Climate Change Disinformation on Social Media: A Meta-Synthesis on Epistemic Welfare in the Post-Truth Era

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Article

Climate Change Disinformation On Social Media: A Meta-Synthesis on Epistemic Welfare in the Post-Truth Era

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Abstract: Climate change disinformation has emerged as a substantial issue in the internet age, affecting public perceptions, policy response, and climate actions. This study, grounded on the theoretical frameworks of social epistemology, Habermas's theory of communicative action, post-truth, and Foucault's theory of power-knowledge, examines the effect of digital infrastructures, ideological forces, and epistemic power dynamics on climate change disinformation. The meta-synthesis approach in the study reveals the mechanics of climate change disinformation on social media, the erosion of epistemic welfare influenced by post-truth dynamics, and the ideological and algorithmic amplification of disinformation, shedding light on climate change misinformation as well. The findings show that climate change disinformation represents not only a collection of false claims but also a broader epistemic issue sustained by digital environments, power structures, and fossil corporations. Right-wing populist movements, corporate interests, and algorithmic recommendation systems substantially enhance climate skepticism, intensifying political differences and public distrust in scientific authority. The study highlights the necessity of addressing climate change disinformation through improved scientific communication, algorithmic openness, and digital literacy initiatives. Resolving this conundrum requires systemic activities that go beyond fact-checking, emphasizing epistemic justice and legal reforms.

Keywords: climate change; disinformation and misinformation; epistemic harm; ideological polarization; post-truth; algorithmic amplification; social media

1. Introduction

Climate change stands as one of the most urgent global challenges of the 21st century, not only because of its severe environmental, economic, and social consequences, but also due to the complex role that information - and intentional deception - play in shaping public perception and policy. In the digital age, social media platforms have emerged as powerful tools for the dissemination of both credible information and falsehoods. However, while misinformation refers to false or misleading information shared without intent to deceive, disinformation involves the deliberate spread of falsehoods with the goal of manipulating opinions, sowing doubt, or advancing specific agendas (Wardle & Derakhshan, 2017). This study is particularly concerned with disinformation, especially as it relates to climate change narratives on social media and their impact on global epistemic health.

Disinformation erodes what can be termed "epistemic welfare" - that is, the collective access to reliable, verifiable, and meaningful information upon which individuals and societies depend to make informed decisions (Hyzen et al., 2025). This erosion is intensified in the post-truth era, where subjective beliefs and emotional appeals increasingly overshadow empirical evidence. The global spread of climate disinformation has proven especially dangerous: it distorts public understanding, weakens trust in scientific expertise, delays policy responses, and ultimately threatens democratic governance and environmental justice.

Social media platforms, through personalized content algorithms and user-driven content creation, have dramatically altered how people access and internalize information (Treen et al., 2020).

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These platforms have also made it easier for disinformation to flourish across national and cultural boundaries, highlighting the need for research that considers both the global scope of this issue and its localized impacts. As traditional gatekeepers of knowledge, such as scientists, journalists, and educators, face growing skepticism, the unchecked spread of climate disinformation has become a transnational problem that calls for urgent scholarly attention. To address this challenge, this study employs a meta-synthesis approach that draws together and analyzes qualitative research on climate change disinformation. The goal is to synthesize common themes across diverse studies in order to provide a richer understanding of how disinformation is constructed, circulated, and received across different global contexts.

Research Objectives

This study is guided by the following research objectives:

1. To define and critically examine the concept of epistemic welfare in relation to climate change disinformation in the post-truth era.
2. To identify and analyze the strategies used to disseminate climate change disinformation across global social media ecosystems.
3. To evaluate the implications of disinformation for public understanding, policy development, and the integrity of global scientific consensus.

By exploring these objectives, this study aims to contribute to global climate communication scholarship and support evidence-based efforts to restore epistemic integrity in a world increasingly shaped by disinformation.

2. Conceptual Discourse

2.1. Epistemic Welfare and the Threat of Disinformation in the Digital Age

Epistemic welfare refers to the quality, accessibility, and fairness of knowledge that individuals and societies depend on for sound decision-making and informed participation in civic life. It encompasses the structures, processes, and social conditions that support reliable knowledge acquisition, including the equitable distribution of accurate information and the empowerment of individuals to evaluate its credibility (Hyzen et al., 2025). In the age of digital technology, however, epistemic welfare has come under increasing strain - not merely from unintentional errors or noise in the information landscape, but from deliberate disinformation campaigns that seek to distort public understanding and manipulate perceptions, particularly around critical global issues like climate change.

Disinformation, as opposed to misinformation, involves the intentional spread of false or misleading information, often deployed strategically to serve political, ideological, or economic agendas (Wardle & Derakhshan, 2017). It is this intentional manipulation that renders disinformation especially harmful to epistemic welfare. In today's algorithm-driven digital environment, disinformation benefits from systems designed to maximize engagement rather than truthfulness. Recommender systems - used by platforms such as Facebook, X (formerly Twitter), YouTube, and TikTok - personalize content streams by analyzing users' behaviors, preferences, and interactions. Although designed to optimize user experience, these systems often prioritize emotionally provocative or controversial content over accurate information (Van den Bulck et al., 2024). This curation mechanism facilitates the viral spread of disinformation, especially on polarizing topics like climate change.

Hyzen et al. (2025) note that such algorithmic structures pose a critical challenge to epistemic welfare by narrowing the range of accessible knowledge. Disinformation thrives in echo chambers and filter bubbles, where algorithmic bias reinforces existing beliefs and shields individuals from alternative or corrective viewpoints. This reduction in informational diversity is not accidental; it is often the consequence of deliberate design choices that reward virality over veracity. As a result,

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users are exposed repeatedly to distorted or manipulative narratives that align with their biases, further entrenching falsehoods and fostering epistemic isolation. This erosion of epistemic diversity carries global implications. In many parts of the world, particularly in developing regions, digital platforms have become primary sources of information. The unchecked spread of climate-related disinformation through these channels not only undermines public trust in science but also disrupts global policy efforts and environmental advocacy. As Kaun et al. (2023) observe, disinformation reduces cognitive openness, discourages critical reflection, and impairs individuals' capacity to evaluate truth claims, ultimately compromising the intellectual autonomy necessary for epistemic well-being.

In addition to distorting personal cognition, disinformation also threatens epistemic justice, a concept articulated by Goldman (1987) and expanded upon by Nueberger et al. (2023). Epistemic justice requires not only the fair distribution of knowledge but also the equitable recognition of diverse epistemic agents, particularly those from marginalized or underrepresented communities. Digital disinformation campaigns, often guided by powerful state or corporate actors, disproportionately silence these voices by flooding the information space with falsehoods that marginalize dissent or fabricate consensus. This phenomenon exacerbates existing global inequalities in knowledge production and access. Furthermore, the opaque nature of algorithmic recommender systems undermines public oversight and accountability. As Coeckelbergh (2023) points out, users are rarely aware of how digital platforms shape the information they see. This lack of transparency disempowers individuals from questioning the credibility or motivations behind the content they consume. Van Dijck (2021) argues that while digital infrastructures increasingly mediate public knowledge, they are not neutral actors; rather, they often replicate and reinforce dominant ideologies and power hierarchies.

In this context, Goldman's (1987) emphasis on the social dimensions of epistemic integrity becomes especially relevant. A healthy epistemic community depends on the collective evaluation and validation of knowledge claims, grounded in mutual trust and open deliberation. Yet in a digital media ecosystem dominated by disinformation and algorithmic opacity, these collaborative norms are at risk. The result is an epistemic environment in which truth is not only contested but strategically undermined – a crisis with implications for democratic governance, scientific credibility, and global climate action.

2.2. Post-Truth and the Crisis of Epistemic Welfare in a Disinformation Age

The term post-truth refers to a sociopolitical condition in which objective facts and rational discourse are increasingly subordinated to emotional appeals, personal beliefs, and ideological loyalty in shaping public opinion. While the concept gained traction in the early 21st century, especially following events like the Brexit referendum and the 2016 United States presidential election, it captures a broader and more enduring epistemic shift. These political moments were not merely characterized by widespread confusion but were marked by deliberate campaigns of disinformation, where factually inaccurate claims were systematically disseminated to influence public sentiment and decision-making.

In the post-truth era, the traditional authority of empirical evidence is destabilized; "truth" becomes defined more by its affective and ideological resonance than by its alignment with verifiable reality (van Dijck, 2021). However, it is important to recognize that this shift does not imply that emotional appeal is inherently antithetical to evidence-based reasoning. On the contrary, emotionally resonant communication can and should accompany scientific facts, especially in areas like climate discourse where public engagement is critical. The problem lies in the strategic deployment of disinformation—not merely to evoke emotion, but to intentionally manipulate it in ways that obscure the truth and advance political or economic agendas.

Disinformation, in this context, is not simply the result of ignorance or accidental error. It is an intentional and often well-orchestrated effort to distort public understanding, sow doubt, and discredit legitimate knowledge authorities such as scientists, journalists, and academics. As Popescu-

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Sarry (2023) argues, the post-truth condition deliberately blurs the boundaries between truth and falsehood, privileging subjective narratives over empirically grounded facts. Social media platforms, whose algorithms reward engagement rather than accuracy, have become fertile ground for the circulation of disinformation. Emotionally charged and polarizing content is algorithmically amplified, often overshadowing rigorous, evidence-based communication.

