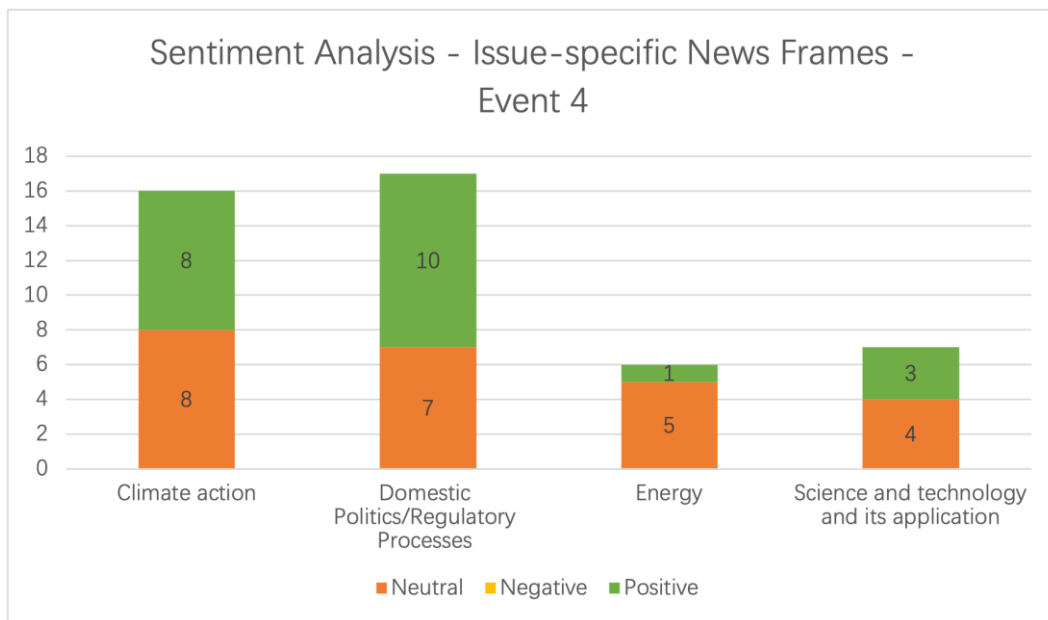
In contrast, the Power Battle (1 mention), Moral Duties and Climate Justice (1 mention), and Human Touch (0 mentions) frames were scarcely used. This scarcity indicates a lack of narratives about political conflict, moral duties, or personal stories. Such framing choices may be attributed to the Green Book’s orientation toward policy elites and institutional communication. Media tended to report through the lens of institutional responsibility and national strategies, rather than focusing on social conflict or emotional mobilization, further reinforcing a top-down logic in narrative construction.

In summary, the 2024 Green Book on Climate Change was framed in media coverage primarily through themes of responsibility construction and economic development, presenting a typical pattern of institutional communication. By embedding narratives of national responsibility and green economic transition, the media constructed a discourse around the policy goals. This also reflects a deep interconnection in China’s current climate communication between institutionalized governance and development-oriented green transformation.

5.3.4.4 Sentiment and Discursive Stance

In the coverage of Event 4—China’s release of the Green Book on Climate Change in 2024, sentiment analysis reveals a marked tendency toward positive reporting. As illustrated in Chart 24, four Issue-Specific Frames exhibited clear tonal distinctions. Across all relevant news articles, no instances of negative tone were identified. Instead, the media narratives were primarily divided between neutral and positive tones, with the latter being particularly prominent in the Domestic Politics/Regulatory Processes (10 positive mentions) and Climate Action (8 positive mentions) frames. This reflects a typical policy-supportive reporting style.

Chart 24 – Sentiment Analysis (Event 4)



Within the Climate Action frame, positive and neutral reports appeared in equal numbers (8 each). Media outlets frequently constructed the legitimacy of national climate action by praising policy achievements and citing green, low-carbon development outcomes. For instance, several articles featured expressions such as “driven by the dual carbon goals, new quality productive forces have emerged” (“双碳目标驱动新质生产力发展”) and “remarkable progress has been made” (“...取得了显著进展”), illustrating the progress between national policy directives and their technical implementation. The clustering of positive tones in this frame demonstrates the media’s tendency to shape an optimistic image of national action and leadership.

In the Domestic Politics/Regulatory Processes frame, 10 reports conveyed a positive tone, significantly outnumbering the 7 reports with a neutral tone. Coverage focused on institutional innovation in climate policy and the strengthening of government governance capacity. For example, the China Meteorological Administration emphasized that “China’s practice demonstrates its commitment” (“中国实践彰显中国担当”), while Sohu.com noted that the Green Book “systematically showcases the achievements of China’s ecological civilization governance” (“《绿皮书》系统展现了我国推进生态文明建设的治理成效”). Such positive language not only reinforces the legitimacy of national

climate governance but also reflects the media's role as an amplifier of national discourse in the process of policy communication.

Although limited in frequency, the Energy frame also contained positive tonal expressions (1 instance), primarily highlighting the transformation of the energy structure through technological innovation and the growth potential of green energy. For instance, the China Meteorological Administration reported that “China has made significant progress in renewable energy, electric vehicles, and green buildings” (“中国在可再生能源、电动汽车、绿色建筑等领域取得了显著进展”), underlining the contribution of energy technologies to green transformation.

Similarly, the Science and Technology and its Application frame displayed a positive tonal orientation. Among the three positive reports in this frame, media coverage focused on the policy value and practical application of scientific research outcomes. Articles cited developments such as “the research and application of climate change monitoring and early warning technologies” (“气候变化监测预警技术研发和应用”) and “China's dominance in over 70% of the global market for photovoltaic modules and wind turbines” (“中国光伏组件和风机制造方面占据全球市场 70%以上的份额”), reflecting a media trend of technological optimism.

In summary, the sentimental composition of media coverage surrounding Event 4 reveals a distinct pattern characterized by predominantly positive reporting, supplemented by neutral narratives, and an absence of negative coverage. This configuration suggests that Chinese media adopted a highly affirmative framing approach to the Green Book on Climate Change, particularly constructing an optimistic narrative in three key dimensions: national policy implementation, institutional governance, and scientific-technological advancement.

5.3.4.5 Key Findings of This Case

This section has provided a systematic analysis of Chinese media coverage surrounding the release of the 2024 Green Book on Climate Change, examining multiple dimensions including volume and type of reporting, issue-specific frame construction, integration of generic frames, and tonal orientation. The findings

reveal several structural characteristics and communicative mechanisms that define climate policy communication in China.

First, in terms of media coverage characteristics, this event exhibited a pattern of low volume but high concentration. A total of 17 valid media reports were collected, with an additional 16 articles excluded due to content redundancy. Analysis shows that Mass media dominated coverage; original reporting accounted for the majority, with a heavy reliance on text-based formats, often accompanied by images, and very limited use of video. This reflects a typical “textualized” dissemination path for policy-related information. Moreover, the reporting peaked sharply on December 27, 2024, immediately after the Green Book’s release, then declined rapidly, forming a window-style reporting cycle.

In terms of Issue-Specific Frames, the media predominantly employed four high-frequency frames: Domestic Politics/Regulatory Processes (17), Climate Action (16), International Relations (13), and Social Progress (10), collectively constructing a framework centered on “national institutions and policy action.” This configuration reinforced a collective narrative focused on state governance capacity, emission reduction achievements, international responsibility, and societal green transformation. Mid-frequency frames such as Science, Economic, Science and Technology Application, and Energy demonstrated a focus on scientific authority, industrial upgrading, and energy structural reform. In contrast, frames such as Ecological/Natural Impacts, Risk Governance, and Leader Dynamic appeared only rarely, indicating that the coverage prioritized narratives of institutional collective action over individualized or risk-based discourses. No other recurrent themes were observed under the “Other” category.

At the level of Generic Frames, both Responsibility and Accountability (9) and Economic Consequences (9) emerged as dominant, reflecting a discursive mechanism focused on legitimizing national responsibility and economizing green development. In addition, the Disaster/Alarmist frame (8) was employed in a relatively moderate manner to emphasize the urgency of the policy issue. Meanwhile, Power Battle, Moral Duties and Climate Justice, and Human Touch frames were virtually absent, further indicating that the event was not constructed as a site of social conflict or moral debate, but rather as a strategic declaration within the domain of institutional governance.

Regarding Sentiment and Discursive Stance, the coverage displayed a highly positive orientation. Across the four high-frequency Issue-Specific Frames, there were no negative-toned reports, while the proportion of positive tone was significant—particularly in the Domestic Politics/Regulatory Processes (10 positive reports) and Climate Action (8 positive reports) frames. Positive tone was mainly expressed through the promotion of policy achievements, the narration of institutional innovation, and the dissemination of technological applications, presenting a communication style of “institutional success and technological confidence.” This sentiment structure further amplified the media’s role in constructing state policy narratives, while downplaying problem-awareness and social tension.

In terms of content and reporting style, most media articles focused on introducing and interpreting the Green Book, with a few exhibiting agenda-setting or re-framing behavior. For instance, The Beijing News reported from the press conference scene and heavily quoted speeches from attending officials; China Weather Network conducted an in-depth interview with the director of the National Climate Center; two articles from Sohu.com interpreted case studies on the transformation of the textile and apparel industry cited in the Green Book; NetEase adopted a “popular science interpretation” approach to present the policy document. Interestingly, Party-run media outlets like Xinhua News Agency and People’s Daily published relatively shorter articles, suggesting that in this particular case, Mass media played a more active and supplementary role in interpreting and expanding upon the official narrative.

In summary, this case reveals four key characteristics: 1- A frame configuration centered on institutional legitimacy and national action; 2- A discursive structure dominated by positive tone, with an absence of negative reporting; 3- A media model in which Mass media leads the transmission and reinforces interpretative reconstruction; 4- A dissemination rhythm defined by concentrated release during a short window and rapid decline in media discourse. Collectively, these features constitute the discourse construction of Chinese media in the social communication of climate documents.

5.3.5 Case 5: China's Wind and Solar Installed Capacity Target under the 14th Five-Year Plan Was Achieved Six Years Ahead of Schedule (2024)

5.3.5.1 Case Background and Relevance

On August 29, 2024, China released a white paper titled China's Energy Transition and officially announced that the country's installed capacity of wind and solar power had surpassed 1.2 billion kilowatts, achieving the 14th Five-Year Plan target six years ahead of schedule. This milestone not only signifies China's rapid development in the renewable energy sector in recent years but also represents a critical moment in fulfilling its international climate governance commitments. The roots of this achievement trace back to the 13th Five-Year Plan period, during which China began strongly advancing its green and low-carbon transition. At that time, the Energy Production and Consumption Revolution Strategy (2016–2030) had already proposed controlling coal consumption and expanding wind and solar development. The early realization of the wind and solar capacity goal demonstrates strong policy enforcement and lays the foundation for China's "dual carbon targets"—peaking carbon emissions before 2030 and achieving carbon neutrality before 2060.

The 14th Five-Year Plan (2021–2025) serves as China's national blueprint for economic and social development, aiming to modernize the country through high-quality growth. Set against the backdrop of China's ongoing economic transition and the mounting pressure for sustainable development, the Plan explicitly emphasizes the goal of green development in response to the global climate agenda.

Regarding climate change mitigation, the 14th Five-Year Plan proposes the following key measures: 1- Carbon Peaking and Carbon Neutrality: China commits to peaking its carbon emissions by 2030 and achieving carbon neutrality by 2060—objectives that have attracted significant global attention and constitute the policy core during this planning period; 2- Renewable Energy Development: The Plan calls for accelerating the development of wind power, solar PV, and nuclear energy while significantly reducing fossil fuel usage. Wind and solar energy hold

importance in this agenda, supporting the goal of increasing the share of non-fossil energy in total energy consumption to around 25% and achieving over 1.2 billion kilowatts of combined installed capacity for wind and solar power by 2030; 3-Emission Reduction and Industrial Transition: The Plan promotes the development of energy-saving and emission-reduction technologies, particularly in high-emission sectors such as industry, transportation, and construction. It also aims to guide enterprises to reduce carbon emissions through carbon market mechanisms.

A notable characteristic of China's climate policy lies in its swift interdepartmental coordination and strong execution across central agencies, local governments, and enterprises. For instance, in March 2022, the National Development and Reform Commission (NDRC) and the National Energy Administration jointly issued the 14th Five-Year Plan for a Modern Energy System, which emphasized the large-scale and high-quality development of wind and solar power. In the first half of 2022, major ministries such as the Ministry of Industry and Information Technology, NDRC, and Ministry of Housing and Urban-Rural Development issued multiple policies supporting the distributed solar market. By the end of August 2022, 29 provinces across China had released their respective 14th Five-Year energy development plans, specifying local wind and solar energy targets.

Enterprises and technologies have rapidly advanced under this policy momentum. According to the China Photovoltaic Industry Association (CPIA), over 300 new PV capacity expansion projects were initiated between early 2021 and June 2022 (Q. Wang et al., 2022). In 2022, China recorded a new historical peak in installed PV capacity, a trend that has continued. By 2024, the country's total installed solar PV capacity reached 886 million kilowatts, a year-on-year increase of 45%. Following phases of policy incentives, cost reduction, and grid parity, China's renewable energy has now entered a stage of large-scale grid integration (M. Han et al., 2022).

Wind energy has similarly benefited from policy-driven growth. After years of scaled development and technological innovation, China has built a comprehensive and efficient industrial and supply chain for wind power. Currently, China is the world's largest wind power equipment manufacturing base. The wind turbine systems produced in China (including those by international brands

manufacturing locally) account for over two-thirds of the global market, while critical components (e.g., generators, hubs, nacelles, blades, gearboxes, and bearings) account for more than 70% of global output (Wang & Qin, 2024). By the end of 2023, Chinese wind turbines had been exported to 55 countries across five continents, and their components had reached global markets.

Outside China, countries such as those in Europe and North America have also increased their renewable energy targets (Wang et al., 2022). In April 2022, the UK government updated its Energy Security Strategy, aiming to increase solar capacity fivefold by 2035, from 14 GW in 2022 to 70 GW. In July 2022, Germany passed an amendment to the Renewable Energy Act (EEG 2023), planning to expand solar PV capacity from approximately 60 GW in 2022 to 215 GW by 2030. Meanwhile, the European Union revised its renewable energy directives and set a clear target of increasing the share of renewables in the energy mix to 45% by 2030. In Brazil, wind power is on the rise, while hydropower remains the dominant source. However, prolonged droughts over the past decade have significantly reduced energy supply, especially during dry seasons. In response, the Brazilian government launched the Growth Acceleration Program (PAC), forecasting investments of over 75 billion BRL in renewable energy generation by 2026.

Chinese wind energy enterprises are actively investing in Brazil's green energy landscape. Major state-owned companies like CGN (China General Nuclear), Goldwind, and Envision Energy have established partnerships and projects—mostly in northeastern Brazil, where wind conditions are favorable. These projects include both onshore and offshore wind farms. For example, CGN currently operates eight wind farms and two solar plants in Brazil, with a total installed capacity of 1,444.8 MW, ranking it among the top ten clean energy suppliers in the country. According to officials in northeastern Brazil, the region's potential offshore wind energy capacity could reach 234 GW.

In official discourse, the early achievement of the 14th Five-Year wind and solar energy targets is frequently employed to reinforce China's image as a "responsible global actor in climate action." State media outlets such as Xinhua News Agency, CCTV, and People's Daily reported on this milestone, often referencing data from the China's Energy Transition white paper.

In sum, the ahead-of-schedule accomplishment of China's wind and solar capacity targets is a concentrated manifestation of the country's strong green policy enforcement, offering a crucial textual foundation for subsequent analysis on how state propaganda discourses are constructed in China's climate communication.

5.3.5.2 Media Coverage Overview

A total of 22 media reports were collected and included for analysis regarding Event 5, the early achievement of China's wind and solar installed capacity target under the 14th Five-Year Plan. By examining media type, reporting sources, content formats, and temporal distribution, this section seeks to uncover the structural dynamics and operational logic of how this event was disseminated within the Chinese media system, further revealing the mechanisms of climate-related discourse production under the broader context of energy transition.

