Democratizing the Technosphere: A Dual-Layered Analysis of the Digital Governance

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Abstract

Between the 'public and private' and the 'technical and political,' to what extent do these dichotomies distance the need for a more complex governance model for emerging technologies mediated by algorithms? Stemming from this inquiry, this article explores the emergence and characteristics of the technosphere, a global digital ecosystem formed by interconnected digital systems and infrastructures. We argue that digital platforms, driven by algorithms, are central to the technosphere, acting as private and public spaces that influence public discourse and political engagement. On the one hand, the algorithms embedded in these platforms are not neutral; they carry biases and values, shaping users' perspectives and behaviors. On the other hand, the governance of these algorithmic systems is debated, with a call for more inclusive and democratic approaches that encompass diverse perspectives. In this context, the multi-governance model for digital platforms is introduced with a governance perspective for platforms that, despite presenting a 'private nature' and 'technical aspects,' also exhibit 'public characteristics' and are observed as 'political instruments.' Thus, considering the complexities of the technosphere, adopting a multi-governance model can lead to a more inclusive, equitable, and democratic landscape.

Keywords: Technosphere. Digital platforms. Algorithmic governance. Algorithmic mediation. Multi-governance model.

Resumo

Entre o ‘público e o privado’ e a ‘técnica e a política’, o quanto tais dicotomias afastam a necessidade de um modelo de governança mais complexo para as tecnologias emergentes mediadas por algoritmos? A partir de tal inquietação, este artigo explora a emergência e as características da tecnosfera, um ecossistema digital global formado por sistemas e infraestruturas digitais interconectadas. Pontuamos que plataformas digitais, impulsionadas por algoritmos, são centrais para a tecnosfera, desempenhando o papel de espaços privados e públicos que influenciam o discurso público e o engajamento político. De um lado, algoritmos embutidos nessas plataformas não são neutros; eles carregam vieses e valores, moldando as perspectivas e comportamentos dos usuários. Por outro lado, a governança desses sistemas algorítmicos é debatida, havendo um apelo por abordagens mais inclusivas e democráticas que contemplem perspectivas diversas. Nesse contexto, o conceito de um modelo de multi-governança para plataformas digitais é introduzido com uma perspectiva de governança para plataformas que, apesar de apresentarem ‘natureza privada’ e ‘aspectos técnicos’, também possuem ‘características públicas’ e são observadas como ‘instrumentos políticos’. Logo,

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considerando complexidades da tecnosfera, adotar um modelo de multi-governança pode trazer um cenário mais inclusivo, equitativo e democrático.

Palavras-chave: Tecnosfera. Plataformas digitais. Governança algorítmica. Mediação algorítmica. Modelo multi-governança.

1 INTRODUCTION

The prevailing literature on digital participation has predominantly concentrated on the capacity of digital technology to augment citizen involvement in decision-making processes and foster civic engagement. Researchers have investigated the potential of digital platforms, such as e-petitions, online forums, and social media, for citizens to express their opinions and preferences concerning public policies (RANCHORDÁS, 2017; HANSSON *et al.* 2014). This perspective views digital technology as an instrument for enhancing participation, governance, and democracy. Nevertheless, as digital technologies become increasingly ubiquitous and permeate all aspects of social life, serving as infrastructure for information, transactions, and relationships, the literature on digital governance has largely overlooked another facet of this equation: the participation in developing digital technologies themselves.

In the dawn of the 1990s, the nascent internet was beginning to transform society as a whole. The early digital participation literature examined the internet's capacity to democratize access to information and cultivate enhanced civic engagement through online platforms (RHEINGOLD, 1993; NEGROPONTE, 1995). Researchers delved into using digital technologies, such as email, websites, and online forums, as vehicles for communication between citizens and public officials and instruments for fostering deliberation and decision-making within the public domain (FISHKIN,1997; SUNSTEIN, 2001). As time progressed, digital participation literature evolved in response to the ever-increasing complexity and sophistication of digital technologies and their subsequent impact on myriad facets of civic life. For instance, the rise of social media platforms led researchers to investigate their roles in sculpting political discourse, mobilizing collective action, and swaying public opinion (SHIRKY, 2008; CASTELLS, 2012). Concurrently, the emergence of e-government and e-democracy initiatives served as significant areas of inquiry, with scholars examining the potential of digital tools and platforms to bolster the transparency, accessibility, and responsiveness of public services and democratic institutions (DUNLEAVY *et al.*, 2006; CHADWICK, 2009).

While much of the existing literature has focused on the potential benefits of digital participation, there is also a growing recognition of its limitations and challenges (KAMPEN & SNIJKERS, 2003; BASTICK, 2017). For example, some scholars have pointed to the potential

for digital participation to exacerbate existing inequalities and power imbalances, as marginalized groups may need equal access to digital technologies or the skills needed to participate effectively. Moreover, there are concerns that digital participation may lead to a "digital divide" between those who can participate digitally and those who are not, potentially disenfranchising some groups of citizens (DUNLEAVY, 2006). These challenges highlight the need for a more nuanced understanding of the role of digital participation in democratic governance and the need for policymakers to address the digital divide and ensure that digital technologies are used to promote inclusion and equity.