This dynamic erodes the epistemic conditions necessary for healthy democratic discourse. As Dahlgren (2018) observes, a well-functioning epistemic environment depends on the equitable circulation of diverse, reliable knowledge and the capacity of individuals to critically reflect on that information. In the post-truth context, disinformation disrupts these processes, flooding the information ecosystem with emotionally appealing falsehoods that actively displace factual content. While emotionally intelligent discourse can enhance the accessibility and relatability of evidence-based reasoning, post-truth politics weaponizes emotion to obstruct understanding and stoke division.

Consequently, this environment fosters epistemic fragmentation - a condition in which individuals are increasingly confined to ideologically homogenous, algorithmically curated echo chambers that limit exposure to diverse perspectives. Neuberger (2023) warns that this digital segregation diminishes intellectual engagement and weakens individuals' capacity to assess information critically. As van Dijck (2021) points out, this leads to epistemic injustice: those committed to evidence-based reasoning are often sidelined, while agents of disinformation gain traction, visibility, and influence. This asymmetry destabilizes the foundations of epistemic welfare, leaving individuals and societies vulnerable to manipulation, cognitive bias, and long-term ideological entrenchment.

3. Theoretical Framework

This study adopts an interdisciplinary theoretical framework grounded in Social Epistemology and Post-Truth Theory to critically analyze the circulation of climate change disinformation on social media. Rather than approaching disinformation as a series of isolated falsehoods or byproducts of ignorance, this framework positions disinformation as a strategic, systemic phenomenon, one that thrives within the architecture of digital discourse, entrenched power relations, and ideological contestation. Drawing on the insights of Jürgen Habermas and Michel Foucault, this framework offers a robust lens through which to interrogate how climate disinformation undermines epistemic health and democratic knowledge production.

Unlike classical epistemology, which treats knowledge as an individual pursuit detached from social contexts, Social Epistemology views knowledge as socially situated, shaped by institutions, power structures, communicative norms, and cultural discourses (Goldman, 1987). Disinformation, in this framework, is not merely false content; it is a deliberate distortion of knowledge that manipulates public understanding, delegitimizes scientific authority, and corrodes the epistemic foundations upon which rational deliberation and environmental policy rest.

Disinformation exploits the vulnerabilities of epistemic systems by weaponizing rhetoric, manipulating evidence, and exploiting digital algorithms to fabricate doubt and engineer confusion. Within this process, epistemic authority becomes contested terrain. As Fricker (2017) argues, testimonial injustice occurs when credible knowers are systematically discredited due to prejudice, while hermeneutical injustice arises when marginalized groups lack the discursive tools to make their knowledge intelligible within dominant paradigms. In the context of climate disinformation, scientists and environmental advocates face testimonial injustice when their expertise is eclipsed by conspiracy theorists, denialist influencers, or corporate-funded counter-narratives (Tren et al., 2020). Simultaneously, Indigenous and frontline communities - those most affected by climate change - face hermeneutical injustice when their situated knowledge is dismissed as anecdotal or irrelevant (Heffernan, 2024).

Habermas's theory of communicative action further clarifies how disinformation distorts rational discourse in the digital public sphere. In ideal communication, actors seek mutual understanding based on shared norms of truthfulness and sincerity (Habermas, 1984). However,

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climate disinformation subverts these norms, replacing reasoned dialogue with strategic manipulation, fear-mongering, and ideological polarization. Disinformation, unlike accidental error, operates with intent - it hijacks public discourse to serve particular interests, often economic or political, while undermining democratic participation and collective problem-solving.

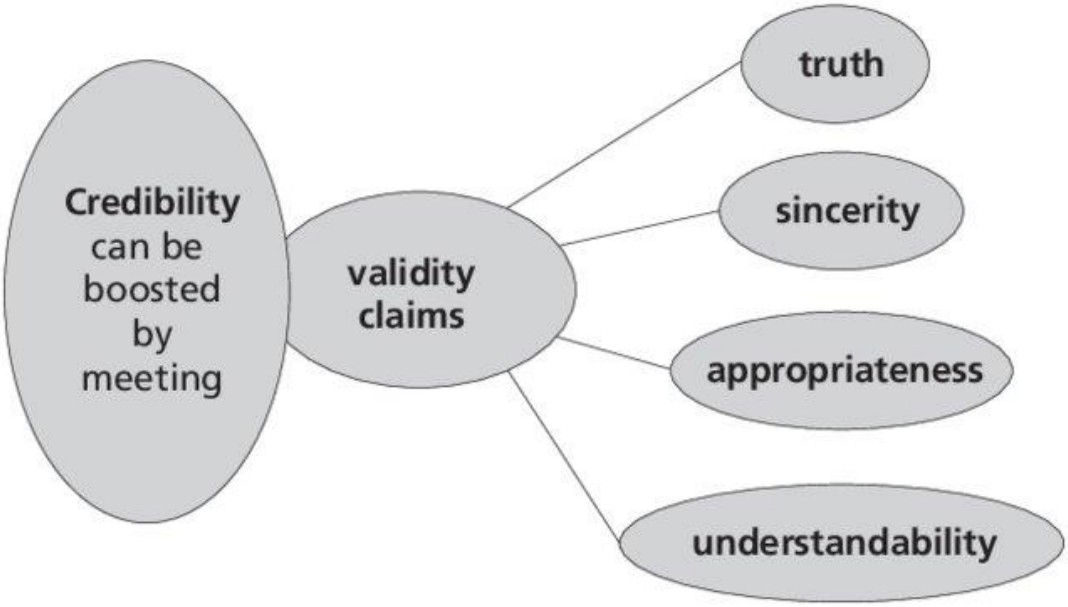

Figure 1. Habermas's theory of communicative action. *Source: Vogel (2019). researchgate.net.*

Habermas (1984) delineates an ideal discourse rooted in communicative rationality, where participants evaluate claims based on truth, sincerity, appropriateness, and intelligibility. However, in the contemporary digital public sphere - defined as the online environment where citizens engage in public debate through platforms like social media, forums, and digital news outlets- disinformation thrives precisely because the foundational conditions for rational-critical discourse have eroded. Unlike the ideal Habermasian public sphere, which presupposes informed participants engaging in reasoned debate, the digital public sphere is increasingly shaped by algorithmic curation, echo chambers, and virality-driven engagement. In such a fragmented media environment, digital literacy - which encompasses the ability to critically assess, interpret, and verify online content, recognize bias, and discern credible sources - becomes essential. Yet, the lack of widespread digital literacy initiatives means that many users are ill-equipped to navigate this complex information ecosystem, leaving them vulnerable to manipulation, polarization, and disinformation..

Algorithmic curation, emotional amplification (Stewart et al., 2022), and political polarization have transformed online communication into a fertile ground for deliberate deception. The viral nature of content and the insularity of echo chambers restrict exposure to diverse perspectives, reinforcing ideological silos that render disinformation more persuasive and less amenable to correction (Coeckelbergh, 2023). This epistemic fragmentation undermines epistemic health by shifting public discourse from evidence-based reasoning to emotionally and ideologically motivated narratives. In the post-truth era, the traditional conception of truth as an objective, reliable reference point is destabilized (Skirbekk, 2020). Within this framework, truth is no longer determined by factual accuracy or scientific consensus but by the emotional resonance and political utility of a narrative. This shift empowers actors who strategically deploy disinformation to manipulate public perception, advance ideological agendas, and protect vested interests.

Further guided by Michel Foucault's theory of power-knowledge, this study understands disinformation not as an incidental byproduct of digital communication but as a deliberate and strategic exercise of power. Foucault (1977) emphasized that knowledge is constructed through discourse, institutions, and power relations, not merely discovered. In the realm of climate communication, disinformation is strategically deployed by powerful actors, particularly

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corporations, political groups, and ideological networks, to systematically distort, obscure, or discredit the scientific consensus on climate change. Among these, the fossil fuel industry has played a historically central role. Through orchestrated disinformation campaigns, they have sought to manufacture doubt about climate science, impede regulatory efforts, and protect their economic interests.

For instance, ExxonMobil's internal documents, as revealed in investigative reports, show that the company had early knowledge of climate change but chose instead to fund think tanks such as the Heartland Institute and the Competitive Enterprise Institute, both of which have actively promoted climate skepticism (Oreskes & Conway, 2010). This is not simply a matter of spreading false information, but rather the intentional and calculated production of ignorance - a practice referred to by scholars as "agnotology" - which aims to undermine scientific authority and delay policy interventions (Proctor & Schiebinger, 2008). These disinformation efforts are often supported by lobbying groups and public relations firms that help amplify misleading narratives in media and political discourse.