Table 11 – Event 5 Analysis of Media Coverage of the Climate Achievement

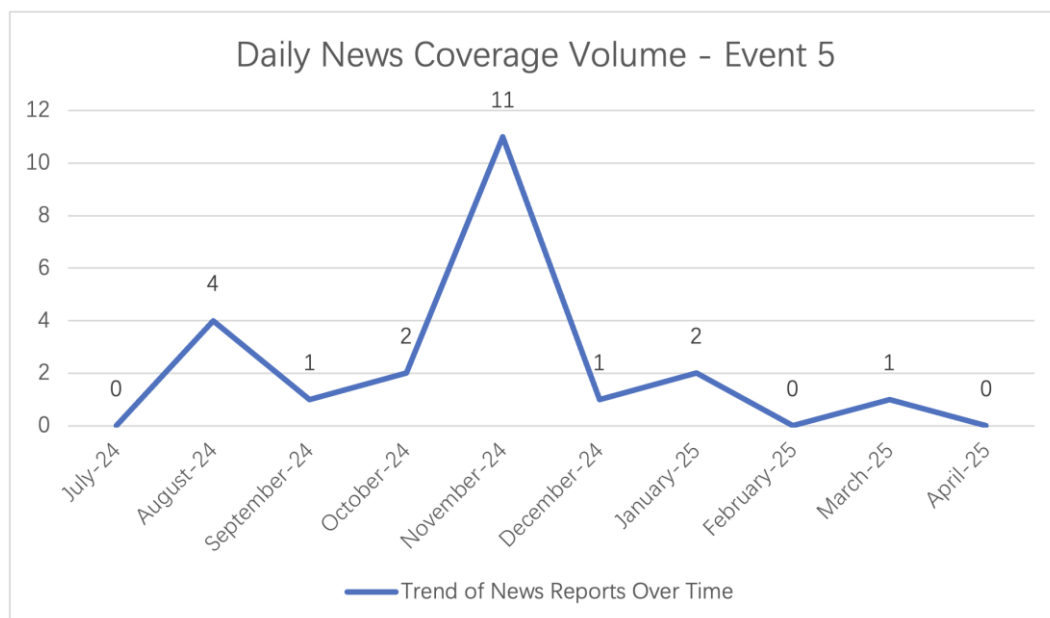
Event 5 - China Achieves Its 14th Five-Year Plan Wind and Solar Power Installation Target Six Years Ahead of Schedule (2024)							
Number	Media Type			Source		Content Format	
22	Party-run media	10	45%	Original	55%	Text only	45%
	Mass media	6	27%	Reposted/ re-edited	45%	With images	45%
	Institutional media	4	18%			With videos	10%
	Others	2	9%				

In terms of media types (see Table 11), Party-run media dominated coverage with 10 reports (45%), followed by Mass media with 6 reports (27%), Institutional media with 4 reports (18%), and Others accounting for 2 reports (9%). These other sources are characterized by their non-professional and non-official nature, including corporate or individual accounts. Overall, Party-run media led the framing and direction of public discourse, while mass media served supplementary and follow-up roles. Institutional media primarily contributed through technical interpretation and industry data.

Regarding reporting sources, original reports and reposted/re-edited content each accounted for approximately half of the sample, 55% and 45%, respectively. This distribution indicates both strong original engagement from media outlets and a notable degree of secondary dissemination. The sources of reposted content were diverse, spanning from major official institutions such as Guangming Daily, Xinhua News Agency, CCTV, and Global Times, to more specialized or sectoral platforms like China Discipline Inspection and Supervision News, Guandian.cn, and Global Zero Carbon. Within the dissemination chain, Party-run media frequently reposted content from each other, while rarely citing mass media sources. Only media platforms such as Sohu.com, known for aggregating news, were observed reposting content from mass media outlets.

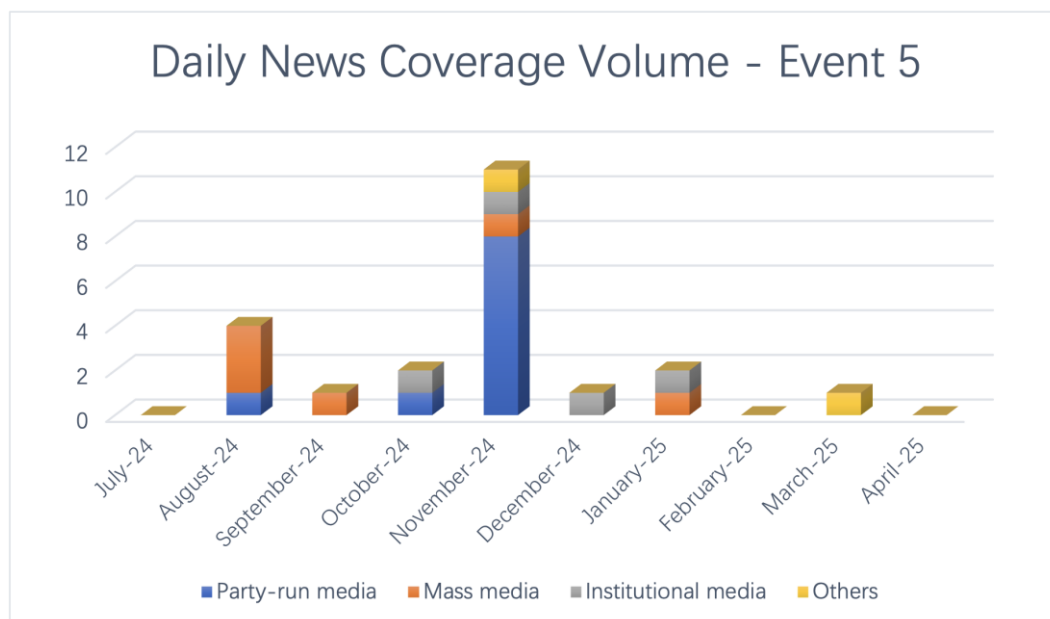
As for content format, text-only reports and text-with-images each represented 45% of the total, while video-based content accounted for only 10%. These findings suggest that coverage of the installed capacity milestone relied predominantly on textual information, with images serving as complementary elements. The use of video remained marginal. Considering the policy-oriented and data-intensive nature of the event, Chinese media still favored traditional text-based authoritative discourse for policy communication.

Chart 25 – Daily Volume of News Coverage on the Climate Achievement (Event 5)



From the perspective of temporal distribution (see Chart 25), coverage showed a clear pattern of concentrated burst, rapid decline, and low-frequency continuation. The peak of reporting occurred in November 2024, with 11 reports, accounting for 50% of total coverage. Interestingly, this peak did not coincide with the official release of the China's Energy Transition white paper. Instead, the COP29 held in the same month likely boosted the topic's visibility, creating a one-time surge in media attention around China's policy accomplishments. After November, the number of reports dropped sharply, with 2 reports each in January and February 2025, and sporadic coverage in March and other months.

Chart 26 – Distribution of News Reports by Media Type Over Time (Event 5)



A closer look at the intersection of media types and reporting time (see Chart 26) reveals that Party-run media dominated the November 2024 peak period, publishing 8 reports, while mass media, institutional media, and other types also contributed to varying degrees, forming a multi-layered dissemination structure. The central role of Party-run media throughout the diffusion cycle reflects the event's policy-driven nature. In contrast, mass media and institutional media primarily played supplementary agenda-setting and professional interpretation roles during the preliminary and follow-up stages of the event.

In summary, the media coverage of this event in China followed a structure, with Party-run media setting the tone, mass media amplifying the message, and

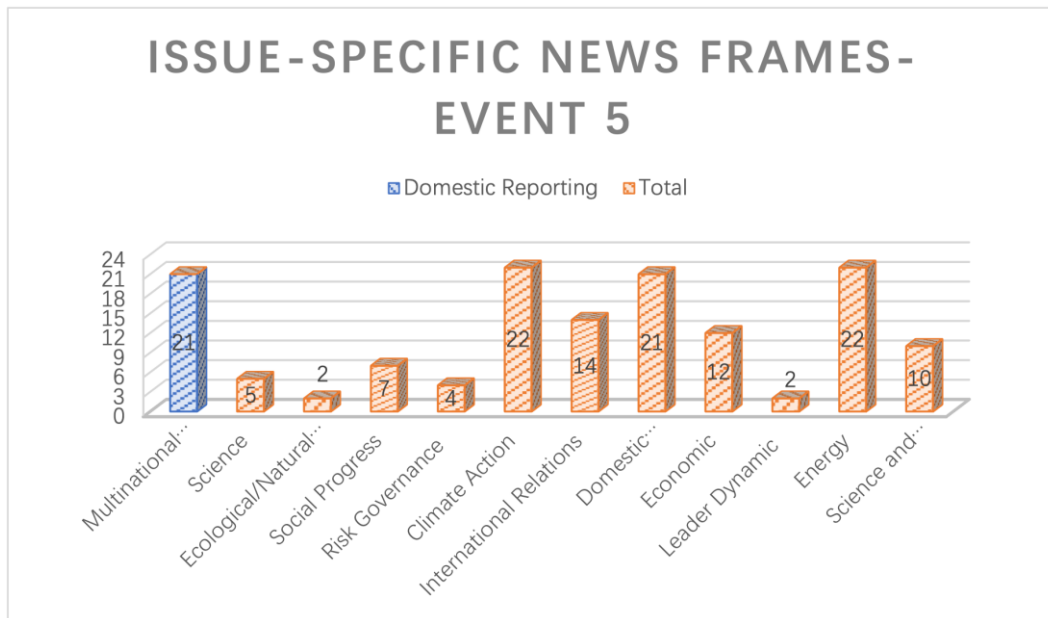
institutional media providing technical insights. The coexistence of original and secondary reporting highlights the multi-channel nature of policy communication. The predominance of text-based reporting, with limited video usage, indicates a sustained reliance on institutionalized discourse pathways and mainstream media channels to construct the climate action in the context of energy policy dissemination.

5.3.5.3 News Framing Analysis

a. Issue-Specific Frames

In this case, the application of Issue-Specific News Frames reveals a relatively concentrated distribution pattern (see Chart 27). The most prominent frames include Climate Action, Energy, and Domestic Politics/Regulatory Processes, which appeared 22, 22, and 21 times, respectively. As the topic itself directly involves both “energy accomplishment” and “national goal attainment,” media coverage commonly employed headlines with phrases such as “commitment fulfilled ahead of schedule” and “installed capacity surpasses...” (“提前兑现承诺”, “装机总量超...”). Such language reflects a clear intention of nation capacity-building.

Chart 27 – Issue-specific News Frames (Event 5)



Closely following were the International Relations and Economic frames, occurring 14 and 12 times, respectively. These highlight the topic's significance in the context of diplomatic symbolism and economic development. Outlets such as China Youth Daily and China Today linked this energy milestone to the global temperature control goals of the Paris Agreement. Additionally, CCTV News associated China's policy achievements with the COP29 international summit, reinforcing the country's image as a responsible global actor. Within the economic category, Benefits of Climate Protection accounted for 92% of the Economic frame, as media extensively reported on indicators such as "clean energy consumption," "total wind power investment," and "new energy vehicle sales" ("清洁能源消费量", "风电投资项目总额", "新能源汽车销量"). These narratives frequently intertwined international discourse with economic outcomes to construct a storyline of green growth and national competitiveness.

The Science and Technology and its Application frame appeared 10 times, reflecting media attention on technological contributions. It emphasized developments in artificial intelligence, electric vehicles, solar and wind technologies. For example, Technology Frontline Observer noted that "various energy storage technologies continue to evolve" and "smart grid technology is advancing" ("多种储能技术不断发展", "智能电网技术也在不断进步"), while

China Weather Network reported that “new energy storage technologies”(新型储能技术) are driving rapid growth in the storage sector. These accounts underscored the foundational role of technological advancement in supporting the energy transition.

Other moderately frequent frames included Social Progress (7 times), Science (5 times), and Risk Governance (4 times). These reflect media concern with dimensions such as the semantic construction of social development, scientific support, and challenges in policy implementation. For instance, Integrity Yaodu featured interviews with Chinese scholars, while other outlets frequently quoted experts and scientific data—indicating that some media offered extended interpretations around societal transformation, expert voices, and technological implementation challenges.

It is notable that Leader Dynamic and Ecological/Natural Impacts frames were marginal in this case, each appearing only twice. Leader Dynamic appeared mainly in tracing the origins of policy goals, such as Integrity Yaodu citing President Xi Jinping’s remarks at the 2020 Climate Ambition Summit, or CCTV quoting statements from Foreign Ministry spokespersons. The Ecological/Natural Impacts frame focused on international climate disasters rather than domestic ecological issues—for example, China Today stated that “the global climate is warming at an unprecedented rate” (“全球气候以前所未有的速度变暖”), and CCTV News highlighted that “2024 saw frequent extreme weather events globally” (2024 年全球极端天气事件频发). These examples suggest that Chinese media tend to externalize and internationalize ecological risks rather than present domestic vulnerabilities.

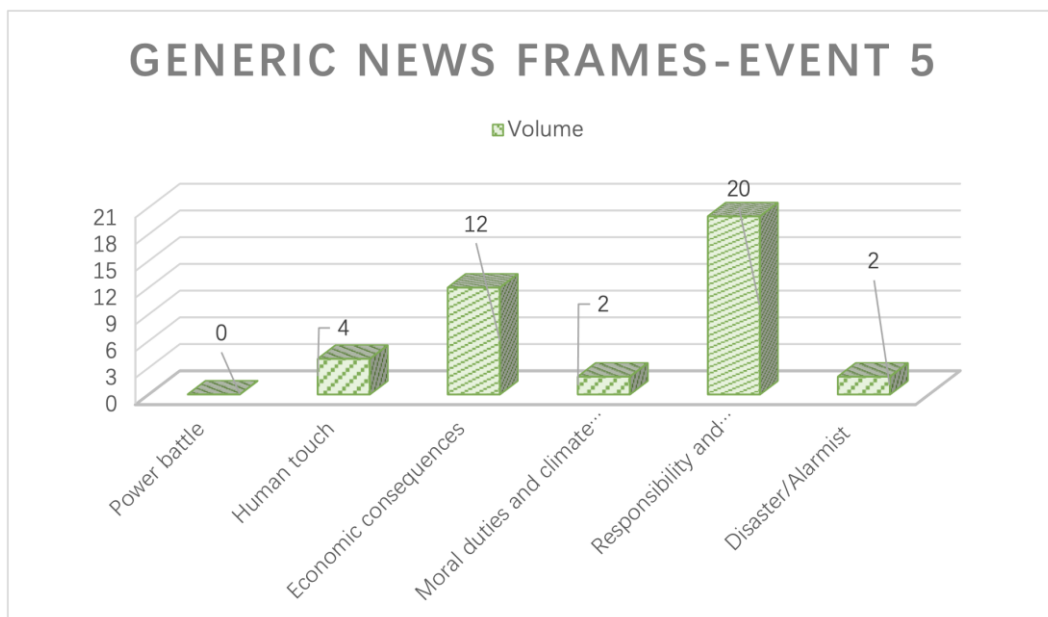
From the perspective of reporting scope, domestic reporting overwhelmingly dominated, accounting for 21 out of 22 reports (95%). Only one report by CCTV News qualified as transnational reporting, featuring wind power projects in South Africa and Chile—all of which were either invested in or operated by Chinese companies. This structure reveals a media focus on constructing domestic achievements and governance capabilities.

In summary, the issue-specific framing of this case is anchored in a triadic structure of Energy, Policy, and International Responsibility, shaping a grand narrative of national achievement. Although some reports incorporated

supplementary topics such as science, society, and ecology, the core structure remained focused on showcasing China’s institutional advantage and global responsibility in the green transition. This frame selection reinforced the media’s role as a “national discourse constructor” in policy communication and revealed a strategic focus path in Chinese media representations of climate issues.

b. Generic Frames

Chart 28 – Generic News Frames (Event 5)



Regarding Generic News Frames (see Chart 28), the most prominent was Responsibility and Accountability, which appeared 20 times, making it the dominant narrative path in this case. This frame emphasizes China’s responsibility in global climate governance, with the media consistently reinforcing themes of “international commitments” and “responsibility to humanity” (“国际承诺”, “对人类社会负责任”). Typical expressions include “China’s commitment to the dual-carbon goals” and “making greater contributions ... to the global response to climate change” (“中国承诺的“双碳”目标”, “为共同应对气候变化。。。作出更大的贡献”). These narratives collectively constructed the legitimacy and moral foundation of China’s national responsibility.

The Economic Consequences frame appeared 12 times, reflecting a positive media evaluation of how the early completion of energy targets has driven economic growth, industrial upgrading, and international competitiveness. Most of these reports focused on green economic development enabled by domestic energy structural reform. In addition, China Youth Daily mentioned China's climate finance aid to African countries, indicating a spillover effect of green growth and contributing to a developmentalist discourse.

The Human Touch frame appeared 4 times, showing that some media attempted to connect this macro-level issue with individual experience to enhance emotional resonance among readers. For instance, China Youth Daily reported on youth participants in COP29, while CCTV News described how wind farms in South Africa had positively impacted the lives of residents. Although relatively infrequent, these reports demonstrate that some mainstream media incorporate grassroots perspectives to enrich the narrative layers of national storytelling.

