



Interuniversity Doctoral Programme in Urban and Regional Development

Social media ecosystem and disinformation.

**The dynamics of the debate on nuclear energy,
radioactive waste and the atomic conflict narrative.**

Simone PERSICO

Supervisor

Prof. Sara Monaci

Politecnico di Torino – Università degli Studi di Torino

Synthesis

Social media has been a disruptive communication technology that has shaped the evolution of social relations in modern society (Amelia & Balqis, 2023), making it essential to monitor developments and understand the nuances of the communication landscape to address phenomena such as disinformation (Wardle & Derakhshan, 2017) that may have a negative impact on public health, public security, civil discourse, political participation and equality (European Commission, 2022).

This doctoral research investigates the circulation of disinformation within the complex and evolving ecosystem of social media platforms, with a focus on how these dynamics influence public understanding of high-impact issues such as nuclear energy and atomic conflict. With the increasingly central role of social media in political and civic discourse, it is critical to understand the mechanisms through which false or misleading narratives spread. The study highlights how disinformation is no longer confined to isolated sources or platforms, but circulates through interconnected environments, both mainstream and fringe, making it difficult to contain or regulate effectively.

The first study analyzes the Italian general elections of 2022, focusing on the double declination of the term “nuclear”: on the one hand as a civilian energy policy, and on the other hand as a symbol of geopolitical threat related to the conflict between Russia and Ukraine. The concept of “Bridges,” (Hayes, 2006) drawn from transmedia theory, is introduced to conceptualize narrative connections between platforms. Through an explanatory sequential design, the research identifies affective, defective and infective patterns of content dissemination, revealing a polarized and fragmented digital public sphere. The analysis highlights the structural role of social media in political communication and the urgent need for interdisciplinary and cross-platform strategies to counter disinformation.

The second study examines regional contestations over the proposed National Radioactive Waste Repository. Combining digital methods and spatial analysis, the research maps the digitally mediated public debate, highlighting the dominance of political actors, local news and activists. The acronym NIMYR (Not In My Region) describes localized resistance, while the debate also takes on transregional and transtemporal characteristics. The results suggest how the absence of coordinated public communication fosters hyper-partisanship and delays in democratic decision-making.

The third study analyzes nuclear narratives in the context of the Russia-Ukraine conflict, with a focus on the role of social media in the construction of global public discourse. Using computational models and qualitative analysis, the research documents how disinformation and propaganda contribute to the fragmentation of public opinion. This case is framed in the regulatory context of Digital Services Act (European Commission, 2022), highlighting its implications for media pluralism and civic debate.

In the case of nuclear energy, the research identifies disinformation strategies that emphasize exaggerated risks or spread unfounded claims about environmental and safety issues. These narratives often originate on alternative platforms such as Telegram, Rumble or Gab-environments characterized by a low level of content moderation-but frequently manage to migrate to more mainstream digital spaces due to structural interconnectedness. This cross-platform dynamic amplifies the reach of such content, revealing the limitations of current regulations, which tend to treat platforms in isolation. Similarly, in the context of atomic conflict, disinformation fuels public anxiety and political polarization. The dissemination of disinformation about nuclear policies, geopolitical tensions, or war scenarios is often strategically constructed to exploit collective fears and undermine trust in institutional narratives. Research shows how disinformation agents can adapt their techniques to changing platforms and normative contexts, targeting specific content to targeted audiences.

To investigate these phenomena, the research adopts a methodological approach based on Digital Methods (Rogers, 2019). Digital Methods are designed to analyze natively digital objects (NDO)-elements that exist and function within digital platforms, such as hashtags, hyperlinks, and metadata. These tools enable tracking patterns and information flows in digital networks. The approach integrates “follow the medium” (examine how the affordances of platforms influence communication) and “follow the natives” (observe how users interact with content) principles. The qualitative content analysis provides a way to understand the fluid and borderless nature of online interaction, and its adaptability makes it suitable for monitoring emerging forms of disinformation in unstable or rapidly changing contexts.

Recognizing the limitations of regulation focused on individual platforms (Surjatmodjo, Unde, Cangara, & Sonni, 2024), the study argues for an integrated response that includes fact-checking, cross-platform monitoring, digital literacy, and coordinated policy strategies. The research highlights the urgency of systemic interventions, especially in less regulated environments where disinformation often originates. Overall, this research contributes to the literature on media studies, digital communication, and Digital Methods, offering an in-depth analysis of how disinformation spreads across social media ecosystems and affects public understanding of nuclear issues.

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