The convergence of fossil fuel interests with those of the tech industry further exacerbates this disinformation ecosystem. Social media platforms such as Facebook and YouTube have been shown to algorithmically promote climate denial content because such material often generates higher engagement - likes, shares, and comments - than evidence-based information (Treen et al., 2020). Despite publicly claiming to combat misinformation, these platforms have profited from increased traffic and advertising revenue generated by sensational or contrarian content. Moreover, reports by the Center for Countering Digital Hate (2021) have demonstrated that a small number of actors - the so-called "toxic ten" - are responsible for the majority of online climate disinformation yet continue to be monetized and algorithmically amplified by tech companies.

This convergence of economic interests - the fossil fuel industry's aim to preserve a carbon-based economy and the tech industry's pursuit of profit through attention-driven algorithms - creates a powerful disinformation infrastructure. It not only sustains public confusion but also entrenches ideological divisions, making consensus on climate policy increasingly difficult. Together, these industries represent a fusion of financial and informational power that reshapes epistemic realities, impeding urgent collective action on climate change.

Social media platforms exacerbate this crisis by creating an information ecosystem in which deception is not only prevalent but algorithmically rewarded. Engagement-driven visibility, personalization, and virality incentivize content that provokes emotion, regardless of its truthfulness. This new digital epistemology, as Skirbekk (2020) describes, departs from traditional norms anchored in peer-reviewed research, journalistic verification, and expert consensus. In its place is a fragmented, decentralized information landscape susceptible to manipulation by those with the resources to exploit it. The collapse of conventional gatekeeping mechanisms has facilitated the unrestricted flow of climate disinformation, allowing conspiracy theories, populist rhetoric, and anti-intellectual sentiment to gain traction (Cosentino, 2020). Consequently, public trust in science and democratic discourse is eroded, while disinformation proliferates under the guise of pluralism and free speech. This epistemic shift poses a direct threat to informed decision-making and meaningful environmental policy.

4. Methodology

4.1. Research Design

This study employed a meta-synthesis methodology, drawing from qualitative and quasi-quantitative techniques to investigate how climate change disinformation impacts epistemic welfare in the digital post-truth era. Meta-synthesis is particularly suited to studies that aim to integrate findings from multiple qualitative or mixed-methods sources into a cohesive, interpretive whole (Walsh & Downe, 2005). More so, meta-synthesis is an interpretive and integrative process that goes beyond mere summarizing of prior research; it seeks to identify themes and theoretical contributions across several qualitative studies (Nye et al, 2016). This method not only enables thematic extraction

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and conceptual integration but also allows for transparency and replicability in identifying patterns across research findings.

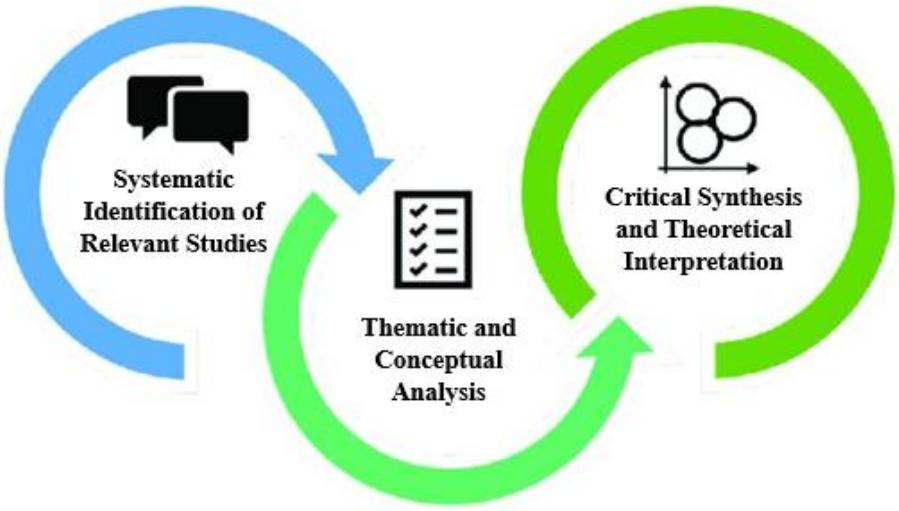

Figure 2. Methodological Framework.

The research followed a four-phase process inspired by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The PRISMA framework provided a structured protocol for identifying, screening, selecting, and synthesizing peer-reviewed literature. The process is visualized in the PRISMA summary chart below;

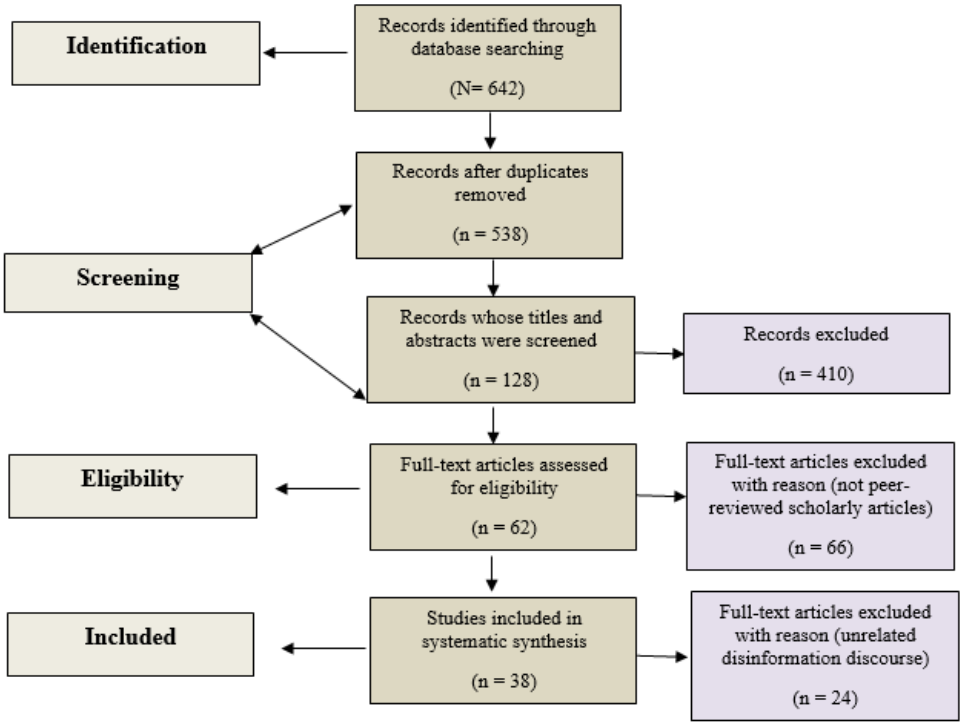

Figure 3. PRISMA Framework.

An extensive database search was conducted across Scopus, Web of Science, ResearchGate, Google Scholar, PubMed, and EBSCOhost using Boolean search strings related to key themes: "climate change disinformation", "epistemic welfare", "social media and misinformation", "post-

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truth era", and "digital public sphere". This search yielded 642 records published or posted as preprints between 2010 and 2024. Following retrieval, 104 duplicate entries were removed using Zotero reference manager. The remaining 538 unique records were screened based on titles and abstracts to ensure thematic relevance to climate change disinformation and epistemic impacts. 410 articles were excluded at this stage due to irrelevance and insufficient empirical grounding.

4.2. Inclusion and Exclusion Criteria

The 128 articles selected for full-text review underwent a rigorous evaluation based on clearly defined inclusion criteria to ensure their relevance to the objectives of this meta-synthesis. Each article was carefully assessed to determine whether it directly engaged with the phenomenon of disinformation, as opposed to the more general category of misinformation. Priority was given to studies that explicitly addressed disinformation as a deliberate and strategic act of distortion, particularly in the context of climate change and related environmental or scientific discourses. In addition to focusing on disinformation and related misinformation, the studies were required to engage substantively with themes related to climate change, environmental communication, or science communication. The relevance of digital media platforms and the broader dynamics of the post-truth era were also essential components, as the synthesis aimed to understand how digital ecosystems amplify or reshape public engagement with climate-related knowledge.

Moreover, only studies that provided empirical evidence or analytical frameworks regarding the epistemic consequences of disinformation, such as its impacts on public understanding, cognitive trust, or resistance to scientific consensus, were considered suitable. The inclusion process thus emphasized studies that not only described disinformation practices but also explored their implications for knowledge production and public perception. Following this detailed evaluation, a total of 38 studies (journal articles and handbooks that are peer-reviewed as well as relevant preprints) were determined to fully meet all inclusion criteria and were subsequently incorporated into the final synthesis. These selected studies form the core analytical foundation of the research, providing a diverse yet coherent body of work through which patterns, contradictions, and emerging themes in climate disinformation can be meaningfully examined.

4.3. Data Extraction and Coding

Each of the 38 studies selected for the final synthesis was meticulously examined through thematic analysis. An inductive coding approach was employed to identify recurring patterns and conceptual threads emerging from the data. During this process, attention was paid to how disinformation is strategically produced, particularly by actors within the fossil fuel and technology sectors. The analysis also explored how digital media platforms, through their algorithmic structures, contribute to the amplification and spread of disinformation. In addition, the studies were assessed for insights into public skepticism, ideological alignment, and the resonance of disinformation with emotionally charged or identity-based belief systems. Special focus was given to identifying instances and consequences of epistemic harm, such as the erosion of public trust, fragmentation of shared knowledge, and instances of epistemic injustice.