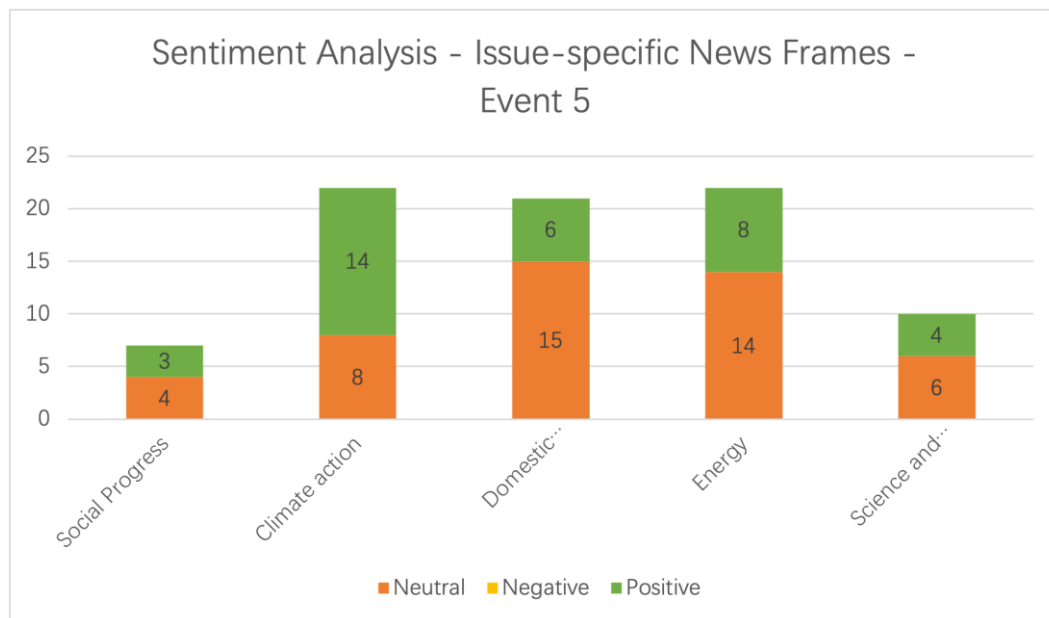
The Moral Duties and Climate Justice and Disaster/Alarmist frames each appeared twice, mainly in discussions of global equity and multilateral governance challenges. China Today noted that “unilateralism and geopolitical conflicts have severely undermined multilateral climate cooperation”(“单边主义和地缘政治冲突严重冲击多边气候合作”), while CCTV News pointed out that “some countries will suffer climate disasters every year going forward”(“一些国家在今后每年都会遭受一些气候灾害”). Although limited in number, such reports introduced justice and risk perspectives, reflecting a understanding of climate complexity by some media.

By contrast, the Power Battle frame was not used at all in this case. This may be due to the topic's limited emphasis on geopolitical confrontation and the mainstream media's general preference for a discourse of harmonious development and win-win cooperation.

In conclusion, the structure of generic frame usage in this case is clearly delineated: Responsibility and Accountability and Economic Consequences formed the core narrative, while Human Touch and Moral Duties and Climate Justice served as discursive supplements, enhancing the humanistic and ethical dimensions of the overall discourse.

5.3.5.4 Sentiment and Discursive Stance

Chart 29 – Sentiment Analysis (Event 5)



In this case, which focuses on media coverage of China's early achievement of the wind and solar energy installation targets set in the 14th Five-Year Plan, the sentiment analysis reveals a clear tendency toward positive orientation. As shown in Chart 29, across the five analyzed Issue-Specific Frames (Climate Action, Domestic Politics/Regulatory Processes, Energy, Science and Technology and Its Application, and Social Progress), there were no instances of negative tone. All media reports were either neutral or positive, forming a highly positive communication structure.

Under the Climate Action frame, there were 14 positive reports, representing a significant proportion, indicating the media's widespread use of positive language when describing the country's climate governance achievements and mitigation efforts. For instance, Beijing Daily emphasized that “China has fulfilled its commitment announced at the Climate Ambition Summit six years ahead of schedule” (“提前 6 年完成我国在气候雄心大会上承诺的。。。目标”), while Xin Huanghe stated that “China has comprehensively advanced the implementation of its Nationally Determined Contributions and achieved positive results” (“全面

推动国家自主贡献实施并取得积极成效”). China Today used the headline “China’s pragmatic actions inject stable momentum into global climate governance” (“中国务实行动为全球气候治理注入稳定动力”). These expressions collectively construct a policy victory narrative centered on effective actions and fulfilled goals.

Within the Domestic Politics/Regulatory Processes frame, there were 6 positive reports, which, while fewer than the 15 neutral reports, still reflect a trend toward affirmative narration. These stories typically emphasized institutional progress and governance capacity improvements.

In the Energy frame, there were 8 positive reports, highlighting technological advancement in clean energy and industrial upgrading. For instance, Beijing Daily wrote that “China has continuously made new breakthroughs in its green and low-carbon transformation” (“绿色低碳转型也不断取得新突破”), while another media, Guocheng Investment Consulting, noted that “China has made unremitting efforts and sustained innovations in the field of green energy” (“中国在绿色能源领域的不懈努力和持续创新”). Such content reinforces the positioning of wind and solar technology as a driving force for national development and reflects optimistic expectations for the future of the green economy.

Within the Science and Technology and Its Application frame, 4 positive reports focused on the integration and transformative power of emerging technologies in the energy system. For example, Technology Frontier Observer described technological innovation as something that “makes new energy soar with wings” (“技术革新：让新能源 如虎添翼”), conveying strong commendatory implications. Similarly, China Today and China Weather Network adopted laudatory tones when reporting on China’s energy storage technologies and new energy vehicles, as noted earlier. These narratives highlight China’s autonomous capacity and strategic potential in green technological innovation.

In the Social Progress frame, 3 positive reports emphasized the broader societal benefits resulting from the green transition. Topics included consumers’ preference for new energy vehicles and how wind power projects have brought economic transformation to rural and regional communities. These reports

attempted to establish a positive link between macro-level policies and livelihood improvement.

In summary, the sentiment structure of this case is marked by a strong “positive construction” tendency, with no negative reports and an absence of critical discourse. This reflects a highly coordinated discursive mode within Chinese mainstream media when presenting climate policy outcomes and strategic national achievements. By consistently employing a positive tone across five Issue-Specific Frames, the media constructed a grand affirmative narrative characterized by goals fulfilled ahead of schedule, development driven by technology and implementation secured by institutions.

5.3.5.5 Key Findings of This Case

This section analyzes Chinese media coverage of the early achievement of the 14th Five-Year Plan wind and solar energy installation targets from three key dimensions: media coverage structure, news framing, and discursive tone. The results reveal a highly centralized and positively oriented discursive pattern.

First, in terms of media coverage structure, although the overall number of reports was not large, the event exhibited high consistency and dominant messaging. Among the 22 articles included in the content analysis, Party-run media accounted for 45%, taking the lead in agenda setting during the peak coverage period (November 2024). Mass media and institutional media served supplementary roles in agenda expansion and technical interpretation. The peak period of information release was closely linked to the convening of COP29, rather than to the event itself, highlighting the dominant role of the government and party-run media in agenda setting. Additionally, during the research process, 11 articles were identified as totally repetitive in both headline and body content—classified as reposts or mirrored publications—which were excluded from analysis due to a lack of substantive editorial contribution. This phenomenon indicates the existence of a communication logic in China’s climate reporting, where content replication and discursive unification are employed to reinforce narrative consistency through frequent reposting.

Regarding Issue-Specific Frames, media reporting primarily utilized three core frames—Climate Action, Energy, and Domestic Politics/Regulatory Processes—with frequencies of 22, 22, and 21 respectively. This formed a narrative axis of policy achievement, energy transition, and national governance. The frequent use of expressions such as “achieved ahead of schedule” and “world’s leading installation capacity” emphasized national capability of fulfilling policy goals. The medium-frequency use of International Relations and Economic frames further demonstrated Chinese media’s strategy of linking climate diplomacy with green economic development. Meanwhile, the low frequency of peripheral frames such as Leader Dynamic and Ecological/Natural Impacts suggests a media tendency to externalize ecological risks and highlight narratives of institutional response and collective action.

The use of Generic Frames revealed a form of communication structure. The Responsibility and Accountability frame appeared 20 times, making it the most dominant, underscoring media efforts to emphasize China’s international commitments and moral responsibility. Frames such as Economic Consequences, Human Touch, and Moral Duties and Climate Justice respectively highlighted themes of economic potential and international finance, public lifestyle and well-being, and global justice, reflecting varying levels of narrative depth. The absence of the Power Battle frame suggests that, in this highly politicized and positively framed topic, mainstream media deliberately avoided conflict-oriented narratives, opting instead to emphasize consensus and cooperation.

Lastly, the sentiment analysis confirmed a strong positive construction of the media discourse. Among the five Issue-Specific Frames, no negative tone was observed. All reports were either neutral or positive, with positive tones dominating in key frames such as Climate Action and Energy. These narratives collectively emphasized goal achievement, technological innovation, and livelihood improvement. Media extensively cited policy terms and authoritative data, reflecting how mainstream Chinese media primarily serve a policy transmission function in climate reporting while also participating actively in national image-building and international communication strategies.

In summary, this case presents the following key characteristics: 1- Highly concentrated and structurally unified media coverage, forming a multi-level

communication network led by Party media, supported by institutional and mass media; 2- A framing structure emphasizing national policy achievement, linking international commitments and economic growth, and focusing on institutional capacity, technological progress, and responsibility; 4- A strongly positive discursive tone, with clear narrative orientation—constructing a policy communication grammar marked by no conflict, strong achievements, and emphasis on commitment; 5- A notable degree of non-editorial content duplication, suggesting a centralized mode of content production.

5.3.6 Case 6: Xi Jinping’s Speech at the 2021 Leaders’ Summit on Climate

5.3.6.1 Case Background and Relevance

On April 22, 2021, at the invitation of U.S. President Joe Biden, Chinese President Xi Jinping attended the Leaders’ Summit on Climate via video link and delivered an important speech. This summit, convened by the Biden administration, invited the leaders of 40 major global economies with the aim of reaffirming the United States’ leadership in global climate governance after its return to the Paris Agreement. The participation of the Chinese President was widely regarded as a key signal of China–U.S. efforts to seek common ground and manage differences in the climate domain, making it one of the most important events in the global climate diplomacy landscape of that year.

In his speech, Xi Jinping reiterated China’s dual carbon goals, namely, to strive to peak carbon emissions before 2030 and achieve carbon neutrality before 2060. He also proposed building a “community of life for man and nature” as a guiding principle for global ecological governance, advocating for multilateralism, common but differentiated responsibilities, and green development. Furthermore, he emphasized that China would strictly control the growth of coal consumption and gradually reduce the proportion of coal during the 14th Five-Year Plan period, promoting a green and low-carbon energy transition.

It is noteworthy that this Leaders' Summit on Climate was held against the backdrop of escalating China–U.S. tensions, especially following the trade war initiated during the later period of the Trump administration. During Trump's presidency, bilateral political communication was almost completely cut off, and the relationship between the two countries entered a tense phase. Upon assuming office, President Biden immediately elevated climate change to a central pillar of national security decision-making (Yu et al., 2021), seeking to reestablish U.S. leadership in global climate governance. The U.S. rejoined the Paris Agreement and aligned with the European Union in advocating for the more ambitious 1.5°C goal (Zhang et al., 2021). At the Leaders' Summit on Climate and other international platforms such as the U.S.–EU summit, American leaders called on developed countries to mobilize US\$100 billion annually by 2025, as required by the Paris Agreement, to support developing countries in climate adaptation and energy transition (Zhang et al., 2021). This marked a stark contrast with the inaction of the Trump administration, which officially withdrew from the Paris Agreement in June 2017 and prioritized domestic development. Some analysts point out that Trump reversed or weakened 125 environmental policies during his term (Yu et al., 2021). Research also indicates that U.S. climate policy has long exhibited cyclical patterns with significant policy reversals.

Under the Biden administration, several studies have shown that despite their climate cooperation, China and the United States maintained a dual relationship of competition and collaboration (Hu & Dong, 2023; Yu et al., 2021; Zhang et al., 2021). Biden once stated that even as the two countries pursued cooperation in climate change and global public health, the U.S. must still take a tough stance on China. The White House also issued detailed statements on its China policy, emphasizing that China poses a major challenge to the U.S., and that the Biden administration would not alter its strategic posture toward China (Yu et al., 2021). This was reflected in three main aspects:

While striving to reclaim global climate leadership, the Biden administration tended to downplay China's contributions, promoting strategies more ambitious than those in the Paris Agreement, such as support for the 1.5°C goal and a global carbon neutrality target by 2050. These proposals gained consensus with the EU, which has long held an active stance on climate change. However, China,

considering its development status and national conditions, was reluctant to adopt more radical targets. As a developing country with abundant coal, limited gas, and low oil reserves, China faced substantial infrastructure and technological transition challenges, and its energy shift remained at a nascent stage.

Although the U.S. sought low-carbon technological cooperation through multiple channels, it simultaneously suppressed Chinese photovoltaic exports, pointing the “high-carbon” nature of Chinese trade products (Zhang et al., 2021). The Biden administration argued that China’s state subsidies provided unfair competitive advantages to state-owned enterprises and posed threats to U.S. technology and intellectual property.

The U.S. launched climate finance plans aimed at pressuring China’s Belt and Road Initiative, arguing that China was outsourcing pollution through its overseas fossil fuel investments. The U.S. called on allies to prevent China from using the Belt and Road to expand global influence, export its political model, and dominate future technology markets.

In response, China emphasized the need for pragmatic cooperation based on mutual trust, proposing collaborations in technology transfer, climate finance, and the restoration of bilateral dialogue mechanisms. Notably, green transformation has also emerged within China-led multilateral efforts such as the greening of the Belt and Road and the expansion of South–South Climate Cooperation Funds.

In his address at the Leaders Summit on Climate, China’s leader first highlighted the vision of building a community of life for man and nature. He reaffirmed China’s stance on climate governance, including green development, systematic governance, people-centered values, multilateralism, and the principle of common but differentiated responsibilities. Xi then emphasized China’s green development actions, presenting its carbon peaking and neutrality roadmap and progress in climate cooperation under the Belt and Road Initiative and South–South Cooperation. The speech revealed key aspects of China’s concerns and agenda in the global climate debate.

From the perspective of climate communication studies, Xi’s speech at the Leaders’ Summit constitutes a critical moment in China’s climate diplomacy communication, providing an essential case for understanding how China utilizes media narratives to construct national roles and international recognition.

5.3.6.2 Media Coverage Overview

This study collected and analyzed a total of 32 media reports regarding Xi Jinping's speech at the 2021 Leaders' Summit on Climate (Event 11). The data and chart analysis reveal that the dissemination of this event within the Chinese media system exhibited a highly centralized structural pattern, reflecting a media operation mechanism centered on mainstream outlets in the context of national climate diplomacy communication.

Table 12 – Event 6 Analysis of Media Coverage of the Xi's Speech

Event 6 - Xi Jinping's Speech at the Leaders' Summit on Climate (April 2021)							
Number	Media Type			Source		Content Format	
32	Party-run media	18	56%	Original	44%	Text only	53%
	Mass media	2	6%	Reposted/ re-edited	56%	With images	25%
	Institutional media	12	38%			With videos	22%
	Others	0	0%				

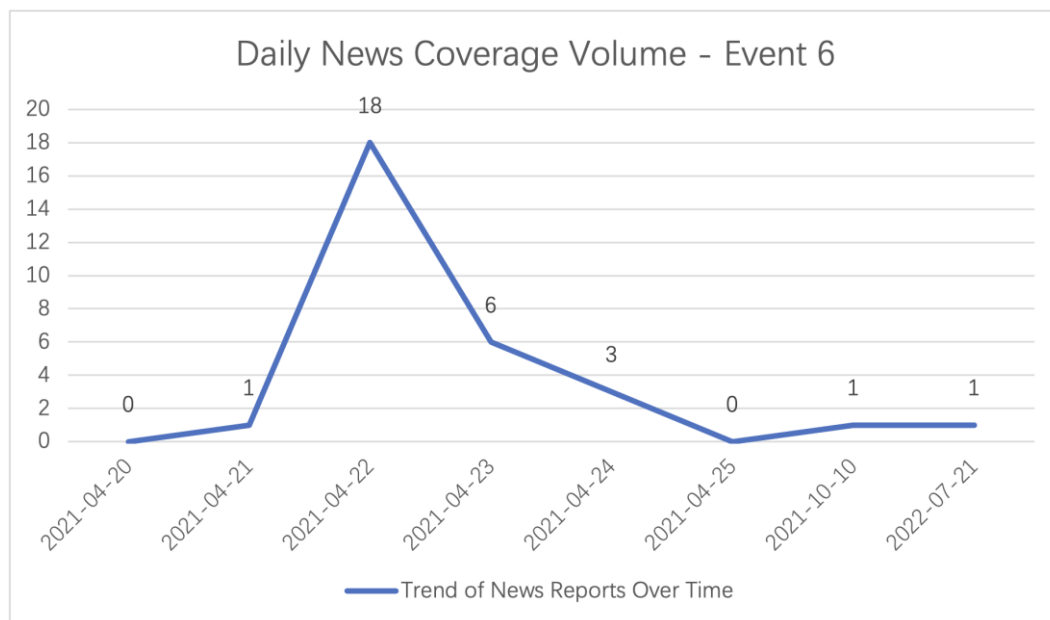
In terms of media type distribution (see Table 12), Party-run media published the most reports, with 18 articles (56%), followed by Institutional media with 12 articles (38%), and Mass media with only 2 articles (6%). No content was found from media classified as "Others." This structure indicates that official and semi-official institutions formed the core of the reporting force on this climate diplomacy issue. Party-run and institutional media together accounted for 94% of the total coverage, demonstrating that, in high-level diplomatic events, China's mainstream media system operates under a state-institution cooperative dynamic.