The codes derived from this analytical process were subsequently grouped into broader thematic categories. These include epistemic erosion, which captures the breakdown of trust in traditional knowledge institutions; algorithmic enhancement, referring to the role of digital infrastructures in accelerating disinformation; ideological weaponization, which denotes the use of disinformation to advance political or cultural agendas; and post-truth resonance, highlighting how disinformation thrives in environments where emotional and ideological appeals often outweigh empirical evidence.

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4.4. Synthesis and Interpretation

The synthesized data from the 38 selected studies were interpreted through the combined lenses of Epistemic Welfare Theory and Critical Discourse Analysis (CDA). Epistemic Welfare Theory provided a framework to assess how the circulation of information, particularly disinformation, affects the collective capacity of individuals and societies to access, evaluate, and use knowledge responsibly. In parallel, CDA enabled a deeper exploration of how language, power, and ideology intersect in the framing and dissemination of climate-related disinformation, especially within digital platforms.

The synthesis process entailed a meticulous comparison of findings across studies, aiming to identify points of convergence (shared themes or patterns) and divergence (contradictions or unique perspectives). Particular attention was paid to how disinformation narratives are constructed and sustained, and how these narratives challenge or obscure the scientific consensus on climate change. This involved tracing conceptual linkages, such as between algorithmic amplification and epistemic fragmentation, as well as mapping tensions between evidence-based reasoning and emotionally resonant ideological appeals. To enhance both accessibility and interpretability, graphical visualizations were employed. These included a thematic word cloud that distills the most frequently occurring concepts across the dataset, offering a high-level view of key discursive elements. This visual tool serves not only as an interpretive aid but also as supplementary evidence of the recurring patterns identified through qualitative synthesis.

5. Results and Discussions

5.1. Results

Table 1. Studies Review Table; Source: Compiled by the author from the various studies reviewed for this research.

Author(s)	SN	Study Title	Research Findings	Theoretical Framework	Geographical Context	Year	Journal/Source
Kathie Treen, Hywel Williams, Saffron O'Neill	1	Online Misinformation about Climate Change	The study finds that climate change disinformation and misinformation are driven by a network of actors financing and amplifying it, thrive in polarized online environments, and spread due to cognitive biases and social norms.	Networked Misinformation and Social Epistemology	United Kingdom	2020	Wiley Interdisciplinary Reviews: Climate Change
Stephen Lewandowsky	2	Climate change disinformation and how to combat it.	The study finds that climate disinformation and misinformation flourish in politically charged environments but can be countered through cognitive-based strategies, emphasizing scientific consensus, culturally aligned communication, and pre-emptive inoculation against false claims.	Cognitive Science, Political Ideology	Australia	2021	Annual review of public health, 42
Stephan Daume	3	Online misinformation during extreme weather emergencies: short-term information hazard or long-term influence on climate change perceptions?	The study finds that misinformation and disinformation during extreme weather events spreads across multiple domains and scales, influencing both immediate crisis responses and long-term climate change perceptions, necessitating structured and comparative research for effective countermeasures.	Misinformation Theory, Crisis Communication Theory, Media Ecology Theory	Sweden	2024	Environmental Research Communications 6
Gregory Simon	4	Disingenuous natures and post-truth politics: Five knowledge modalities of concern in environmental governance	The study finds that post-truth politics and 'disingenuous natures' distort environmental knowledge and decision-making, necessitating a clearer theoretical framework to analyse how misinformation and ideological constructs shape human-environment interactions.	Post-Truth Theory, Social Construction of Knowledge, Epistemic Injustice	United States of America	2022	Geoforum, 132

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Torbjørn Gundersen, , Donya Alinejad, Teresa Yolande Branch, Bobby Duffy, Kirstie Hewlett, Cathrine Holst, Susan Owens	5	A new dark age? Truth, trust, and environmental science.	The study finds that trust in environmental science is neither universally declining nor wholly stable, but rather fluctuates based on social, political, and media influences, highlighting both scepticism and continued confidence in scientific knowledge.	Trust Theory, Democratic Theory	Norway	2022	Annual Review of Environment and Resources, 47
Santamaría Garcia, Sara, Paolo Cossarini, Eva Campos-Domínguez, Dolors Palau-Sampio	6	Unraveling the Dynamics of Climate Disinformation. Understanding the Role of Vested Interests, Political Actors, and Technological Amplification	The study finds that climate disinformation is shaped by the intersection of political actors, vested interests, and technological factors, with algorithms and far-right political parties playing a significant role in amplifying false narratives, showing the urgent need for improved climate communication strategies.	Disinformation Theory	Latin America	2024	Observatorio (OBS*) (2024)
Hefferman Andrew	7	Countering Climate Disinformation in Africa	The study finds that climate disinformation in Africa significantly hampers both the support for climate mitigation policies and the effectiveness of adaptation measures, necessitating targeted policies that include fact-checking, education, and community-driven solutions to combat the crisis.	Disinformation Theory, Climate Justice and Information Warfare	Africa	2024	Center for International Governance Innovation – Working Paper (2024)
Stephen Lewandowsky, John Cook, Nicolas Fay, Gilles Gignac	8	Science by social media: Attitudes towards climate change are mediated by perceived social consensus.	The study finds that public attitudes toward climate change are significantly shaped by perceived social consensus. Social media platforms influence this perception by showcasing agreement or disagreement with scientific views, ultimately impacting belief formation and resistance to misinformation and disinformation. This highlights how social validation processes online mediate the acceptance of climate science.	Cognitive Psychology, Social Consensus Theory	Australia	2019	Memory & Cognition, 47(8)
Aman Tyagi, Joshua Uyheng, Kathleen Carley	9	Affective Polarization in Online Climate Change Discourse on Twitter	The study finds that online discussions around climate change on Twitter are deeply affected by affective polarization, where users increasingly express strong emotional alignments with ideological groups. This emotional intensity fosters division, reduces cross-ideological engagement, and contributes to hostile communication environments that hinder constructive discourse on climate policy.	Computational Social Science, Affective Polarization Theory	United States of America	2020	arXiv preprint arXiv:2008.13051
Giulio Corsi	10	Evaluating Twitter's Algorithmic Amplification of Low-Credibility Content: An Observational Study.	The study finds that Twitter's algorithm tends to amplify content from low-credibility sources, especially on controversial issues like climate change. This algorithmic behavior results in greater visibility for misleading narratives and decreases the prominence of verified scientific information, posing risks to public understanding and trust in climate science.	Algorithmic Bias, Information Ecology Theory	Italy	2023	arXiv preprint arXiv:2305.06125
Aleix Bassolas, Joan Massachs, Emanuele Cozzo, Julian Vicens,	11	A cross-platform analysis of polarization and echo chambers in climate change discussions.	The study finds that social media discussions on climate change are often confined to ideologically homogeneous groups across multiple platforms, forming distinct echo chambers. These environments reinforce users' beliefs while filtering out opposing viewpoints, intensifying polarization, and limiting opportunities for consensus or dialogue.	Network Theory, Echo Chamber Hypothesis	Spain	2024	arXiv preprint arXiv:2410.21187

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Edoardo Loru, Alessandro Galeazzi, Anita Bonetti, Emanuele Sangiorgio, Niccolò Di Marco, Matteo Cinelli, Andrea Baronchelli, Walter Quattrociocchi,	12	Who Sets the Agenda on Social Media? Ideology and Polarization in Online Debates	The study finds that ideologically motivated actors are highly influential in setting the agenda of climate-related debates on social media. Through selective posting and algorithmic engagement, these actors steer public discourse toward polarizing themes, shaping users' exposure to climate content, and reinforcing political divides.	Agenda-Setting Theory, Political Ideology Framework	Italy	2024	. arXiv preprint arXiv:2412.05176
Max Falkenberg, Alessandro Galeazzi, Maddalena Torricelli, Niccolo Di Marco, Francesca Larosa, Madalina Sas, Amin Mekacher, Warren Pearce, Fabiana Zollo, Walter Quattrociocchi, Andrea Baronchelli	13	Growing polarization around climate change on social media.	The study finds a growing polarization in climate change discourse on social media, with a noticeable shift toward ideologically driven groupings that rarely interact. This trend is exacerbated by platform algorithms and selective sharing practices, creating fragmented information environments that challenge the communication of scientific consensus.	Polarization Theory, Computational Social Science	Italy, United Kingdom, France	2021	arXiv preprint arXiv:2112.12137
Joachim Allgaier	14	Science and Environmental Communication on YouTube: Strategically Distorted Communications in Online Videos on Climate Change and Climate Engineering.	The study finds that YouTube contains a significant number of videos presenting distorted or conspiratorial narratives around climate change and geoengineering. These videos often exploit the platform's recommendation system to increase visibility, thereby shaping public perceptions and undermining trust in legitimate environmental science.	Science Communication Theory, Strategic Communication	Germany	2019	Frontiers in Communication, 4
Hywel Williams, James McMurray, Tim Kurz, Hugo Lambert.	15	"Network analysis reveals open forums and echo chambers in social media discussions of climate change." (2015): 126-138.	The study finds that climate change discourse on social media reflects a mix of open forums and tightly knit echo chambers. While some users engage across ideological lines, others remain insulated within reinforcing networks that perpetuate confirmation bias, impeding broader dialogue and increasing the vulnerability to disinformation.	Network Analysis, Echo Chamber Theory	United Kingdom	2015	Global environmental change 32
Amanda Porter, Lina Hellsten.	16	Investigating participatory dynamics through social media using a multideterminant "frame" approach: The case of Climategate on YouTube.	The study finds that user-generated content on YouTube played a central role in shaping the narrative around Climategate, with diverse interpretations emerging due to varying frames. By analyzing these frames, the study shows how participatory online spaces can reframe scientific controversies and influence public trust in science.	Framing Theory, Participatory Media Theory	Netherlands	2014	Journal of Computer-Mediated Communication, 19 (4)
Yan Huang, Weirui Wang	17	Message Strategies for Misinformation Correction: Current Research, Challenges, and Opportunities.	The study finds that correcting climate misinformation and disinformation requires tailored message strategies, especially during crises. It highlights challenges such as cognitive resistance and echo chambers, and proposes a need for more adaptive, evidence-based correction models in high-stakes communication environments.	Crisis Communication Theory, Message Framing	China	2025	Communication and Misinformation: Crisis Events in the Age of Social Media
Sander van der Linden, Anthony Leiserowitz, Seth Rosenthal, Edward Maibach	18	Inoculating the Public against Misinformation about Climate Change.	The study finds that applying inoculation theory - preemptively exposing people to misinformation with a refutation - can significantly reduce the effectiveness of climate change denial. This psychological resistance helps build resilience in public understanding, especially when misinformation and	Inoculation Theory, Science Communication	United States of America	2017	Global Challenges, 1

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			disinformation challenge scientific consensus.				
Salil Benegal, Lyle Scruggs	19	Correcting misinformation about climate change: The impact of partisanship in an experimental setting	The study finds that correcting misinformation and disinformation about climate change is highly dependent on partisanship. While factual corrections are effective among moderates, strong partisans tend to reject corrective messages, showing how political identity shapes receptivity to scientific information.	Political Psychology, Motivated Reasoning	United States of America	2018	Climatic change 148 (1)
Tatyana Deryugina, Olga Shurchkov	20	The effect of information provision on public consensus about climate change.	The study finds that providing factual, scientifically grounded information increases public belief in the existence and risks of climate change. However, the effect is more pronounced among individuals with less pre-existing knowledge, showing a gap in how new information is processed.	Information Deficit Model, Behavioral Economics	United States of America	2016	PloS one 11 (4)
Ethan Porter, Thomas J. Wood, Babak Bahador	21	Can presidential misinformation on climate change be corrected? Evidence from Internet and phone experiments	The study finds that correcting misinformation and disinformation from high-profile figures, such as U.S. presidents, is difficult but not impossible. While corrections can initially improve factual understanding, partisan alignment often moderates long-term acceptance, particularly in politically polarized contexts.	Political Communication Theory, Elite Cue Theory	United States of America	2019	Research & Politics 6 (3)
Brendan Nyhan, Ethan Porter, Thomas Wood	22	Time and skeptical opinion content erode the effects of science coverage on climate beliefs and attitudes	The study finds that the effects of accurate science coverage on climate change beliefs diminish over time and can be eroded by exposure to skeptical media content. This suggests a time-decay pattern in attitude change and highlights the importance of sustained scientific messaging.	Media Effects Theory, Cognitive Psychology	United States of America	2022	Proceedings of the National Academy of Sciences 119 (26)
Dylan Bugden	23	Denial and distrust: explaining the partisan climate gap	The study finds that partisan differences in climate change beliefs are largely driven by underlying distrust in science and institutions. Conservatives, in particular, express higher levels of skepticism, shaped by identity and ideological beliefs, reinforcing the partisan climate gap.	Cultural Cognition Theory, Political Ideology Framework	United States of America	2022	Climatic Change 170 (3)
Jonathon Schuldt, Sungjong Roh, Norbert Schwarz.	24	Questionnaire design effects in climate change surveys: Implications for the partisan divide	The study finds that how climate survey questions are worded can significantly influence the responses, especially among politically divided groups. Subtle shifts in question design either mitigate or exaggerate the partisan divide, underlining the importance of methodological precision in climate polling.	Survey Methodology, Framing Effects	United States of America	2015	The ANNALS of the American Academy of Political and Social Science, 658(1)
Riley Dunlap, Robert Brulle	25	Sources and amplifiers of climate change denial.	This study identifies the major institutional sources of climate denial, including fossil fuel industries, conservative think tanks, and media outlets, which collectively fund and disseminate misleading information to create doubt about climate science. The findings show how strategic misinformation campaigns are amplified through elite networks to maintain the status quo and resist climate action.	Sociological Institutionalism, Political Economy of Climate Denial	United States of America	2020	Research handbook on communicating climate change
Waqas Ejaz, Muhammad Ittefaq	26	Understanding influences, misinformation, and fact-checking concerning climate change	The study explores how climate journalism in Pakistan is affected by political influences, misinformation, disinformation, and insufficient fact-checking mechanisms. It finds that journalists face structural challenges, including limited resources and	Media Gatekeeping Theory, Framing in Crisis Communication	Pakistan	2024	Journalism and Reporting Synergistic Effects of Climate Change, pp. 168-188

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		journalism in Pakistan.	governmental pressure, which hinder balanced coverage. Misinformation and disinformation spread rapidly, often unchecked, due to a weak verification culture and sensationalism in the media.				
Mike Schäfer	27	Online communication on climate change and climate politics: a literature review	This literature review reveals that online climate communication has diversified over time, shifting from top-down institutional messaging to participatory digital platforms. While this has increased public engagement, it has also fragmented discourse and allowed misinformation to spread more easily. The study emphasizes the dual potential of online media to inform or mislead audiences.	Digital Media Ecology, Public Sphere Theory	Global/Europe-centric	2012	Wiley Interdisciplinary Reviews: Climate Change, 3
Hannah Schmid-Petri	28	Politicization of science: How climate change skeptics use experts and scientific evidence in their online communication.	The study demonstrates that climate skeptics strategically use scientific language and selectively cite experts to legitimize their denialist narratives online. Rather than outright rejecting science, they engage in scientific mimicry to cast doubt, create confusion, and politicize scientific discourse to serve ideological agendas.	Framing Theory, Science Communication Strategy	Germany	2017	Climatic Change, 145
Jianxun Chu, Yuqi Zhu, Jiaojiao Ji.	29	Characterizing the semantic features of climate change misinformation on Chinese social media.	The study characterizes climate change misinformation and disinformation on Chinese social media, showing that such content often uses vague semantics, exaggerated claims, and conspiracy rhetoric. Misinformation and disinformation tend to exploit cultural references and emotional appeals rather than scientific facts, reducing the public's ability to distinguish credible information.	Discourse Analysis, Semantic Network Theory	China	2023	Public Understanding of Science, 32
Frank Fischer	30	Post-truth politics and climate denial: Further reflections	Fischer argues that post-truth politics, driven by populism and distrust in elites, reinforce climate denial by privileging emotional narratives over scientific evidence. The research finds that climate denial becomes a performative political act aimed at resisting environmental regulation rather than an epistemological disagreement with science.	Post-Truth Theory, Critical Policy Analysis	United States and Europe	2020	Critical policy studies, 14
Frank Fischer	31	Knowledge politics and post-truth in climate denial: On the social construction of alternative facts.	This study explores how "alternative facts" are socially constructed in climate denial narratives. It shows how power and ideology shape knowledge production, allowing fringe views to masquerade as legitimate science. The paper calls for reclaiming the epistemic authority of science in democratic debate.	Constructivist Policy Analysis, Knowledge Politics	Western Democracies	2019	Critical policy studies, 13
Peter Jacques	32	A general theory of climate denial.	Jacques presents a general theory that climate denial is not a lack of knowledge but a structured, ideological resistance to perceived threats to economic and political power. Denial is organized and institutionalized, often functioning through networks of influence that challenge environmental governance.	Ideology Critique, Environmental Political Theory	United States of America	2012	Global Environmental Politics, 12
Annika Skoglund, Johannes Stripple,	33	From climate skeptic to climate cynic.	The study introduces a conceptual shift from climate skepticism to climate cynicism, where actors no longer question the science but dismiss climate action as futile or corrupt. This cynical position fosters disengagement, suggesting that	Critical Discourse Analysis, Political Cynicism Theory	Sweden and Europe	2019	Critical Policy Studies 13