Regarding content origin, original reporting and reposted/re-edited content accounted for 44% and 56% respectively. Although original reporting maintained a relatively strong presence, reposted content slightly dominated in volume. Notably, reposts were highly concentrated in source: among the 18 reposted articles, 14 were from Xinhua News Agency, 2 from CCTV News, 1 from People's Daily, and 1 from China Tibet Online. This concentration reveals that a few cores official media served as the primary originators of the event's coverage, with further

dissemination carried out by other institutional outlets, thereby reinforcing message consistency and agenda unity.

In terms of content format, text-only reporting remained dominant, making up 53% of the reports. Reports combining text and images accounted for 25%, while video-based coverage made up 22%. Although the share of video content was slightly higher than in other cases, the coverage remained primarily text driven.

Chart 30 – Daily Volume of News Coverage on the Xi's Speech (Event 6)

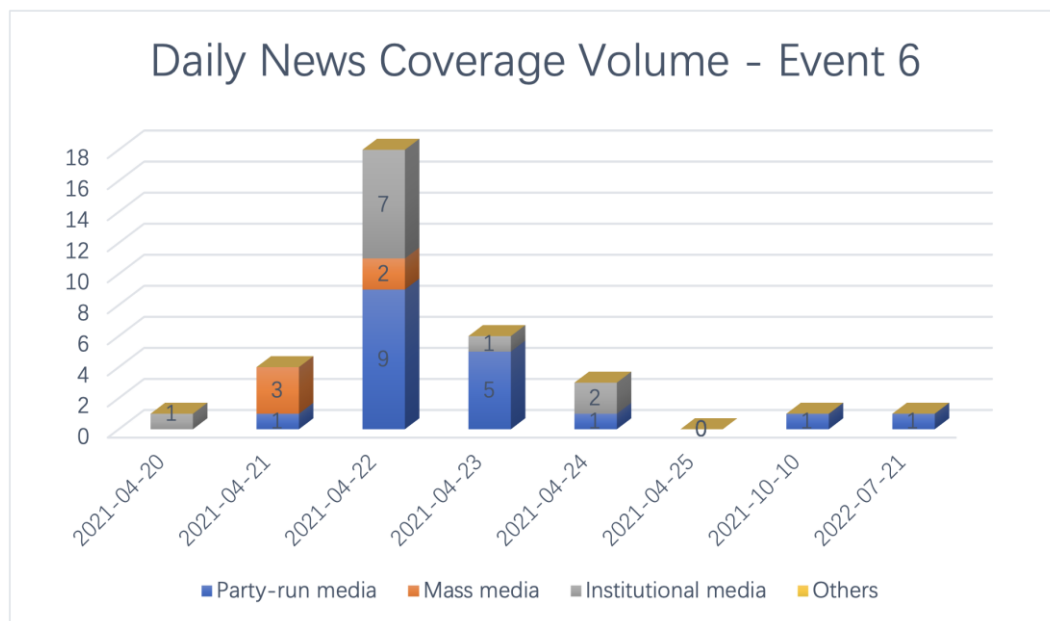


Looking at the temporal distribution of coverage (see Chart 30), the peak of media attention occurred on April 22, 2021—the day of the summit—when 18 reports were published, accounting for 56% of all collected content. This clearly demonstrates the Chinese media's preference for a concentrated, rapid-response strategy when covering major speeches by national leaders. Report volume dropped quickly thereafter, with 6 articles on April 23, 3 on April 24, and none on April 25. Two follow-up or retrospective articles appeared in October 2021 and July 2022, indicating that the issue did not enter a sustained news cycle, and public attention was largely confined to the temporal node of the leader's appearance at the summit.

A cross-analysis of media type and publication date (see Chart 31) reveals that on April 22, Party-run media contributed 9 articles, Institutional media 7, and Mass media 2. This pattern highlights the agenda-setting role of Party media in initiating coverage, with institutional media following up through dissemination or

analytical interpretation. The limited involvement of mass media indicates that this type of climate diplomacy content wasn't adapted into emotionally resonant or socially engaging narratives, and in lower participation from popularized media platforms.

Chart 31 – Distribution of News Reports by Media Type Over Time (Event 6)



In sum, Xi Jinping's speech at the Leaders' Summit on Climate triggered a highly institutionalized media response within the Chinese communication system. The coverage structure was dominated by Party-run and institutional media, with a balanced mix of original and reposted content, mostly originating from a small set of core mainstream outlets. In terms of timing, the coverage followed a single point burst pattern, showcasing the coordinated efficiency of Chinese media in executing climate diplomacy communication tasks.

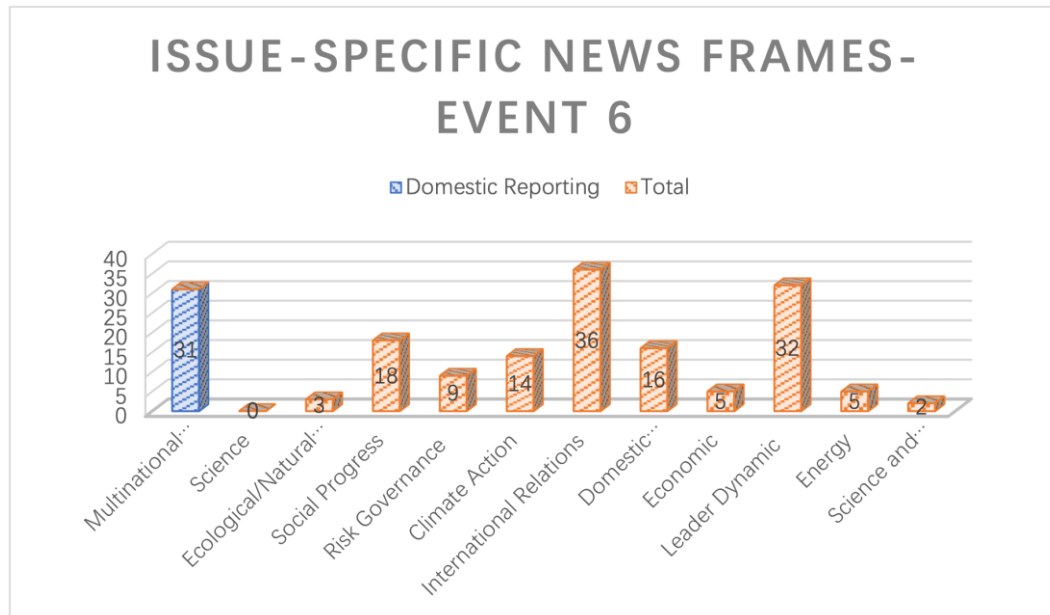
5.3.6.3 News Framing Analysis

a. Issue-Specific Frames

In this sixth case, the use of Issue-Specific News Frames is notably concentrated (see Chart 32), reflecting the Chinese media's core narrative focus

when reporting on the Leaders' Summit on Climate and Xi Jinping's speech. The two most salient frames are International Relations and Leader Dynamic, appearing 36 and 32 times respectively. This high frequency is closely tied to the nature of the event itself—namely, an international multilateral climate summit with the head of state as a principal speaker.

Chart 32 – Issue-specific News Frames (Event 6)



Within the International Relations frame, some reports integrated subframes such as Climate Cooperation and Advocacy or Power Battle. For example, Xinhua News Agency cited Xi Jinping's diplomatic appeal: "President Xi emphasized the need to work together in cooperation" ("习近平主席指出要携手合作"), while also stating that "developed countries, which bear inescapable historical responsibility for climate change... should not keep pointing fingers at others" ("对气候变化负有不可推卸历史责任的发达国家.....不应一味指手画脚"), presenting a critical tone toward Western positions on climate responsibility. Media reports also frequently mentioned the Paris Agreement, COP26, and China's hosting of the 15th Conference of the Parties to the Convention on Biological Diversity, reinforcing China's image of multilateral engagement in global environmental governance.

The frames Social Progress (18 times), Domestic Politics/Regulatory Processes (16 times), and Climate Action (14 times) were also commonly used. The

Social Progress frame was often expressed in promotional and moral mobilization language. For instance, CNR News quoted Xi Jinping as saying: "Humanity should take nature as its root and respect nature" ("人类应该以自然为根，尊重自然"), and added in its commentary: "The ecological environment is the foundation for human survival and development" ("生态环境是人类生存和发展的根基"), reflecting an intent to educate the public on ecological values.

Under the Domestic Politics/Regulatory Processes frame, some media like Xinhua and CRI Online focused on China's "dual carbon" pathway and goals, emphasizing the strategic of governance. The Climate Action frame exhibited variation: CCTV News highlighted the symbolic meaning of Xi's participation in international summits, while Zhejiang Daily emphasized institutional commitments such as "the China-US Joint Statement on Climate Crisis" ("中美发布《气候危机联合声明》") and "the inclusion of ecological civilization principles into the Constitution" ("生态文明理念写入宪法"). This reflects a dual emphasis on policy commitments and governance mechanisms. It is worth noting that most media framed policy issues through direct quotations of Xi's speech, aiming to construct authority and legitimacy.

Other frames include Risk Governance (9 mentions), Economic (5 mentions), and Energy (5 mentions). The media made moderate use of the Risk Governance frame, mostly addressing the challenges and uncertainties in the transformation process. For example, Guangming Net (光明网) noted that "China's ecological civilization construction still faces many practical contradictions and challenges" ("我国生态文明建设仍然面临诸多现实矛盾和挑战"), while Xinhua (新华社) pointed out that "extreme weather poses serious challenges to human survival and development" ("极端天气给人类生存和发展带来严峻挑战").

The Economic and Energy frames appeared five times each, covering issues such as green investment, clean energy transition, and GDP growth. For instance, China National Radio (央广网) reported on China's investment in foreign new energy projects, while Guangming Net emphasized the role of the green economy in supporting China's growth model. All content associated with the Economic frame was classified under the sub-frame "Benefits of climate protection," further

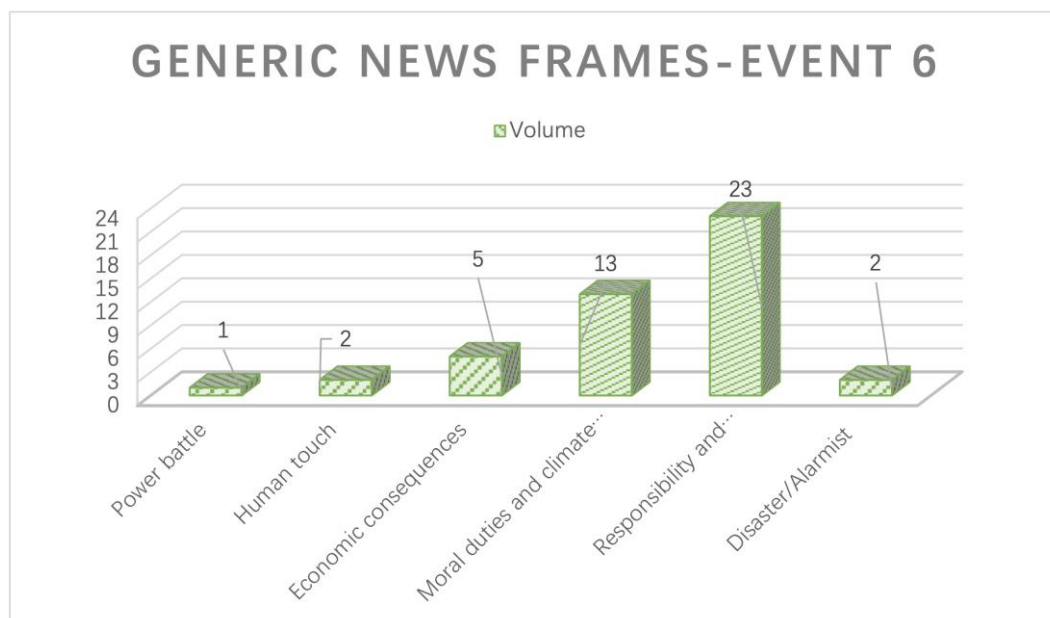
demonstrating the Chinese media's positive narrative surrounding green transformation.

By contrast, the Science frame did not appear at all. Ecological/Natural Impacts and Science and Technology and Its Application appeared only 3 and 2 times, respectively. This indicates that in politically and diplomatically oriented event coverage, media tend to focus more on state actors and policy discourse, rather than rational discussions of science and environmental systems.

In summary, the distribution of frames in this case is highly concentrated around the axis of diplomacy, leadership, and policy, showcasing the Chinese media's strategy of constructing a national narrative image in global climate governance. In terms of reporting scope, domestic reporting overwhelmingly dominated. Only one transnational article—from Observer Network—criticized the U.S. commitments, accounting for merely 3% of the sample. This may show that in such international events, Chinese media primarily function as tools for external position declaration and internal consensus building.

b. Generic News Frames

Chart 33 – Generic News Frames (Event 6)



As for Generic News Frames, the most frequently used was Responsibility and Accountability, appearing 23 times and ranking first (see Chart 33). This frame emphasizes China's sense of responsibility in global climate governance, while also highlighting the responsibility of developed countries and the international community. Phrases such as "actively fulfilling commitments" ("积极履行承诺") and "making contributions to all humanity" ("为人类作出贡献") were frequently used. For instance, Xinhua News Agency quoted Xi Jinping as saying: "Developed countries should demonstrate greater ambition and action" ("发达国家应该展现更大雄心和行动") and "The international community must show courage and take responsibility" ("国际社会要勇于担当"), and clearly asserting that "China assumes its responsibilities based on the vision of building a community with a shared future for mankind" ("中国基于推动人类命运共同体的责任担当").

The second most frequent frame was Moral Duties and Climate Justice (13 times), highlighting the rights claims and historical injustice concerns of developing countries in climate governance. An article published by the Ministry of Ecology and Environment quoted Xi Jinping: "The international community should fully recognize the contributions of developing countries in addressing climate change and take into account their special difficulties and concerns" ("国际社会应该充分肯定发展中国家应对气候变化所作贡献，照顾其特殊困难和关切"), emphasizing the principle of "common but differentiated responsibilities" and expressing dissatisfaction with developed countries' delays in delivering climate finance commitments. These references demonstrate the Chinese media's ongoing focus on issues of global justice.

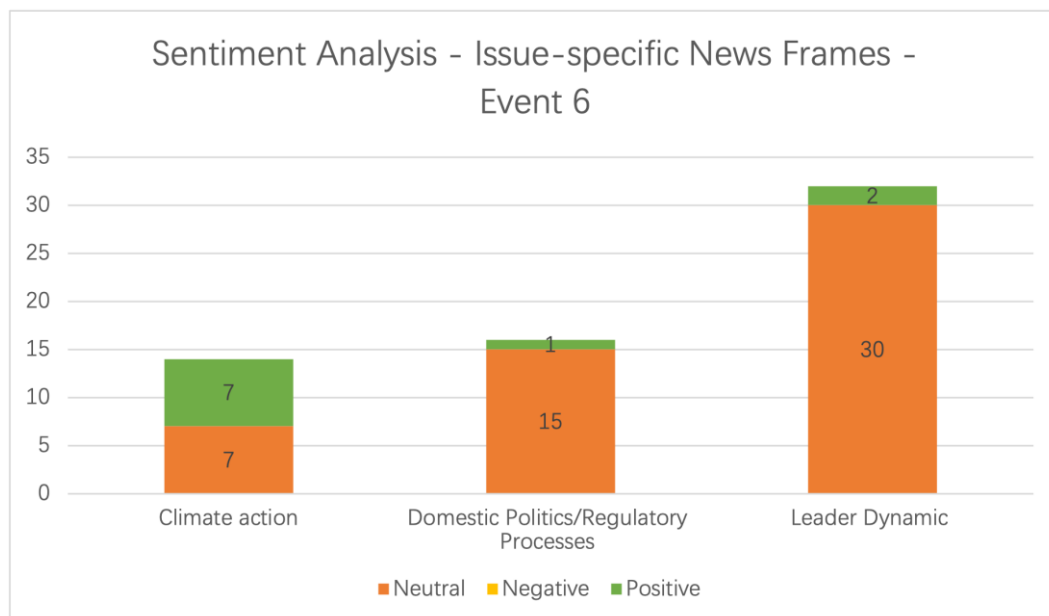
The Economic Consequences frame (5 times) highlighted the positive effects of green development on national economic restructuring and competitiveness. For instance, reports by Xinhua and CNR News discussed China's growing investment in renewable energy and new energy vehicle industries, showing how policy guidance and market vitality are interlinked. The Power Battle frame appeared only once and referred to criticisms directed at U.S. leadership pledges. This indicates that the event was not framed as a geopolitical confrontation, but rather as a platform for cooperation and institutional development.