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			apathy, rather than denial, is the new challenge in climate communication.				
Tim Forsyth	34	Politicizing environmental science does not mean denying climate science nor endorsing it without question.	Forsyth argues that politicizing environmental science should not be equated with denying climate change or blindly endorsing scientific consensus. Instead, he emphasizes that environmental science is inherently political because it involves value judgments about risk, justice, and policy outcomes. The article critiques technocratic approaches to climate policy and calls for more reflexivity in how science is used in environmental governance, suggesting that science should be interpreted in context and not treated as politically neutral.	Science and Technology Studies (STS), Political Ecology	Global South, Southeast Asia	2012	Global environmental politics, 12
Antonio López	35	Gaslighting: fake climate news and Big Carbon's network of Denial.	López investigates how gaslighting - a psychological tactic of manipulation - is employed by Big Carbon networks to disseminate fake climate news. The research illustrates that these corporations use media platforms, PR firms, and think tanks to create cognitive dissonance, making the public question their understanding of climate reality. These disinformation efforts are not just accidental but strategically designed to delay climate action by manufacturing doubt and reframing environmental responsibility.	Critical Media Theory, Psychological Manipulation in Communication	Western industrialized nations	2022	The Palgrave handbook of media misinformation
Martin Bush	36	Denial and Deception.	Bush explores the deliberate strategies of denial and deception employed by fossil fuel interests to mislead the public and policymakers about climate change. The study traces how these tactics evolved from outright denial to more subtle forms, such as greenwashing and promoting natural gas as a 'bridge fuel.' Bush highlights how such narratives are reinforced by corporate lobbying, media manipulation, and selective funding of scientific research to obscure the urgency of climate action.	Environmental Communication, Political Economy of Energy	North America and Europe	2020	Climate Change and Renewable Energy. Palgrave Macmillan
Jessica Wentz, Benjamin Franta	37	Liability for public deception: linking fossil fuel disinformation to climate damages.	This legal study connects fossil fuel disinformation to tangible climate damages by outlining how corporate deception campaigns may be grounds for legal liability. The authors provide historical evidence of intentional public deception by major oil companies and argue that courts can hold these actors accountable under tort and fraud law. The findings represent a critical bridge between climate communication and environmental justice, positioning disinformation as a legally actionable form of harm.	Legal Theory, Environmental Law, Accountability Frameworks	United States of America	2022	Environmental Law Reporter. 52
Ahmed Al-Rawi, Derrick O'Keefe, Oumar Kane, Aimé-Jules Bizimana	38	Twitter's fake news discourses around climate change and global warming.	This study analyzes Twitter discourse to map how fake news about climate change is circulated and framed. The authors find that misinformation and disinformation often intersect with conspiracy theories, anti-science rhetoric, and political ideology. Bots and coordinated campaigns play a significant role in amplifying false narratives. The paper emphasizes the importance of platform accountability and digital literacy to combat the algorithmic spread of denialism.	Computational Propaganda, Network Analysis, Disinformation Studies	Western digital ecosystem with a global online user base	2021	Frontiers in Communication, 6

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5.2. Visual Synthesis of Dominant Themes

To complement the systematic synthesis of the 38 studies analyzed in this meta-synthesis, a word cloud was generated to visually represent the most frequently occurring concepts, themes, and terms. This visualization offers an accessible semantic snapshot of the dominant discourses emerging from the literature on climate change disinformation in the digital age. The prominence of certain terms reflects their centrality in the academic conversation, while smaller, yet meaningful, terms help capture the dynamics within the post-truth digital public sphere. The word cloud serves as both a visual entry point and a thematic anchor for the qualitative patterns discussed in the next sections.

Figure 4. Word Cloud Showing Themes Extracted during the Meta-synthesis.

To clarify and organize the range of themes extracted during the meta-synthesis, a scaled table was developed to group recurring terms according to frequency, centrality, and conceptual weight across the reviewed literature. This tabular representation supplements the word cloud above by providing thematic categories based on relevance to the central inquiry.

Scale	Label	Representative Keywords
Size 5	Core Themes	Disinformation, Post-truth, Climate Change, Epistemic Harm
Size 4	Major Themes	Misinformation, Epistemic Erosion, Social Media, Public Opinion, Digital Platforms
Size 3	Sub-Themes	Fossil Fuel Industry, Ideological Polarization, Fake News, Knowledge Crisis, Truth Decay, Algorithmic Amplification, Skepticism, Strategic Ignorance, Emotional Appeal
Size 2	Contextual Descriptors	Information Disorder, Fact-Checking, Media Literacy, Science Denial, Tech Platforms, Meta-Synthesis, Cognitive Bias, Confirmation Bias, Political Agendas, Echo Chambers
Size 1	Methodological/ Fringe Terms	Qualitative Synthesis, Epistemic Fragmentation, Digital Literacy, Narrative Frames, Thematic Coding, Empirical Studies, Analytical Review, PRISMA, Knowledge Authority, Public Perception, Knowledge Gaps, Trust Deficit, Policy Delay, Thematic Saturation, Online Discourse, Academic Institutions, Open Access, Data Integrity

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5.3. Spatial Mappings

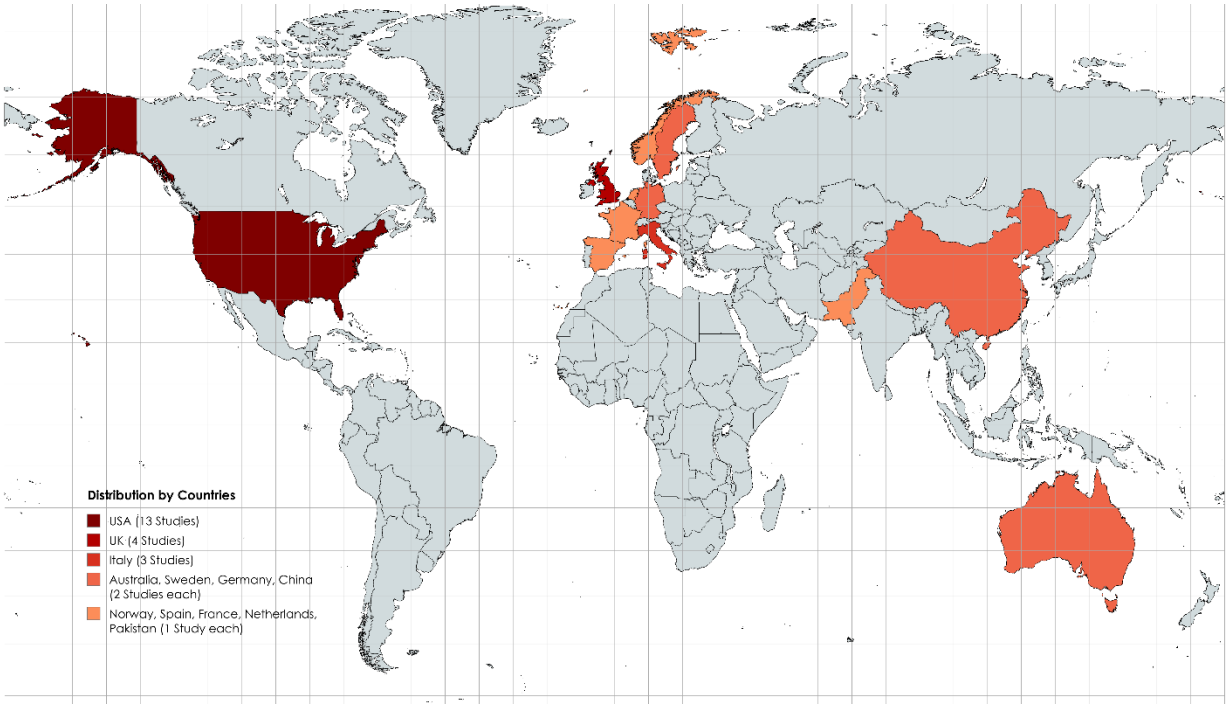

Figure 5. Geographical Distribution (by Countries) of Reviewed Studies on Climate Misinformation, Disinformation, and Epistemic Harm.

This figure maps out the geographical representations of the studies included in the meta-synthesis based on countries. Each marker corresponds to a study's primary geographical focus or the location of the research institution.

Figure 6. Geographical Distribution by regions (Global North vs Global South).

This figure reveals a stark imbalance in the geographical focus of climate change disinformation research from the 38 studies included in this meta-synthesis. While some studies span multiple

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regions or present global perspectives, the distribution remains heavily skewed toward the Global North. Specifically, nearly 87% (33 out of 38) of the studies are centered on contexts within the Global North - particularly North America, Western Europe, and parts of Oceania, while only 13% (5 out of 38) identify with or directly examine the Global South. This unequal distribution shows a significant research gap in how climate change disinformation is conceptualized, studied, and addressed across diverse sociopolitical and media ecosystems. The underrepresentation of the Global South in this field can be attributed to several factors: limited research funding, infrastructural and technological disparities, lower academic publishing access, and the dominance of English-language journals that often prioritize Global North contexts. Additionally, climate change discourse in the Global South may be more closely tied to issues of survival, adaptation, and justice, rather than to epistemic or communicative disinformation frameworks, which are prevalent in the North

5.4. Discussion of Findings

Social Epistemology

In the age of post-truth, the climate crisis is no longer merely a contestation of facts but a battleground of beliefs, algorithms, and emotional appeals. Social media platforms, once heralded as tools of democratic communication, now function as sophisticated engines of disinformation, subtly and systemically eroding the public's epistemic welfare. The consequences of this erosion are obvious: a public less able to discern truth from fiction, more susceptible to ideological polarization, and increasingly alienated from scientific consensus. The crisis is not simply about what people do not know, it is about how they are made not to know. As such, it demands a turn to social epistemology, which allows us to understand knowledge as a collective enterprise entangled in institutions, technologies, and power. Within this framework, studies such as Treen et al. (2020) show how climate misinformation is not random noise but a deliberate manipulation of uncertainty.

By exploiting scientific balance and exaggerating disagreement, disinformation campaigns weaponize cognitive biases, such as the availability heuristic and confirmation bias, to produce epistemic harm. The emotional appeal found in such content is not accidental; it is calibrated to trigger identity-based responses, ensuring that misinformation resonates more deeply than measured analysis ever could. This phenomenon is amplified by algorithmic design, wherein emotionally charged content is not only more engaging but more visible. Consequently, digital platforms do not merely reflect public opinion, they curate and reshape it in ways that distort perceived social consensus, as Lewandowsky et al. (2019) demonstrate. When users believe that denialist views are widely held, their own skepticism becomes epistemically justified, leading to a dangerous spiral of mutual reinforcement.

Efforts to resist this spiral often emphasize fact-checking and media literacy, but such solutions fail to account for the systemic architectures of disinformation. Lewandowsky (2021) identifies prebunking and inoculation strategies as promising interventions, but even these approaches struggle against the velocity and virality of falsehoods. The problem is not merely one of content but of infrastructure. Platforms are designed to reward attention, not accuracy, and in this attention economy, truth decays while disinformation thrives. This is particularly evident during moments of crisis, as Daume (2024) shows, when extreme weather events are hijacked to push misleading narratives. These temporal windows, characterized by heightened emotion and low verification, are fertile ground for epistemic exploitation. Yet climate disinformation does not operate uniformly. Simon (2022) identifies five modalities of knowledge manipulation - instrumental, cultural, performative, ethical, and speculative - which political actors deploy to reframe climate change in ways that benefit specific interests. These modalities reveal how disinformation is not just about lying but about storytelling, about crafting alternative epistemic realities that are morally persuasive and socially intuitive. Such reframing is particularly effective in environments already saturated with distrust. Gundersen et al. (2022) trace the roots of climate denial not to ignorance but to the collapse of institutional credibility. When science is framed as partisan or elitist, the rejection of climate data

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becomes a form of resistance, a way of asserting agency in a world perceived to be controlled by distant powers. The result is a slow drift toward what they call an epistemic dark age, where knowledge is no longer evaluated by standards of evidence but by tribal allegiance and ideological comfort.

This ideological entrenchment is not accidental but engineered. Santamaría et al. (2024) expose the political technologies that sustain disinformation ecosystems. Through AI-driven personalization, echo chambers, and influencer networks, climate disinformation is tailored, targeted, and turbocharged. What emerges is not ignorance in the traditional sense, but what Proctor terms "agnotology" - the production of strategic ignorance. The fossil fuel industry, among others, leverages this ignorance not by denying facts outright but by flooding the public sphere with competing narratives, muddying the epistemic waters until no claim can be taken as credible. In such a world, even truth becomes suspect, and skepticism becomes virtue. The global implications of this crisis are unevenly distributed. Heffernan (2024) draws attention to the vulnerabilities of African nations, where digital illiteracy and local narratives are exploited to spread climate disinformation. Here, epistemic harm intersects with postcolonial marginalization.

The imposition of Western scientific discourse, often without cultural translation or contextual grounding, creates a void into which disinformation easily flows. The result is an epistemic colonization that undermines both indigenous knowledge systems and scientific engagement, leaving communities doubly disenfranchised, excluded from global climate policy and manipulated within local information spheres. To understand the gravity of this moment is to recognize that epistemic welfare is not a luxury but a prerequisite for democratic life and environmental survival. It is not enough to combat disinformation with isolated interventions or to place the burden of discernment on individual users. What is needed is a collective rethinking of the epistemic infrastructures that govern knowledge production and circulation. This includes platform accountability, algorithmic transparency, and a reinvestment in public institutions that can command trust without coercion. It also requires an ethical commitment to epistemic justice, one that amplifies marginalized voices, contextualizes scientific discourse, and resists the commodification of attention.

Post-Truth and Communicative Action

In the post-truth era, climate change discourse has become increasingly susceptible to distortion through social media platforms that not only propagate misinformation but also intensify ideological polarization. The dissolution of shared epistemic foundations, highlighted by terms such as epistemic erosion, strategic ignorance, and truth decay, is at the heart of this crisis, where emotional appeal often trumps empirical evidence. Post-truth theory posits that objective facts are less influential in shaping public opinion than appeals to emotion and personal belief, a condition exacerbated by digital environments where algorithmic amplification and echo chambers thrive. Tyagi et al (2020) demonstrate how affective polarization on Twitter fosters antagonistic emotional clusters, creating fragmented online communities. These emotional silos, often intensified by low-credibility influencers and bots, reinforce distrust and skepticism, leading to epistemic harm as the digital public square becomes dominated by conflict over consensus.

Corsi (2023) corroborates this dynamic, showing that Twitter's algorithm disproportionately amplifies low-credibility content, enabling misinformation to outcompete legitimate scientific discourse through algorithmic biases designed for engagement rather than accuracy. What emerges is a distorted informational landscape, echoing Williams et al.'s (2015) earlier findings that climate change discussions are frequently segregated into open forums and ideologically insulated echo chambers. The networked dynamics of these platforms, according to Bassolas et al. (2024), encourage cross-platform polarization, with users exposed repeatedly to confirmation-biased narratives, especially when interacting within like-minded digital communities. In this environment, disinformation operates not merely as an error in knowledge but as a systemic condition of informational disorder. As Loru et al. (2024) argue, the agenda-setting power of dominant ideological actors on social media contributes to an epistemic hierarchy, whereby the loudest and most

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emotionally resonant messages, not the most accurate, steer public discourse. This is a critical element of post-truth dynamics: the supremacy of performative belief over reasoned understanding.

Further compounding this are platforms like YouTube, where Allgaier (2019) identifies "strategically distorted communications" in climate-related content. Here, disinformation is not just shared, it is produced with intent, often backed by vested interests like fossil fuel lobbies, exploiting the cognitive vulnerabilities of users through curated visuals and narrative manipulation. Porter and Hellsten (2014), analyzing the Climategate controversy, highlight how framing strategies on YouTube serve to delegitimize science while privileging sensationalism, confirming post-truth theory's premise that perception often trumps substance. Polarization grows not only through the volume of disinformation but through its emotional salience and strategic framing. Falkenberg et al. (2021) show the intensifying polarization in climate debates, observing that interactions become increasingly hostile over time, reducing opportunities for deliberative engagement. This aligns with algorithmic amplification and ideological polarization from the word cloud, where digital platforms reward outrage, exaggeration, and tribalism. In such a landscape, the epistemic environment deteriorates, eroding public capacity to differentiate between credible and false claims, a condition caused by the prevalence of fake news, epistemic erosion, and knowledge crisis.

Efforts to address this epistemic decay are evident in Van der Linden et al. (2017), who advocate for psychological inoculation techniques to bolster public resilience against misinformation. Their approach targets the very mechanisms that post-truth environments exploit, equipping audiences with preemptive resistance strategies that challenge disinformation's persuasive structures. Similarly, Huang and Wang (2025) explore corrective message strategies, emphasizing the challenge of re-establishing data integrity and digital literacy in fragmented online environments. Together, these studies reveal a multilayered crisis where disinformation is not simply an aberration but a systemic outcome of social media architectures that prioritize virality over veracity. The collapse of shared epistemic norms, amplified by algorithmic mechanisms and ideological entrenchment, signifies more than a communications problem; it reflects a foundational rupture in the construction and transmission of knowledge. The post-truth condition is not a passive state but an active battleground over the control of meaning, truth, and the legitimacy of science.

In light of Habermas' Theory of Communicative Action, the failure of climate change discourse on digital platforms reflects a broader breakdown in rational-critical debate. This theory assumes that genuine communication arises from an ideal speech situation, where participants engage without coercion, distortion, or strategic manipulation, oriented toward mutual understanding and consensus (Habermas, 1984). However, climate change communication today is rife with strategic distortions and ideological manipulation that undermine this communicative ideal, leading instead to epistemic erosion, truth decay, and entrenched partisan divides. Benegal and Scruggs (2018) show that corrective information about climate change is often processed through partisan filters, demonstrating how identity-based reasoning thwarts the goal of communicative rationality. Even when factual corrections are offered in good faith, they frequently fail to produce mutual understanding, especially in polarized environments where strategic ignorance is actively maintained.

In these spaces, communication ceases to be dialogical and instead becomes instrumental, serving to entrench preexisting positions rather than opening a shared epistemic horizon. This strategic distortion is further illuminated in the findings of Deryugina and Shurchkov (2016), who reveal that while information provision can increase public understanding of climate change, the effect is fragile and susceptible to ideological backsliding. When actors are not oriented toward truth but toward self-affirmation, information becomes a tool of manipulation rather than enlightenment, contradicting Habermas' vision of communicative action based on sincerity, comprehensibility, truthfulness, and legitimacy. These ideals are structurally undermined by digital ecosystems where disinformation circulates freely and correction efforts - such as those studied by Porter et al (2019) - face limited success in combating even the most blatant presidential-level disinformation.