In conclusion, the generic frames used in this case reflect a mainstream narrative centered on "responsibility" and "climate justice," emphasizing national commitment, international initiatives, and institutional construction. The distribution of these frames clearly reveals the core discursive strategies and narrative positioning adopted by Chinese media in global climate discourse.

5.3.6.4 Sentiment and Discursive Stance

This section analyzes the tone associated with the Issue-Specific Frames used in the sixth case, based on the visualized data, to further explore the discursive tendencies adopted by Chinese media in reporting the Leaders' Summit on Climate and Xi Jinping's speech. According to Chart 34, the overall tone of the coverage displays a combination of high positivity and functional neutrality, with no negative tone observed. This trend, to some extent, aligns with the traditional narrative logic and ideological control often present in Chinese media when reporting on major political and diplomatic events.

Chart 34 – Sentiment Analysis (Event 6)



Among the three main framing dimensions subjected to sentiment analysis, the Leader Dynamic frame appeared most frequently, with 32 articles, of which 30

were neutral in tone and only 2 were positive. These reports were largely characterized by official paraphrasing, authoritative citations, and factual statements, without explicit evaluative commentary on the leader's speech or actions, thereby preserving a neutral and authoritative sentiment. Media outlets such as CCTV News and Xinhua News Agency commonly used neutral expressions such as “Xi Jinping pointed out”, “proposed”, and “emphasized” (“习近平指出”, “提出”, “强调”), conveying state positions and initiatives without personalizing the discourse. This tone choice reflects how the leader's discourse is constructed as a “proxy for the national stance” rather than as personal opinion, and serves a communication strategy focused on political centrality and informational consistency. The two positive-tone reports—published by CNR News and Guangming Net—provided interpretive commentary on Xi's speech with a more educational slant. Notably, both titles included the phrase “Daily Quote from Xi Jinping” (“每日一习话”), implying a routine of studying the leader's statements. As such, these two articles were coded under promotional discourse regarding the national leader.

Within the Domestic Politics/Regulatory Processes frame, 16 reports were identified, among which 15 were neutral and only 1 was positive. This distribution indicates that although these articles addressed key policy themes such as carbon peaking and carbon neutrality, they predominantly employed descriptive language, avoiding strong value judgments about the effectiveness or trajectory of the policies. The single article with a positive tone, published by Guangming Net, explicitly stated: “Since the 18th National Congress of the Communist Party, China's... ecological civilization efforts have achieved historic results” (“党的十八大以来, 中国.....生态文明建设取得历史性成就”), offering a favorable portrayal of the nation's governance capacity.

Compared to the above two frames, the Climate Action frame showed a relatively higher proportion of positive sentiment. Among the 14 reports, 7 were positive and 7 were neutral, making it the only frame where positive and neutral tones were evenly distributed. These reports primarily highlighted China's proactive actions and international commitments in addressing climate change. Media outlets such as Xinhua and CCTV News adopted positive expressions such

as “carried out actions extensively and deeply” (“广泛深入开展行动”), “continued to benefit others” (“持续造福”), and “made contributions” (“作出贡献”), reinforcing the image of China as a responsible and proactive participant in global climate governance.

In summary, the sentiment distribution in this case reveals three distinct trends: 1- Depersonalized neutrality is prevalent in reports involving state leaders or policy declarations. This tone helps maintain the formality and ceremonial nature of such reports, distinguishing them from other types of news coverage; 2- In contexts emphasizing climate action achievements and China’s role in global governance, the positive tone becomes significantly more pronounced, constructing an image of China as responsible, reliable, and leading in the climate domain; 3- The absence of negative tone suggests that in politically sensitive contexts, Chinese media avoid any form of skepticism or oppositional discourse, underscoring the highly affirmative tendencies within China’s climate communication framework.

This tonal structure reflects not only the operational logic of China’s state media system but also the choice of combining positive portrayal and neutral description to serve dual objectives.

5.3.6.5 Key Findings of This Case

Through a three-nivels analysis of media coverage related to Xi Jinping’s speech at the 2021 Leaders’ Summit on Climate (Event 6), this study reveals the highly centralized communication model, state-centered discursive structure, and systematically biased tonal orientation adopted by Chinese media when addressing major climate diplomacy topics. At the level of media coverage, this case exhibits a distinctive pattern of mainstream media focus, concentrated release and re-dissemination, with Party-run and institutional media accounting for 94% of the reports. The share of original and republished content is roughly equal; however, the sources of republished articles are highly concentrated in official platforms such as Xinhua News Agency, reflecting the event’s political sensitivity and policy-oriented nature within China’s national discourse system.

Regarding Issue-Specific News Frames, media coverage was strongly centered on International Relations and Leader Dynamic, appearing 36 and 32 times respectively. This framing indicates that the event was constructed in Chinese media narratives as both a diplomatic platform for articulating national positions and a symbolic site for showcasing top-level leadership. Reports commonly referenced diplomatic terms such as the Paris Agreement, COP26, and the principle of common but differentiated responsibilities, reinforcing China's identity as both a participant and a leader in global climate governance. Meanwhile, the Leader Dynamic frame served to portray a stable, authoritative, and trustworthy national image through extensive coverage of Xi Jinping's statements and actions.

Other frames such as Social Progress, Domestic Politics/Regulatory Processes, and Climate Action jointly contributed to a positive depiction of China's internal governance capacity, institutional legitimacy, and implementation outcomes. Notably, no significant new themes were identified under the "Other" category, media coverage was highly focused on the core diplomatic and policy-oriented agenda.

In terms of Generic News Frames, the dominant discursive logic was shaped by Responsibility and accountability and Moral Duties and Climate Justice, appearing 23 and 13 times respectively. This distribution reflects the Chinese media's effort to emphasize China's role as a responsible major power and to advocate for the discursive rights of developing countries in the global climate narrative. The Economic Consequences frame appeared less frequently and played a secondary role. This structured frame configuration further confirms that in the domain of climate diplomacy, Chinese media tend to construct communication narratives grounded in order, cooperation, and moral legitimacy, rather than confrontational representations.

At the level of Sentiment and Discursive Stance, negative tone was almost entirely absent. Media reports employed only neutral and positive tones. Reports under "Leader Dynamic" and "Domestic Politics" overwhelmingly adopted neutral expressions, maintaining the authoritative and de-emotionalized features of official communication. In contrast, reports using the Climate Action frame displayed a balanced sentiment distribution between neutral and positive, indicating that when emphasizing China's climate commitments and governance outcomes, media were

more inclined to adopt affirmative language. This tonal pattern illustrates the Chinese media's strong preference for positive communication in politically sensitive topics and reflects a strategic discursive control approach adopted by the state communication system to influence global public opinion and shape national image.

Additionally, it is worth noting that six duplicated media articles were excluded from the sample due to complete textual repetition (including identical titles and body text). These reports were primarily published on Party-affiliated platforms such as Communist Party Members Network, People's Daily Online, and China Government Network, further indicating the top-down nature of the communication process, with Party-run media leading dissemination through multi-channel reposting, forming a structured mechanism of content reproduction. Among them, China Government Network reposted 11 articles from Xinhua, 7 of which were extremely brief—comprising only two to three sentences—and exhibited a headline-as-content pattern. Due to the lack of sufficient semantic content, these short texts could not be included in the Generic Frame analysis but were still considered in the Issue-Specific Frame coding.

In conclusion, this case demonstrates a highly institutionalized, centralized, and state-oriented media communication structure in China when facing international climate diplomacy scenarios. Through unified agenda-setting and content dissemination by the mainstream media system, Chinese media reinforced positive narratives of national stance expression and governance capacity.

5.4. Discussion

This chapter aims to synthesize the analytical findings from the six preceding case studies and further illuminate the divergent framing strategies, media representation logics, and institutional foundations underlying climate change coverage in Chinese and Brazilian media. Through a systematic analysis of 261 news articles, this study identifies not only the dominant issue-specific and generic news frames as well as tone types employed by the media in both countries but also reveals how these discursive practices are embedded within distinct national

communication systems, political cultures, and media operational logics. The following three subsections provide an in-depth comparative discussion along three dimensions: framing strategies, influencing factors, and the role of dominant themes.

5.4.1 Comparative Framing Strategies in Brazilian and Chinese Media

Through the systematic analysis of the six cases, the study finds that Brazilian and Chinese media exhibit significantly different framing strategies, while also sharing certain overlaps and tensions that together shape the discursive pathways through which climate issues are communicated.

From a structural perspective, Brazilian media demonstrate a pluralistic framing ecology. Commercial media, institutional platforms, and specialized outlets jointly construct a relatively complex public discourse arena. Across multiple cases, Brazilian media made extensive use of frames such as Ecological/Natural Impacts, Domestic Politics/Regulatory Processes, Climate Action, Responsibility and Accountability, and Moral Duties and Climate Justice (see Chart 35 and 36), reflecting an intersecting narrative structure of crisis, policy, and societal impact. News reports frequently localized international events, embedding them within domestic crises (e.g., wildfires, floods) or policy disputes, thereby generating hybrid narratives that combine diversity and critical engagement. Critical tones were more frequent, especially in commercial outlets.

Chart 35 – Distribution of the Most Frequently Coded Issue-Specific Frames in Brazilian Media

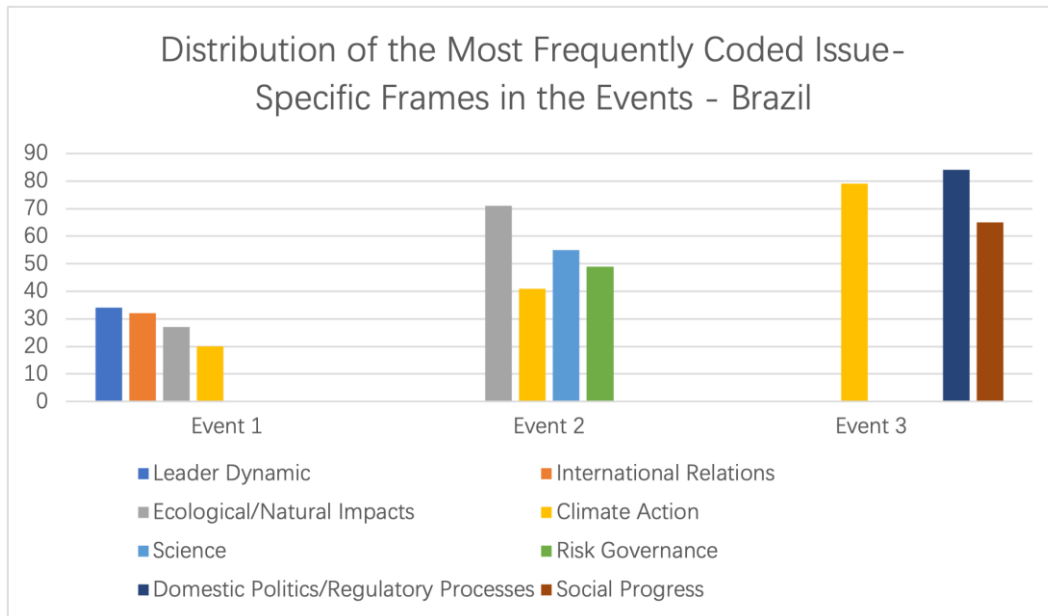
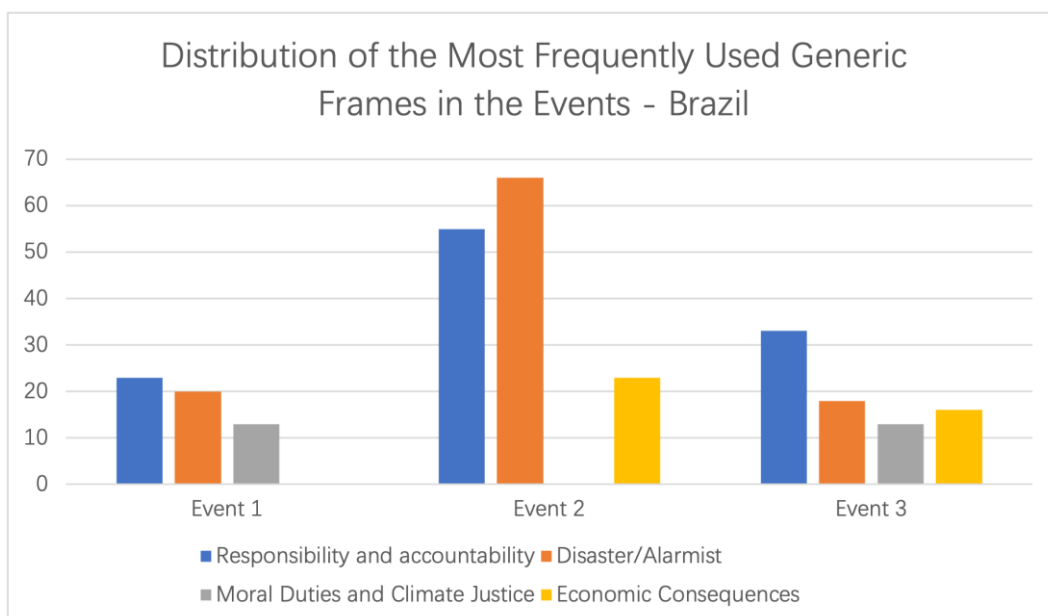


Chart 36 – Distribution of the Most Frequently Used Generic Frames in Brazilian Media



In contrast, Chinese media presented a markedly centralized and state-driven framing structure. Party-run and institutional media dominated agenda-setting, with coverage heavily focused on institutional legitimacy, policy achievements,

international commitments, and leader dynamics. In several cases, Chinese media consistently employed frames such as Responsibility and Accountability, Climate Action, Economic Consequences, and Leader Dynamic (see Chart 37 and 38), constructing a highly unified and functionally strong narrative system that affirms the role of the state. While Brazilian media tend to emphasize problem consciousness and social participation, Chinese media prioritize goal attainment, policy implementation, and moral responsibility in international governance.