This problem is not merely one of information scarcity, but of media literacy, interpretive bias, and ideological motivation, as Nyhan et al. (2022) observe. Over time, the presence of skeptical

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content erodes the positive effects of accurate scientific reporting. Here, time functions as a corrosive agent, dissolving even momentary consensus. The durability of disinformation, often anchored in emotional resonance rather than factual robustness, disrupts the intersubjective validation process crucial to Habermas' ideal. As Bugden (2022) articulates, this contributes to a partisan climate gap, where climate denial is less about ignorance and more about distrust, more of epistemic mistrust deeply embedded within political identities. Schmid-Petri (2017) adds another layer to this crisis by showing how climate skeptics strategically employ expert discourse to simulate rationality, blurring the lines between authentic and distorted communication. Such appropriation of scientific language for ideological ends further obscures communicative transparency and feeds into what the word cloud captures as strategic ignorance and epistemic erosion. The simulation of credibility, rather than its achievement, has become a communicative norm, an affront to Habermas' insistence on the internal truthfulness and moral validity of speech acts.

This is exacerbated by survey-based research like that of Schuldt et al (2015), who reveal that even the phrasing of questions influences climate attitudes along partisan lines. Language itself, the vessel of public reasoning, becomes a battleground, no longer a neutral medium of shared understanding but a site of ideological contestation. Dunlap and Brulle (2020) extend this point, exposing the vested interests, particularly fossil fuel lobbies and political elites, that serve as amplifiers of climate denial, deliberately derailing rational discourse through strategic media operations. The international context, too, reflects these communicative tensions. Ejaz et al (2024) point to the fragile infrastructure of climate journalism in Pakistan, where limited data integrity and a lack of resources for fact-checking allow misinformation to flourish.

Without robust deliberative norms and institutional safeguards, communicative action becomes nearly impossible. This global dimension endorses Schäfer's (2012) observation that online climate communication is often superficial, fragmented, and shaped by competing political logics rather than deliberative consensus. Thus, what becomes evident is that the digital public sphere is failing to uphold the conditions for Habermasian communication. The interplay of disinformation, fake news, and public opinion manipulation impedes the formation of rational will and democratic consensus. Rather than an open communicative space, digital discourse on climate change is marked by epistemic injustice, cognitive dissonance, and ideological polarization, all indicators that communicative action is being supplanted by communicative dysfunction.

Foucault's Theory of Power-Knowledge

Foucault's concept of power-knowledge contends that power is not simply repressive but productive; it constructs discourses, shapes what can be known, and legitimizes specific forms of truth while marginalizing others (Foucault, 1977) and this again reveals how disinformation, fake news, and denial are not accidental or marginal errors in communication but are central mechanisms through which dominant power structures protect vested interests, particularly those aligned with fossil capital. Chu et al (2023) uncover how climate disinformation on Chinese social media is semantically coded to appear credible and authoritative, drawing upon cultural references and emotionally charged language to embed itself into public discourse. These narratives often mimic scientific discourse, blurring the line between expert and pseudo-expert speech. This performative simulation of legitimacy echoes Foucault's assertion that knowledge is institutionalized through mechanisms of validation, which are not neutral but shaped by the regimes of power that authorize them.

Fischer (2019, 2020) deepens this critique by analyzing how the "post-truth" condition is not simply about lying but about displacing the authority of scientific consensus in favor of politically expedient "alternative facts." These are facts not grounded in empirical evidence but manufactured through rhetorical repetition, media amplification, and ideological loyalty. The power to define what is real, what is climate change, and who gets to speak about it, is contested in these terrains of knowledge. The discursive framing of climate denial does not arise spontaneously, it is curated, funded, and algorithmically promoted to secure the dominance of fossil-fuel interests. Jacques' (2012) theory of climate denial aligns with this Foucauldian paradigm. He demonstrates that denial is

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institutionalized within think tanks, corporate-funded research, and political lobbying, forming what he calls an "organized denial machine." This machine does not operate through the open contestation of scientific claims but through the strategic production of counter-knowledge that appears scientific while serving extractive capitalism.

Here, disinformation, public opinion manipulation, and epistemic injustice are not accidental byproducts, they are engineered outcomes. Denial functions as a technology of governance, managing dissent and discrediting transformative environmental policies by questioning the legitimacy of climate science itself. Skoglund and Stripple (2019) further problematize the subjectivities produced by denial. They trace the evolution from climate skeptics, who doubt the validity of climate science, to climate cynics, who may accept the science but deny the moral or political urgency to act. These subjectivities are forged within the matrix of media, political rhetoric, and cultural norms that normalize inaction and minimize ethical responsibility. This shift reflects a deeper epistemological transformation where truth is devalued and replaced by relativism and performative expertise. Power, in this sense, does not need to erase truth; it only needs to devalue its authority by offering alternative epistemologies that are more emotionally resonant or ideologically convenient.

Forsyth (2012) offers a counterpoint that resists both blind acceptance and outright denial, advocating for a critical politicization of science. Yet even this call acknowledges the role of politics in shaping how scientific knowledge is perceived and used. In this light, Foucault's insight that knowledge is always situated and implicated in power structures becomes indispensable. Scientific neutrality is a myth in a political landscape where oil companies, as López (2022) exposes, employ gaslighting techniques to create confusion and doubt. These corporations manipulate public discourse not by denying science outright but by overwhelming it with noise, pseudo-scientific reports, media influencers, and targeted content, all under the pretense of reasoned debate. Bush (2020) reinforces this by mapping the deliberate tactics of deception used by fossil fuel companies, from sowing uncertainty to funding misleading studies. These actions are not failures of public relations, but rational strategies embedded in broader systems of power.

As Wentz and Franta (2022) argue, the consequences of such strategies are not only epistemic but material, linking fossil fuel disinformation to tangible climate damages and proposing liability for public deception. The ability to produce ignorance, therefore, is not an absence of knowledge but a specific form of knowledge production, one designed to shield power and deny responsibility. Al-Rawi et al. (2021) explore the digital battlefield of Twitter, where fake news discourses around climate change reveal the entanglement of algorithmic power and ideological manipulation. The platform architecture favors emotionally charged and polarizing content, allowing misinformation to flourish while crowding out nuanced or evidence-based communication. This environment enables the emergence of echo chambers and ideological polarization, terms from the word cloud that signify the fragmentation of the public sphere into isolated communities of belief. In such spaces, truth becomes not a matter of consensus but of group loyalty, and communication serves the reproduction of identity rather than the pursuit of shared reality.

In this Foucauldian landscape, climate change denial emerges as a system of power-knowledge: an epistemological regime constructed to defend extractive capitalism, destabilize collective understanding, and delay climate action. Its effectiveness lies not in its accuracy but in its performativity, that is, its ability to simulate truth, mobilize affect, and fragment the discursive field. Combating this regime requires more than fact-checking or public education; it demands a political strategy to dismantle the institutions and incentives that produce and authorize climate denial as legitimate knowledge.

6. Conclusions

The crisis of climate change is no longer just an environmental emergency, it is a crisis of truth. In an age marked by disinformation, misinformation, political tribalism, and engineered doubt, the struggle for meaningful climate action is being waged not only on the ground but in the contested space of knowledge itself. Climate denial has evolved beyond mere skepticism into a deliberate,

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strategic project, one that manipulates public perception, exploits ideological fractures, and reconfigures power through the distortion of reality. Across online platforms and media ecosystems, climate disinformation is not simply spreading; it is being algorithmically amplified, aesthetically repackaged, and emotionally weaponized. The digital age has turned denial into performance, where the appearance of engagement often masks epistemic decay. What was once a scientific debate has become a battleground for influence, where trends matter more than truth, and virality outpaces verification. The result is a deeply fragmented discourse where echo chambers isolate people from opposing views and fuel affective polarization, turning climate narratives into hardened belief systems.

Beneath this communication chaos lies a more unsettling truth: climate denial is not the absence of knowledge, but the production of strategic ignorance. It is a tool of power, protecting entrenched economic interests and reinforcing the status quo. The deliberate distortion of facts, the manufacturing of uncertainty, and the cultivation of distrust are not accidental, they are calculated mechanisms designed to delay action and disarm the public. This is not just a war on science; it is a war on reason itself. Yet, the battle is not lost. The path forward lies in rebuilding a culture of communicative integrity. It demands more than just presenting facts; it calls for the reconstruction of trust, the humanization of data, and the empowerment of diverse voices within climate discourse. It requires platforms to be held accountable, media to be courageous, and the public to be critically engaged. Above all, it calls for a reawakening of truth as a shared civic value, one that transcends political loyalties and economic convenience.

To reclaim the climate narrative is to reclaim the moral and epistemological foundations of society. It is to declare that truth still matters, that reason still has a role, and that justice cannot exist without honesty. Climate denial is not just a miscommunication, it is a mirror reflecting who holds the power to define reality. In choosing to defend truth, we are not just defending science; we are defending the very possibility of a livable, equitable future. And that, in the end, is a fight worth everything.

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