Chart 37 – Distribution of the Most Frequently Coded Issue-Specific Frames in Chinese Media

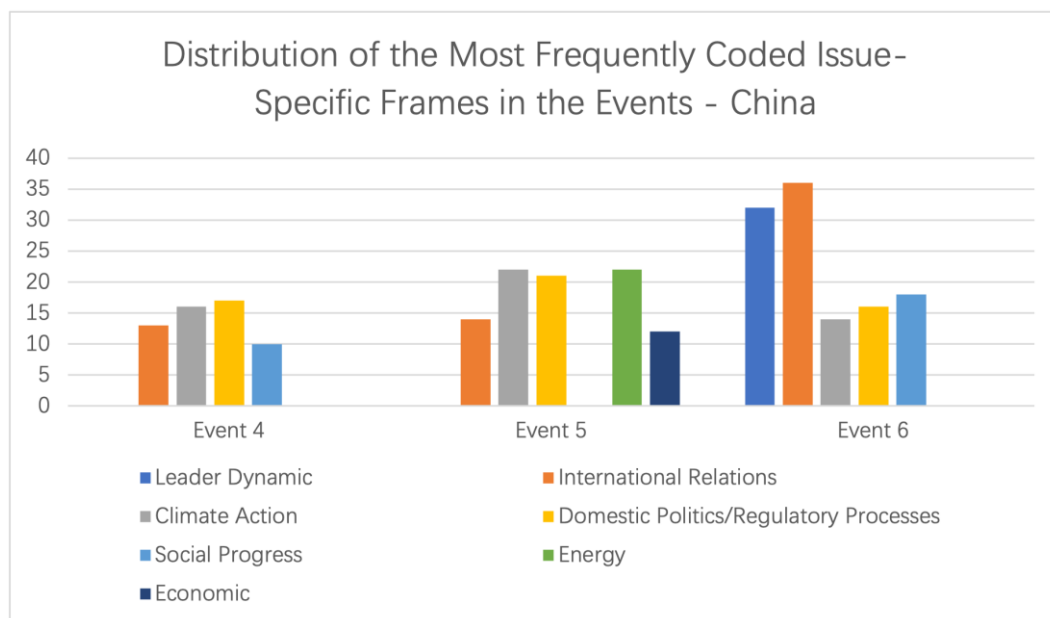
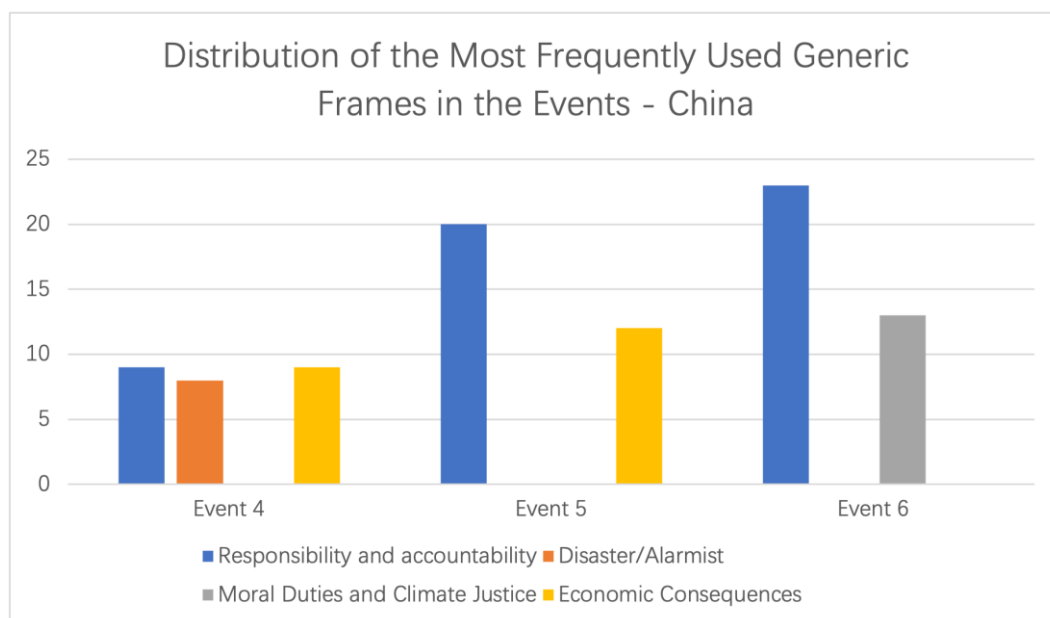


Chart 38 – Distribution of the Most Frequently Used Generic Frames in Chinese Media



Nonetheless, these contrasts are not absolute. Certain tensions were also observed within each country's media landscape. For instance, in Case 3, Brazilian institutional media used procedural language to convey policy credibility, while commercial media expressed public dissatisfaction through criticism, revealing internal discursive divergence. In China, although overall reporting leaned strongly positive, mass media attempted interpretive reconstruction in coverage of topics such as the Green Book or energy transition, suggesting that even under party-led dominance, mass media retain a degree of expressive latitude. Moreover, although tone control was strict in diplomatic reporting, Chinese media's articulation of Western climate responsibilities often contained implicit criticism, reflecting a dual strategy of cooperation and contestation.

In diplomacy-oriented events, both countries' media highlighted the significance of national leaders and international pledges. The Climate Action frame appeared frequently in both media systems, indicating its consensual value within national climate communication. However, differences remain: Brazilian coverage focused more on responding to climate disasters and mobilizing society, whereas Chinese media emphasized policy achievements and global responsibility. Additionally, while the Social Progress frame in Brazil centered on public participation, in China it served more as a vehicle for moral and educational messaging. Similarly, Ecological Impacts were framed in Brazil as urgent domestic

crises, but in China were externalized as othered crises, creating a sense of narrative distance.

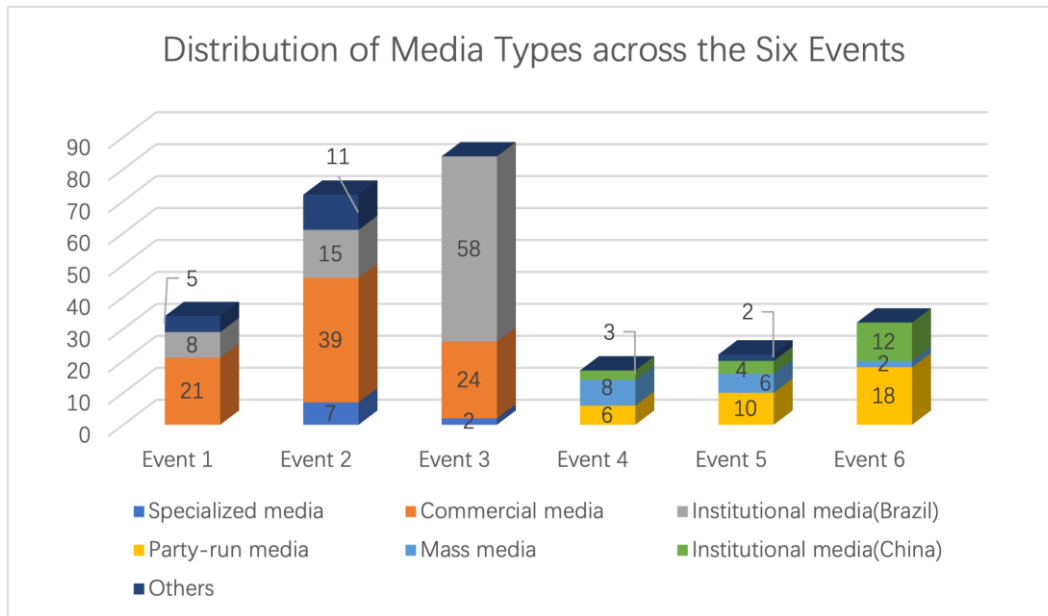
In summary, the framing strategies of Brazilian and Chinese media reflect distinct communicative logics driven by their institutional systems. Brazilian media construct a diverse and intersecting climate discourse structure, reflecting a pluralist media system and democratic contestation. Chinese media produce monolithic, state-affirming narratives, reinforcing policy goals, institutional logics, and national responsibility awareness within a guided communication framework. Nevertheless, in areas such as national identity construction, and diplomatic communication, both countries' media display strategic overlaps—highlighting the common challenges faced by emerging powers in climate communication.

5.4.2 Factors Influencing Climate Media Representations

This section aims to explore the structural and operational variables that shape how the media in Brazil and China represent climate issues. The findings indicate that media system type, editorial autonomy, political context, and event typology are key factors driving differentiated news framing strategies.

First, media system differences are clearly reflected in the distribution of media types (see Chart 39). Brazil's media ecology demonstrates a relatively pluralistic institutional structure. In the first three cases, commercial and institutional media jointly dominated agenda setting, resulting in diverse reporting styles and divergent viewpoints that created a rich and complex informational space. Even in state-driven topics such as Plano Clima, commercial outlets retained the capacity for original expression and often questioned the attainability and effectiveness of policy goals. In Brazil, institutional media mainly include outlets affiliated with government agencies, academic bodies, and political institutions. Specialized and international media further complemented the coverage by adding professional and analytical dimensions.

Chart 39 – Distribution of Media Types across the Six Climate-Related Events



In contrast, the Chinese media system follows a party-led, hierarchical, and controlled narrative model. Institutional media in China are almost entirely government-affiliated websites, and like party-run outlets, they operate under high levels of government control. Party-run and institutional media were dominant across all three cases—particularly in Event 6 (Xi Jinping’s speech) and Event 5 (renewable energy milestone)—where reporting was marked by centralized sourcing, uniform content, and consistent tone. While mass media had more room for expression in socially oriented topics (e.g., Event 4 on the Green Book), their agenda-setting power was still largely confined to interpreting and extending official narratives.

Second, editorial independence constitutes another decisive factor in the divergence between Brazilian and Chinese climate coverage. In Brazil, especially within the commercial media sector, editors often enjoy high levels of autonomy and are able to express critical views outside institutional boundaries. For instance, in Event 3 (Plano Clima), institutional outlets such as Agência Gov and Agência Brasil presented the policy using procedural language, emphasizing institutional trust and participatory mechanisms. In contrast, commercial media openly questioned the feasibility and efficacy of the plan. Similar dynamics were observed in Events 1 and 2, where commercial media adopted critical tones to highlight deficiencies and contradictions in governmental climate governance.

In the Chinese context, even non-party-run mass media typically reproduce official stances. They participate in agenda construction primarily through indirect expression and information relay, operating within institutionally sanctioned frameworks. For example, in Event 6, core content was sourced from Xinhua News Agency and heavily featured direct quotations from national leaders, with minimal independent reporting from mass media. This pattern suggests that even so-called “non-party” media tend to function as quasi-official platforms in politically sensitive climate contexts, reinforcing rather than diverging from the dominant state narrative.

Third, platform mechanisms and content reproduction practices also play a role. In China, there is frequent non-editorial replication, where identical content is circulated across multiple platforms with no substantive modification. This practice contributes to a structurally reinforced narrative stability and content control. In contrast, Brazilian media seldom exhibit this phenomenon. While content sharing does occur, it more often involves editorial re-framing or narrative recomposition, signaling higher information fluidity and discursive diversity.

Fourth, the broader political and societal context significantly shapes how climate issues are framed. In Brazil, the frequency of extreme climate events (e.g., the 2024 wildfires and floods) and the salience of the Amazon ecosystem generate a sense of societal urgency, turning climate change into an intersectional issue of governance, justice, and national development. In Event 2, media coverage constructed narratives linking natural disasters, state failure, and social crisis, frequently emphasizing governmental accountability and community vulnerability. These framing practices align with the Brazilian media’s role in democratic oversight and public critique. In contrast, Chinese media are more inclined to emphasize diplomatic milestones, policy achievements, and technological optimism. In Events 4 and 5, the dominant tone was overwhelmingly positive, positioning national actions as model practices in global governance and reinforcing narratives of developmentalism and institutional efficacy. This framing structure projects an image of no conflict—high achievement—and legitimacy, while simultaneously constraining space for public deliberation on social discussion and policy trade-offs.

Fifth, event typology itself strongly shapes media narratives. In diplomatic events (Events 1 and 6), Brazilian media combined Lula's speech with reflections on domestic climate crises and efforts to rebuild international influence, employing a hybrid framing strategy that mixed internationalism with domestic critique. Chinese media, on the other hand, portrayed Xi Jinping's address as a projection of national leadership and policy orientation, reflecting a centralized narrative strategy. In policy-related events (Events 3 and 5), Brazilian media emphasized public participation and procedural transparency, with critical voices emerging predominantly from commercial media. In contrast, Chinese reporting focused on the early fulfillment of policy targets and the logic of institutional performance. In socially impactful events (Events 2 and 4), Brazilian coverage linked disasters like wildfires and floods to issues of justice, health, and marginalized communities. Chinese media largely avoided domestic crisis framing, instead relying on external references such as global trends and technological solutions, reinforcing a developmentalist discourse.

In summary, Brazilian media act as both a relay and a watchdog, whereas Chinese media function primarily as amplifiers of institutional discourse. These representational differences are not only a reflection of media system types but are also deeply embedded in political culture, access to information, journalistic practices, and platform architectures. It is important to note, however, that despite systemic divergence, both countries' media exhibit converging discursive strategies on issues such as national responsibility, climate action, and global image-building, revealing a shared logic of expression among emerging powers in climate communication.

5.4.3 Dominant Themes and Their Role in Climate Narratives

This section explores the types, functions, and cross-national variations of dominant climate-related themes identified in the six cases. It aims to uncover how these themes shape the direction and structure of national climate communication. The analysis reveals that both Brazilian and Chinese media construct two thematic systems around climate change: one composed of shared themes, including Climate

Action, Domestic Policy/Regulation, International Relations, and Responsibility and Accountability; and another comprising nation-specific themes, which differ in their orientation toward social participation (in Brazil) versus institutional demonstration (in China).

Regarding shared themes, both countries emphasize climate action, policy pathways, international responsibility, and institutional roles. In Brazil, Events 1 (Lula's UN speech), 2 (forest fires), and 3 (Plano Clima) are all heavily focused on these four categories. Notably, the "Responsibility and Accountability" frame is often accompanied by a critical tone. Media not only underscore Brazil's obligations in global climate governance but also critique developed countries for their inadequate climate finance commitments, revealing the multi-tension embedded in this theme. In China, Events 4 through 6 also highlight these four themes; however, coverage tends to frame them more positively or neutrally, often portraying them as reflections of institutional strength. For instance, in the case of the "renewable energy milestone in the 14th Five-Year Plan" (Event 5), climate action is framed using expressions such as "achieved ahead of schedule" and "global leadership," which enhance perceptions of policy effectiveness and institutional legitimacy.

The existence of such shared framing strategies suggests that despite differing institutional contexts, both Brazilian and Chinese media must engage in narrative practices that address national image construction, policy legitimation, and expressions of international responsibility. However, the tonal differences and discursive structures within these shared themes expose deeper contrasts. Brazilian media permit the articulation of conflict, divergence, and negotiation within shared topics, while Chinese media emphasize order, effectiveness, and authoritative expression. These internal tensions within shared frames indicate formal similarities but substantive divergences in narrative construction.

At the same time, each country's media system exhibits unique thematic preferences. Brazilian media show a strong sensitivity to issues concerning vulnerable groups and ecological injustice, emphasizing themes such as Health Impacts, Indigenous and Minority Representation, and Environmental Justice. In Event 2 (forest fires), outlets frequently cite public health experts on the health risks of wildfire smoke, establishing a secondary narrative linking climate disasters to

public health crises. In Events 1 and 3, indigenous voices, NGOs, and opposition groups are cited to frame climate change within broader contexts of cultural inclusivity and social inequality. These narrative practices disrupt state- and diplomacy-centered frameworks, repositioning climate discourse within the realm of civil rights, cultural identity, and public participation, thereby creating a more civic-oriented media environment.

In contrast, dominant themes in Chinese media center around Technological Innovation, Policy Goal Achievement, and Leader Image and National Unity, all of which are prevalent across multiple cases. For instance, in Events 5 (renewable energy goals) media coverage frequently highlights breakthroughs in smart grids, energy storage, and electric vehicles, casting these developments as symbols of national competitiveness. In socially impact events (e.g., the release of the Green Book), expressions such as “driven by the targets” and “international leadership” dominate the narrative logic, reflecting a development-centered strategy for constructing national identity. Moreover, the “Leader Dynamic” frame appears frequently in Event 6 and is delivered in a uniformly neutral tone, crafting a stable, controllable, and morally persuasive leader image that supports China’s soft power discourse in international climate communication.

From a narrative effects perspective, the thematic differences produce distinct communicative outcomes. In Brazil, dominant themes foster deliberative discourse and public debate. Media narratives offer diverse perspectives and conflicting frames, positioning climate change as a central issue in democratic oversight, public engagement, and policymaking. This is achieved through a coupled narrative of science, governance, justice, and risk, embedding climate issues deeply within societal structures. In contrast, in China, dominant themes support strategic communication and nation branding. The narrative chain of development, policy, responsibility and leadership reinforces institutional legitimacy and international credibility. Media serve not only as interpreters of climate policy but also as amplifiers of state actions, emphasizing control, positivity, and contribution.

In summary, the thematic systems of Brazilian and Chinese media reveal structural divergences: Brazil presents a more inclusive and critical thematic ecology, highlighting conflicts, failures, and multiple voices, whereas China’s themes are cohesive and aspirational, prioritizing national coherence, progress, and

responsibility. Beneath the surface of shared themes, both countries demonstrate deep-seated tensions between narrative strategies and institutional logic. Brazilian media use thematic integration to mobilize public engagement, while Chinese media employ discursive discipline to reinforce institutional legitimacy and project soft power. This comparison of thematic structures not only underscores the media system differences between nations but also reminds researchers that cross-national climate communication studies must go beyond frame typologies to examine how themes are embedded in political culture, institutional design, and communicative ecosystems in order to fully grasp the mechanisms and effects of discursive power in climate narratives.

Taken together, this comparative analysis reveals how Brazilian and Chinese media construct climate narratives through distinct yet revealing logics. While Brazilian outlets frame climate issues as contested political terrain—intertwining science, governance, social justice, and environmental urgency—Chinese media portray climate as a sphere of national achievement, moral leadership, and institutional strength. These differences are not merely editorial; they reflect more profound divergences in political systems, media autonomy, and climate governance cultures. Yet, beneath these divergences lie shared pressures to articulate national and global responsibility through climate discourse, suggesting that even heterogeneous systems respond to converging normative imperatives. Ultimately, this contrast highlights the importance for climate communication scholars to situate media discourse within broader political, ideological, and systemic frameworks when analyzing transnational environmental narratives.

6. Conclusion

6.1 Summary of the Study

Climate change has emerged as one of the most global and complex public issues of the 21st century. It not only falls within the domain of natural science research but also profoundly influences political decision-making, economic development, social governance, and everyday life. From the perspective of the history of science, the origins of modern climate science can be traced back to early 19th-century studies on the greenhouse effect (Dessler, 2011). Since the latter half of the 20th century, the impact of human activities on the climate system has increasingly become a central concern within the scientific community. The establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988 marked the transformation of climate science from an academic topic to a global policy issue. Its series of assessment reports facilitated the consolidation of scientific consensus and the institutionalization of global climate governance. Nevertheless, despite the strengthening of scientific consensus, significant divergences persist in societal perception and policy responses to climate change. This indicates that climate discourse is shaped not only by scientific evidence but also by political, economic, social, and cultural factors.

Within the field of social communication studies, Environmental Journalism constitutes a critical subfield, and Climate Communication has evolved into a highly politicized and internationally influential theme. Environmental journalism fulfills functions of information dissemination and social oversight, while simultaneously reflecting the logics of governance and discursive practices surrounding environmental and climate issues. China and Brazil, as two pivotal actors in the Global South, exemplify distinct yet representative cases in climate communication and environmental journalism research.

China's media system is deeply embedded within the party-state structure (Zhao, 2011). The development of environmental journalism has long been shaped by policy directives and institutional constraints (Repnikova & Fang, 2019), with reporting characterized primarily by propaganda, public education, and limited

oversight. In the context of digital transformation, Chinese media exhibits features of state-led agenda steering. In contrast, Brazil's media ecology operates within a dual structure of commercialization and democratization (Albuquerque, 2011; Loose & Carvalho, 2023). Brazilian news production is driven not only by market logics but also by the influences of social movements, digital communication, and political polarization (Ituassu & Guerrero, 2024; Tavares et al., 2024; Evangelista & Garcia, 2024).

From a comparative Global South perspective, China and Brazil display both convergences and divergences in their climate contexts. Their commonality lies in their pivotal roles in global climate governance and the shared challenge of balancing domestic economic growth with international responsibility. Their differences, however, are rooted in political systems, socio-cultural orientations, media autonomy, and modes of public participation. China is characterized by state-driven and institutionalized responses, whereas Brazil emphasizes public debate, social mobilization, and ecological justice. These contextual differences provide a solid foundation for the cross-national comparative framework of this research.

At the theoretical level, Framing Theory serves as a crucial analytical tool in climate communication studies. Originating from interdisciplinary intersections across sociology, psychology, framing theory underscores that news reporting—through the processes of selection, emphasis, interpretation, and structuring of information—can shape public cognition, emotional responses, and policy attitudes toward an issue (Entman, 1993; Lecheler & de Vreese, 2018). In the domain of climate communication, researchers have observed that even seemingly similar terminological choices (e.g., “climate change” versus “global warming”) can evoke distinct emotional reactions and societal impacts (Schuldt et al., 2011). Therefore, examining the framing construction and narrative logic of climate news within the institutional, media, and cultural contexts of China and Brazil is not only of scholarly significance but also offers practical insights for climate communication in the Global South.

Building upon the aforementioned background, this research seeks to address three core questions:

1- What framing changes have the media undergone during the development process in these two countries?

2- What are the differences between state-owned (party-run/institutional) and mass/commercial media in reporting on climate change?

3- As developing countries, what political, economic, and cultural factors influence media reporting on climate change in China and Brazil?

To answer these questions, this dissertation adopts a combined theoretical and empirical approach to conduct a cross-institutional and cross-cultural comparative study of climate news, with its academic contributions reflected in three main aspects:

Enriching Global South climate communication studies: Existing literature on climate communication is heavily concentrated on Western democratic contexts, paying limited attention to the institutional logics, media practices, and discursive constructions in non-Western countries.

Advancing the cross-context and multi-level application of framing theory: Through empirical analysis, this study examines how news frames operate under different political systems and cultural settings, emphasizing the moderating roles of institutional, cultural, and affective factors in framing effects.

Informing climate communication practice: By uncovering differences between Chinese and Brazilian media in discursive construction, issue selection, and social functions, this research provides insights for public communication and policy outreach.

Methodologically, this research adopts a combination of qualitative content analysis and case study. Six domestic climate-related cases were selected, with three from China and three from Brazil, covering international climate speeches by national leaders, national climate policies and plans, and socio-environmental impacts of climate change. This multi-dimensional selection ensures representative coverage of both political and social aspects of climate discourse.

The content analysis framework integrates Issue-Specific Frames and Generic Frames, supplemented by Sentiment Analysis, enabling a systematic examination from three dimensions: content structure, narrative strategies, and discursive functions. The research corpus consists of 261 online news articles from mainstream media in China and Brazil, supported by academic literature and policy background documents to contextualize events and media narratives. This research design ensures the feasibility of cross-national comparison while providing

analytical tools to capture the complexity of climate communication across different institutional environments.

Focusing on climate news coverage in China and Brazil, this study combines theoretical discussion with empirical analysis to explore how global issues are localized and discursively constructed within national media systems. Chapter 2 traces the evolution of climate change from a scientific topic to a global governance agenda. Drawing on Kuhn and Latour, it explains the process through which climate science achieved paradigm-based consensus and how this scientific consensus is constrained by political, economic, and socio-network factors during its societal reception. Furthermore, the chapter presents seven dimensions of comparison highlighting the similarities, differences, and complementarities between China and Brazil in climate policy, domestic institutions, socio-cultural contexts, and international roles. While China tends to advance climate action through institutionalized pathways and technology-driven strategies, Brazil emphasizes ecological justice, regional leadership, and social mobilization.

Chapter 3 systematically examines the developmental trajectories, institutional logics, and reporting characteristics of environmental journalism in China and Brazil, revealing the structural differences in news production and social functions under distinct political systems. This lays the institutional and communication foundation for the comparative study of climate news.

In China, the evolution of environmental journalism has been policy-driven. Its reporting has primarily focused on propaganda and public education, with a limited capacity for watchdog functions. With the advancement of digital media integration, the convergence of traditional and new media has further incorporated environmental and climate issues into national communication strategies, transforming them into key platforms for showcasing state governance capacity and ecological civilization building.

In contrast, Brazilian environmental journalism developed in a media ecosystem shaped by democratization and commercialization. News production is more strongly influenced by market logics and the discourse of political elites, and coverage tends to highlight social conflicts, environmental disasters, and public oversight functions. Digitalization and social movements have fostered greater diversity of topics and enhanced civic engagement. However, overall

environmental reporting still demonstrates event-driven, fragmented, and commercially oriented characteristics. At the same time, digitally native alternative media play a unique role in expanding environmental news agendas and amplifying the voices of marginalized groups (Sarmiento, 2019; Loose & Carvalho, 2023), while long-term engagement by academic communities and civil society organizations provides the social foundation for the sustainable development of environmental public agendas.

Chapter 4 reviews and reconceptualizes Framing Theory and its applicability to climate communication research, emphasizing the roles of linguistic nuance, cultural resonance, and institutional context in framing effects, and providing conceptual tools and analytical pathways for cross-national climate news analysis.

By comparing the scientific definitions, public perceptions, and discursive uses of the two core terms—“climate change” and “global warming”—in political and media discourse, the analysis demonstrates how subtle linguistic differences can generate significant framing effects. This illustrates that terminology choice not only influences the agenda construction of news coverage but also potentially shapes public risk perception and policy attitudes.

This chapter also traces the academic origins and interdisciplinary evolution of framing theory, encompassing its sociological and psychological foundations, and explicates its core concepts, typologies, and research methodologies. It critically reflects on the theory’s applicability in contemporary communication environments marked by digitalization, political polarization, and selective exposure. The analysis reveals that factors such as emotional mobilization, cultural resonance, and asymmetric polarization have become key moderators of framing effects (Lecheler & de Vreese, 2013; Lecheler & de Vreese, 2019; Oliver et al., 2020; Bennett & Livingston, 2025). Moreover, it highlights that cross-national communication research must fully account for the cultural and discursive conditions of different social environments (Ituassu et al., 2023).

Chapter 5 constitutes the core empirical section of this study. It conducts a cross-national comparative analysis of six domestic climate-related events in China and Brazil, revealing the construction logic of news frames, institutional differences, and social meanings. These cases encompass national leaders’ climate

speeches, domestic policy announcements and updates, and the socio-environmental impacts of climate change.

Building on qualitative content analysis grounded in Issue-Specific Frames and Generic Frames, supplemented by sentiment analysis, this chapter presents its major findings across three analytical dimensions:

Firstly, it is about comparative framing strategies in Brazilian and Chinese media. Brazilian media focus on social conflict, environmental risk, and public accountability, and tend to construct hybrid narratives that combine institutional and critical perspectives, reflecting a pluralist media system and democratic contestation. By contrast, Chinese media center their climate reporting on institutional legitimacy, policy achievements, international commitments, and leader dynamics, and produce monolithic, state-affirming narratives consistent with a guided communication model aimed at reinforcing political legitimacy and projecting soft power.

Then, it comes to factors influencing climate media representations. The study finds that media discourse is shaped by the combined influence of media type, editorial autonomy, platform mechanisms and news production practices, political and social context, and event type. Brazilian media act as both relay and watchdog, balancing the transmission of official information with critical scrutiny. In contrast, Chinese media function primarily as amplifiers of institutional discourse, where reporting reflects state agenda-setting and policy integration logics, whereas Brazilian reporting is more heavily influenced by market-driven dynamics.

Finally, the study discusses the dominant themes and their role in Climate Narratives. The analysis reveals that both countries emphasize shared themes such as Climate Action, Domestic Policy, International Relations, and Accountability. Despite their different institutional contexts, Chinese and Brazilian media alike must engage in narrative work that constructs national image, legitimizes policy, and frames international responsibility. However, tonal divergence and discursive hierarchy distinguish the two media systems. Brazilian media allow for divergence, contestation, and negotiation within these shared themes, while Chinese media emphasize order, effectiveness, and authoritative expression.

In country-specific frames, Brazilian media demonstrate sensitivity to marginalized groups and ecological inequalities, highlighting themes such as

Health Impacts, Indigenous and Minority Representation, and Environmental Justice. This narrative trajectory extends climate issues into the realms of civic rights, cultural identity, and social participation, fostering a public-oriented communicative environment.

Chinese media, on the other hand, exhibit dominant themes of Technological Innovation, Policy Goal Achievement, and Leader Image and National Unity across multiple cases. These dominant narratives support strategic communication and nation branding, emphasizing controllability, positivity, and contribution. Overall, Brazil's thematic ecology is more inclusive and critical, highlighting conflicts, failures, and multiple voices, whereas China's thematic system is cohesive and aspirational, prioritizing national coherence, progress, and responsibility.

These themes not only influence news agendas and public perceptions but also respond directly to the three core research questions outlined at the beginning of this study.

1. How have media in the two countries experienced framing changes in the development of climate news?

Chinese and Brazilian media exhibit distinct evolutionary trajectories in the framing of climate reporting, reflecting patterns noted in existing scholarship.

In Brazil, prior studies indicate that climate news has evolved from crisis-oriented reporting toward a more diversified agenda. Early coverage relied heavily on alarmist environmental events, often overlooking deeper structural issues and social implications (Beling Loose & Villar Belmonte, 2023; Tourinho Girardi et al., 2020). Subsequently, with the influence of international climate governance and social issues, media increasingly focused on international events, minority groups, and social inequalities (Tourinho Girardi et al., 2018). Over time, climate reporting came to feature themes of objectivity, sustainability, and conflict (Beling Loose & Villar Belmonte, 2023; Costa Bueno, 2013).

The three Brazilian cases analyzed in this study reinforce and extend this trajectory: media coverage centers on social conflict, environmental risk, and public accountability, often adopting a critical tone and constructing hybrid narratives that reflect the pluralist nature of Brazil's media system and democratic public sphere.

In China, scholars have observed a discursive shift from viewing climate change as an "economic burden" to framing it as a "development opportunity," with

climate action portrayed as a pathway to sustainable growth and enhanced international competitiveness (Pan et al., 2021). Across the three Chinese cases, climate reporting is consistently embedded within the national narrative and nation-branding discourse, highlighting frames of policy achievements, institutional legitimacy, international commitments, and leader dynamics. Overall, Chinese coverage demonstrates a highly centralized communication style, dominated by positive or neutral tones, reflecting the strategic communication logic of the party-run and institutional media.

It is important to emphasize that this research is qualitative and case-based. While the themes and frames identified are illustrative and representative, they do not capture the entirety of climate communication in China and Brazil. Moreover, as the findings reveal, event type, political sensitivity, and social impact shape frame selection and discursive construction. Future research may adopt longitudinal, cross-event approaches to provide a more macro-level perspective. Nevertheless, this study clearly reveals the evolving framing patterns and current characteristics of climate reporting in both countries, across international relations, domestic politics, and socially embedded climate events.

2. What differences exist between party-run/institutional media and mass/commercial media in climate reporting?

The empirical analysis shows that differences in media types and reporting styles in both countries are strongly tied to institutional attributes and journalistic norms.

In Brazil, commercial media generally lead climate coverage, emphasizing criticality, competition, and conflict. During international policy events, institutional media such as Agência Brasil and official government websites primarily deliver procedural narratives, while commercial media maintain independent agenda-setting and space for criticism. In socially impactful climate events (e.g., forest fires), commercial media tend to adopt negative tones, highlighting accountability and social consequences, fulfilling the watchdog function of a democratized media environment.

In China, climate coverage is dominated by party-run and institutional media, with mass media acting primarily as explanatory and supplementary channels. During politically sensitive diplomatic or policy events (e.g., leaders' speeches or

the achievement of energy targets), party media retain narrative dominance and exhibit highly unified content. In social or scientific events (e.g., the release of the Climate Change Green Book), mass media gain slightly more expressive space, but agenda-setting still largely follows official releases, displaying a pattern of “interpretive supplementation.” Overall, Chinese mass media largely align with the themes and tones of party media, reflecting a centralized and institutionalized communication model.

This distinction underscores that editorial autonomy and institutional context are key drivers of media differences. Brazilian commercial media, with relative independence, can reflect criticism and pluralism; Chinese media, under state agenda guidance, demonstrate cohesion and integrative communication.

3. As developing countries, what political, economic, and cultural factors influence climate reporting in China and Brazil?

This study finds that the divergence in climate reporting between the two countries is profoundly shaped by some interrelated factors. Political system and governance model, China’s party-state system positions climate news to serve policy promotion, institutional legitimacy, and national image-building. Brazil’s democratization and dispersed power result in coverage that is pluralistic, event-driven, and emphasizes public oversight.

Secondly, about the Media system and market logic, Chinese media is more centralized, with a party and institution-dominated media structure, high content replication, and tonal consistency. While Brazilian media is a commercialized and diversified media landscape, marked by editorial independence, high information flow, and discursive pluralism.

When it comes to Socio-cultural context and issue embedding, Brazilian society shows heightened sensitivity to ecological disasters, Indigenous rights, and social inequalities, leading media to embed climate stories in social justice and civic participation discourses. Chinese media align climate narratives with developmentalism and national responsibility, integrating them into technological advancement, economic transition, and international commitment narratives.

Considering event type and political sensitivity. In diplomatic speeches, Chinese media reinforce national discourse and the leader's image, while Brazilian media present both international and domestic critical perspectives. In policy

announcements, China highlights policy achievements and institutional efficacy, whereas Brazil emphasizes public participation and policy accountability. In social impact events, Brazil links disasters to social inequality, while China externalizes the narrative through global trends and technological solutions.

In summary, climate reporting in China and Brazil is shaped by the combined influence of political institutions, media ecosystems, socio-cultural dynamics, and event typologies. These factors collectively produce localized expressions of global climate discourse, illustrating how national contexts mediate transnational environmental narratives.

The theoretical contributions of this study are primarily reflected in the following aspects. First, within the field of climate communication, this dissertation responds to ongoing calls for more empirical research on media practices in the Global South by conducting cross-institutional and cross-cultural analyses. In doing so, it complements and extends existing literature that has been predominantly focused on Western democracies. While climate change communication studies have yielded a rich body of scholarship, they remain predominantly focused on developed countries in Europe and North America, producing experiential frameworks grounded in Western democratic institutions and commercial media environments (Guenther et al., 2023; Badullovich et al., 2020). Media practices in Global South countries, by contrast, have received comparatively limited scholarly attention, despite their distinct media systems and social structures. News production in emerging economies is simultaneously shaped by state institutions, market logics, and the embedding of discourse in divergent cultural and political ecologies. By selecting China and Brazil as the focal cases, this study examines the localized communication logics of climate reporting from a comparative Global South perspective, offering a more diverse empirical complement to the existing climate communication literature. Chinese climate coverage is characterized by high institutionalization and a state-oriented approach, emphasizing policy targets, institutional efficacy, and international responsibility. Brazilian climate coverage, by contrast, is marked by pluralism and critical engagement, reflecting the intertwined structure of commercial media, institutional outlets, and social movements. This contrast not only illustrates how global issues acquire localized

expressions under different institutional conditions but also responds to ongoing scholarly calls to expand climate communication research beyond Western contexts.

Second, with respect to the application and extension of framing theory, this study demonstrates the applicability of Framing Theory within digitalized, politically polarized, and multicultural contexts, as elaborated in Chapters 4 and 5. It emphasizes the significance of emotional mobilization, cultural resonance, and institutional environments as key moderating factors, thereby providing empirical support for a multi-scalar and context-sensitive approach to framing effects. Theoretically, this research offers a systematic review and cross-national application of news framing theory, tracing its dual origins in psychology and sociology, while highlighting the importance of thematic explication and contextual variables in operationalization. Framing theory first emerged from the sociological tradition (Goffman, 1974), emphasizing how social meaning acquires cognitive structure through discursive construction. It was later expanded in psychology and political communication (Gamson & Modigliani, 1987, 1989; Kahneman & Tversky, 1979, 1984; Scheufele & Iyengar, 2014; Lecheler & de Vreese, 2018). Chapter 4 of this study revisits these two intellectual lineages, underscoring that frames are not merely modes of information presentation; their effects are mediated by political institutions, cultural values, and audience psychology.

Empirical analysis further reveals that even when the same frame types are employed, different social and institutional environments produce divergent interpretations and discursive constructions. For instance, under the Climate Action frame, Chinese media frequently highlight narratives of “achieving targets ahead of schedule” and “global leadership,” emphasizing national development and institutional efficacy. Brazilian media, in contrast, situate climate action within domestic crises such as wildfires and floods, foregrounding social mobilization and policy accountability. Similarly, under the Social Progress frame, Chinese coverage tends to adopt an educational and morally instructive tone, whereas Brazilian coverage stresses public participation and social inclusiveness, reflecting the dynamics of a democratized media ecosystem. These differences illustrate that the meaning of frames is not fixed but deeply contingent on their sociopolitical context. This finding enriches the understanding of framing theory in non-Western media environments and confirms its applicability and boundaries in Global South

contexts. By analyzing six climate-related events in China and Brazil, this study demonstrates that framing theory can explain the relationship between news narratives and audience cognition across divergent institutional settings, yet its application requires careful contextualization that incorporates institutional, cultural, and media-market variables.

Third, this study advances a conceptual logic for understanding the localization of global issues through the empirical comparison of China and Brazil. Climate change, as a global issue, is re-embedded in national political, social, and cultural contexts through news reporting, thereby generating unique narrative pathways imbued with institutional characteristics and cultural symbolism, which underscores the explanatory power of framing theory in comparative media studies. In China, the localization of global issues manifests as institutional achievement and nation branding. For example, in the coverage of China's early completion of its "14th Five-Year Plan" wind and solar capacity targets, climate discourse is incorporated into national development strategy and international responsibility narratives, with positive frames reinforcing institutional legitimacy and soft power. In Brazil, localization takes the form of socialization and public-oriented expansion. In coverage of forest fires and the Plano Clima, climate issues are linked to Indigenous rights, public health, and environmental justice, generating locally resonant narratives that combine critical perspectives with public mobilization. This conceptual framework illuminates the process of recontextualization through which global issues are domesticated in cross-national media coverage and provides a theoretical lens for understanding how Global South countries construct their own voices within international issue arenas.

Through cross-national comparative analysis, this study reveals both the convergences and divergences of news reporting in terms of frame selection, narrative logic, and discursive functions. These findings not only hold academic value but also offer practical insights for journalistic practice, policy communication, and climate communication in Global South countries.

Chinese and Brazilian media exhibit pronounced differences in their climate reporting. Chinese media are dominated by narratives emphasizing national goals, policy achievements, and international responsibility, whereas Brazilian media foreground social conflicts, environmental risks, and public accountability. This

indicates that journalistic practice in climate reporting is deeply attuned to national political culture and audience expectations. In centralized media environments, such as China, journalists may explore ways to integrate scientific explanation and social relevance into reporting while adhering to the national agenda, thereby enhancing public understanding and engagement. In pluralistic media environments, such as Brazil, it is essential to maintain the critical and watchdog function of the press while improving thematic coherence to strengthen public comprehension of climate issues.

Although climate issues in both countries serve as tools for nation branding and policy communication, the modes of media expression differ significantly. Brazilian media mobilize public discussion and social oversight through narrative chains that link climate issues to disasters, social justice, and public accountability. Chinese media, in contrast, reinforce national trust and highlight international responsibility by framing climate discourse through policy achievements and development-oriented logics. For policymakers, effective climate communication requires the design of information strategies that are attuned to domestic political and social contexts. In China, linking climate policies to livelihood concerns and tangible achievements can enhance public identification and foster genuine participation. In Brazil, leveraging mechanisms of social deliberation and public oversight can transform policy goals into broader societal consensus and collective action.

Despite their institutional differences, both China and Brazil face the challenge of translating international climate responsibilities into domestic narratives while balancing national interests and public-oriented appeals. This offers a valuable reference for Global South countries: in state-led media environments, incorporating more socially oriented elements can improve public understanding and participation; in pluralistic environments, reinforcing issue integration while maintaining the watchdog function can mitigate the risks of information fragmentation.

Ultimately, effective climate journalism and policy communication require a balance between global narratives and local contexts. By enhancing thematic diversity, social mobilization, and cultural adaptability, climate communication can increase its public value and global impact. These insights provide direct guidance

for journalists, policymakers, and climate communication practices across the Global South.

Taken together, this comparative analysis reveals how Brazilian and Chinese media construct climate narratives through distinct yet revealing logics. While Brazilian outlets frame climate issues as contested political terrain—intertwining science, governance, social justice, and environmental urgency—Chinese media portray climate as a sphere of national achievement, moral leadership, and institutional strength. These differences are not merely editorial; they reflect more profound divergences in political systems, media autonomy, and climate governance cultures. Ultimately, this contrast highlights the importance for climate communication scholars to situate media discourse within broader political, ideological, and systemic frameworks when analyzing transnational environmental narratives.

6.2 Limitation and direction

Although this study provides a systematic exploration of cross-national climate communication and news framing analysis, several limitations remain. These limitations reflect the stage-specific nature of this research while also leaving room for future inquiry.

First, the scope of sample coverage is limited. The empirical component of this study centers on six domestic climate-related events, which are representative in terms of event type, thematic attributes, and societal impact, covering three primary categories: international speeches by national leaders, domestic policy announcements, and socio-environmental events. However, climate news reporting is inherently temporal, fragmented, and diverse. The sample of this study cannot fully capture all types of climate reporting or their long-term evolution. For example, the media representation of international multilateral negotiations, cross-border cooperation, or sudden extreme climate events may exhibit new discursive features that are not fully reflected within the scope of this study.

Second, the data sources are relatively limited. This research focuses on the discursive construction of online media, with data primarily drawn from online

news texts in China and Brazil. While this choice ensures data reliability and cross-national comparability, it presents certain constraints. Social media, short-video platforms, and informal communication networks are playing an increasingly important role in climate issue diffusion and in mobilizing public emotions. Examining these alternative framing spaces would help reveal how news frames interact and bridge across different communication spheres. Furthermore, offline communication ecologies—such as policy outreach campaigns, community-based education, and the communication practices of non-governmental organizations—are not included in this study. As a result, the analysis primarily reflects media discursive structures, with relatively limited attention to other emerging actors in societal communication.

About the study's methodology has inherent limitations. This research relies predominantly on qualitative content analysis, using textual interpretation and frame classification to uncover media narrative logics. While this approach allows for in-depth understanding of reporting content and discursive structures, it is naturally constrained in terms of statistical robustness. For instance, longitudinal variations in the prevalence of specific frames or themes, and their correlations with public attitudes, require quantitative validation. Future research could combine large-scale coding, automated text mining, and long-term tracking to enhance the generalizability and predictive power of the findings.

Finally, this study presents an additional methodological limitation closely related to framing theory: the absence of an empirical investigation of audience reception. Framing theory is not only a tool for analyzing news content but also a classical media effects theory, whose core premise is that the frames employed by the media may shape public cognition, emotional responses, and policy attitudes through processes of selective emphasis, structured presentation, and meaning construction. However, this research primarily focuses on textual analysis and frame identification within Chinese and Brazilian news media, emphasizing the logic of news production and discursive construction, without conducting systematic examinations of how audiences perceive, interpret, or respond to these frames. In other words, the analysis in this study remains situated on the supply side of framing, while the audience side—the actual effects of these frames—has not been directly measured. This implies that the study's findings on media framing

patterns and localized narrative logics are based on theoretical assumptions about their potential social and policy impacts, rather than on empirical verification of audience-level effects. Consequently, readers should interpret the findings with caution: the conclusions primarily reflect the narrative patterns and institutional logics of media discourse, while their actual influence along the broader societal communication chain must be validated through future audience-based research.

In sum, these limitations remind readers to interpret this study's conclusions as an in-depth analysis of representative events within specific contexts, rather than a comprehensive depiction of the entire landscape of climate communication. At the same time, these constraints point to clear avenues for future research and expansion.

Building on the aforementioned limitations and the practical insights of this study, future research can be further expanded in several key directions.

First, broadening methodological and data dimensions. Future studies may combine quantitative content analysis with in-depth qualitative approaches to construct a more comprehensive dataset through multimodal and cross-platform sampling. For instance, incorporating data from social media and short-video platforms would allow the examination of topic diffusion, emotional mobilization, and patterns of public interaction. Longitudinal tracking and event-sequence analysis can capture the evolving logic of climate reporting across different time periods. Moreover, automated text mining and machine learning techniques can be applied to enhance the capacity for large-scale data processing and improve the statistical robustness of conclusions.

Second, theoretical refinement and contextual variable specification. This study highlights the role of institutional, cultural, and affective factors in shaping framing effects, and future research can further deepen theoretical exploration. For example, examining how political polarization and cultural identity influence the selection of news frames on climate issues; analyzing the role of emotional mechanisms—such as anxiety, pride, and empathy—in climate communication and their linkages to policy identification and social mobilization; and developing cross-cultural framing comparison models that make climate communication practices in countries with different institutional types more comparable. Such approaches would also provide clearer theoretical tools for global communication research.

Third, expanding research regions and issue domains. Future studies can move beyond the bilateral comparison of China and Brazil to include more countries in the Global South and other emerging economies, thereby forming multi-case and multi-region comparative networks that better reflect the diversity of global climate communication practices.

In the future, research can expand to incorporate audience reception studies, providing a more complete understanding of the full production–reception chain in framing theory. Future studies could integrate the results of content analysis with survey or experimental designs to test the specific effects of different frames—such as Climate Action, Social Progress, or Responsibility and Accountability—on audience cognition, emotional responses, and policy attitudes. For example, researchers could examine whether Chinese audiences, when exposed to positively oriented narratives emphasizing national achievements, demonstrate greater policy trust and stronger identification with international responsibility; or whether Brazilian audiences, when exposed to critical coverage emphasizing social justice and public accountability, are more likely to show heightened mobilization intentions or increased scrutiny of government policies.

Moreover, incorporating audiences from both China and Brazil within the same experimental or survey framework would allow for deeper analysis of how institutional, cultural, and socio-psychological variables moderate framing effects. For instance, future research could explore whether audiences in Brazil’s pluralistic and democratic media environment are more likely to exhibit opinion divergence, whereas audiences in China’s centralized and state-oriented media environment tend to display greater consistency or alignment with official narratives.

Additionally, future studies could integrate digital trace data from social media and online platforms, tracking user behaviors such as clicks, emotional reactions in comments, and sharing patterns, to explore how news frames are received, reinterpreted, or amplified in digital public spaces. Such an approach would not only address the current gap in capturing the “effects chain” of framing but would also help illuminate the processes through which climate change narratives are recontextualized within the digital public spheres of the Global South.

Through methodological innovation, theoretical deepening, and regional expansion, future research can more comprehensively reveal the diversity of climate communication in the Global South. At the same time, it will advance the development of climate communication and comparative media research within the global academic landscape and provide more targeted scholarly support for the public communication of global climate action.

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Appendix A — Supplementary Criteria for Frame Selection

The selection of materials in this study strictly followed the analytical rules described in the methodology section of Chapter 5. In addition, the following supplementary criteria were applied to ensure the consistency and appropriateness of the included content.

Table - A 1 - Supplementary Criteria for Frame Selection

The Selection of Frames - Supplementary Explanation			
Item	Object	Decision	Situation and reason
1	The unit of analysis is "news reports" rather than "official original information releases"	Not included in the analysis ✗	The original speech was published on the government's official website. It is not about media framing, but about the information source itself; media framing analysis focuses on how the media processes and presents such raw materials.
2		Included in the analysis ✓	Government speeches were reported, quoted, or commented on by the media (e.g. Folha, Globo, G1, etc. reported Lula's speech). These media select, emphasize, and evaluate the original information (typical framing operations)
3		Included in the analysis ✓	Reports from government-run news organizations (such as Agência Brasil covering Lula's speech). This allows comparison between state-directed media framing and that of mass media.
4	Focus on media content related to designated topics and events	Not included in the analysis ✗	Clearly irrelevant content (such as war, AI regulation, UN institutional reform), and no climate-related expressions or metaphors.
5		Not included in the analysis ✗	Reports that are not related to the specified event (e.g., the report does not discuss event 1), even if the content is about climate change.
6		Not included in the analysis ✗	Reports about the specified event, but not the country of study (e.g., a report discussing event 1, but only reporting on the United States).
7	Method of classification in frames and sentiment		In the relevant event, the framing and sentiment conveyed in the headline and subheadline represent the article's dominant frame, even if there are other opinions in the article. The title and subtitle still reflect the main opinion of the article.
8	Analysis Criteria for forwarded news	Not included in the analysis ✗	The website forwarded the media content without any modifications.
9		Included in the analysis ✓	The website forwarded media content, and the content is not completely consistent with the source (it has been filtered, abridged, or adapted, etc.).

Appendix B — Raw Coding Data of the Six Case Events

This appendix presents the original coding tables for all news articles included in the six case events analyzed in this study. Each table corresponds to one event and documents all sampled news items along with their classification results. The tables include key information such as the media platform, media type, source (original or reprinted), URL, article title, publication date, presence of video or photo (V for video, F for photo, N for text only), as well as the assigned Issue-Specific Frames and Generic Frames.

These data were coded strictly in accordance with the methodological procedures described in Chapter 5. The inclusion of this appendix is intended to ensure transparency, enable replicability, and provide readers with a clear view of how the analytical categories were applied to each individual news item. The coding results serve as the empirical foundation for the qualitative analyses presented in the main text.

In addition, color highlights are used to indicate sentiment judgments associated with each Issue-Specific Frame: yellow denotes neutral sentiment, blue indicates positive sentiment, and red marks negative sentiment. This tonal layer of analysis complements the frame classification and helps reveal how media narratives position climate-related topics emotionally and evaluatively.

Table - B1 — Event 1: Lula's Climate Speech at the 2024 UN General Assembly

Event 1 - Lula's Speech at the 2024 United Nations General Assembly (September 24, 2024)																			
No	Media	Type	Source	Topic	Date	Video	Comments	Thematic	Science	Ecological/	Social	Risk	Climate	International	Sub-	Domestic	Regulatory	Economic	Leadership
						Photo		Reporting	Sub-System 1	Impacts	Programs	Assessment	Action	Relations	Policy	Initiatives	Cooperation	Impact	Dynamic
1	O Globo	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
2	Redes Sociais	Post	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
3	Folha de São Paulo	Article	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
4	BBC	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
5	UOL	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
6	CGTN	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
7	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
8	BBC	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
9	CGTN	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
10	CGTN	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
11	BBC	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
12	Folha de São Paulo	Article	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
13	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
14	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
15	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
16	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
17	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
18	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
19	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
20	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
21	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
22	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
23	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
24	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
25	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
26	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
27	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
28	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
29	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
30	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
31	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
32	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
33	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
34	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X
35	Agência Brasil	Reportage	Original	Lula's speech at the UN General Assembly	2024/09/24	F		Domestic					N	X					X

Table - B2 — Event 2: Forest Fires Across Brazil (September 2024)

[illegible]

Table - B3 — Event 3: Launch of Brazil's New National Climate Plan

Annex 2 - The Launch of Brazil's New National Climate Plan (May 10 December 2023)																											
No.	Model	Type	Source	Route	Title	Public Date	Website of the project	Comments	Transportation Responsibility	Source	Geographical Location	Project Progress	Risk Assessment	State Status	International Relations	Domestic Policy/Regulatory Framework	Environmental Policy	Economic	Labour Market	Energy	Science and Technology and Innovation	Other	Project Status	Project Status	Comments on the Project	Next Steps	2023-2024
1	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
2	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
3	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
4	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
5	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
6	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
7	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
8	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
9	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
10	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
11	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
12	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
13	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
14	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
15	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
16	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
17	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
18	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
19	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
20	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
21	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
22	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
23	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
24	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
25	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
26	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
27	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
28	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
29	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
30	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
31	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
32	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
33	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
34	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
35	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
36	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
37	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
38	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
39	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
40	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
41	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
42	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
43	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
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46	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
47	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
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49	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
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74	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
75	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
76	GTN BR	Original	Original	Original	Original	2020-10-10	Original		Domestic	Original	Original					Original	Original	Original	Original	Original	Original						
77	GTN BR	Original	Original	Original	Original	2020-10-10	Original																				