In recent years, the literature on digital participation has expanded to include topics such as the digital divide, data privacy, and algorithmic decision-making. Scholars have examined disparities in access to and usage of digital technologies among various demographic groups, highlighting the risk of digital exclusion and reinforcement of social inequalities (DIJK, 2005, HARGITTAI, 2010). Furthermore, issues related to data privacy, surveillance, and the ethical implications of algorithmic decision-making in the public sphere have emerged as crucial areas of inquiry within digital participation research (EUBANKS, 2018; ZUBOFF, 2019). As digital technology advances rapidly, permeating all aspects of social life, it becomes increasingly important to reevaluate and reassess the digital participation literature. The rapid development of artificial intelligence, the Internet of Things, and other emerging technologies will likely impact civic engagement, public administration, and democratic processes. For example, the popularity of platforms like TikTok in the United States and Instagram in China illustrates how digital technologies can serve political ends. With their extensive user bases and sophisticated algorithms, these platforms possess the potential to shape public opinion, influence political discourse, and even enable large-scale mobilization (CORREA & SILVA, 2021).

A critical aspect overlooked by the literature on digital governance is participation in developing digital technologies. A digital democracy depends not only on digital technologies for civic engagement but also on democratic participation in the constructing technologies. Initiatives such as Participatory Design and Code for America, and Code for All exemplify efforts to involve citizens in the development of digital platforms and tools for government and civic organizations, promoting transparency, accountability, and participation in decision-making processes (SCHULER & NAMIOKA, 1993). The debate now shifts towards technological governance and the modeling of rules that guide algorithms as a space for public action. The question arises: should the process involve not only developers but also broader social participation, shared governance models, and auditability, engaging society as a whole?

It is known that digital technologies are instrumental in improving the openness, transparency, and accountability of institutions and the participation and engagement of citizens in the government decision-making process. Much literature deals with e-Participation, e-Voting, collaborative and participatory online initiatives, and digital democracy. However, challenges arise concerning using such spaces as instruments of social dispute and public policy since their rules are beyond public institutional arrangements. In such a context, we discuss that the existing literature on digital participation needs to pay more attention to participation in developing digital technologies or adopting a public policy approach to digital governance and creating algorithms as an area for public action. This essay aims to provide an initial analysis of this latter aspect by examining the politics of technology and the opportunities for democratic participation in the technical realm. This essay is structured around three arguments presented below.

In the first argument, we revisit the theoretical foundations that allow us to depict technological artifacts as possessing a political nature, which influences or guides how society organizes itself and interacts. Following this, we introduce the technosphere concept, arguing that technological artifacts are no longer self-contained objects but form part of a socio-technical infrastructure in which we engage (and are therefore influenced by) almost daily in various social lives. Despite this, the technosphere is predominantly privately controlled. Lastly, we introduce a framework proposal to understand digital participation from a perspective of democratic participation in the development of technologies, moving beyond merely using them as instruments for participation.

2 POLITICAL ATTRIBUTES OF TECHNOLOGY

The increasing permeation of technology into our society underscores the importance of understanding the politics embedded within technological systems. Traditional viewpoints often conceive of technology as politically neutral tools, serving merely as instruments for facilitating human objectives. However, a burgeoning body of literature challenges this neutrality assumption, arguing that technological artifacts embody and reflect specific political attributes and power dynamics. This section delves into four seminal theoretical constructs illuminating technology's political dimensions - Actor-Network Theory, Langdon Winner's Theory of Technological Politics, the Critical Theory of Technology, and the Social Construction of Technology. These theories expose the intricate relationships between technology, politics, and society, disrupting the conventional dichotomy and arguing for an integrated approach.

2.1 Actor-Network Theory: Understanding the Agency of Technological Artifacts

Actor-Network Theory [ANT], predominantly attributed to Bruno Latour's work (2005), presents a groundbreaking perspective for grasping the politics embedded within technology. ANT propounds that technological artifacts possess agency and actively participate in molding social relations and power dynamics (LATOUR, 2005). This perspective contradicts the traditional view that technologies are politically neutral tools. By vesting agency in technological artifacts, ANT situates them as political entities that mediate social interactions, aiding in the architecture of power relationships (WINNER, 1980). Consequently, this viewpoint facilitates a nuanced comprehension of technology's political role, challenging the rigid dichotomy between society and technology. ANT emphasizes the crucial role of networks in technology politics, underscoring the intricate interplay among human and non-human actors, including technologies, laws, and institutions (LATOUR, 2005). Understanding these networks is paramount to comprehending technology implications as they mutually shape and influence each other (LAW & MOL, 1995). Hence, politics within technology emerges from the dynamic negotiations and interactions within these networks.

2.2 Langdon Winner's Theory of Technological Politics

The politics embedded within technology occupies a central space in Winner's contributions. Winner probes the intricate nexus between technological artifacts and socio-political power structures. In his groundbreaking essay "Do Artifacts Have Politics?" (WINNER, 1980), Winner posits that technologies are politically charged and not merely neutral entities. Winner (1980) outlines two dimensions of politics inherent in technological artifacts. The first dimension presents technologies as vehicles reflecting and bolstering the values and interests of their creators. Here, technologies are tools for powerful social actors to uphold their interests and cement their authority. For example, Robert Moses' design of low overpasses in New York's parkways intentionally excluded buses, mirroring his bias for affluent car owners over the urban poor reliant on public transportation (WINNER, 1980).

In contrast, the second dimension of Winner's (1980) argument suggests that some technologies possess an intrinsic political structure derived from their functional characteristics. These artifacts are not merely tools but contain embedded power and authority forms that influence social relations. An example is the centralized structure of nuclear power plants necessitating hierarchical organization and control concentration, thus reinforcing undemocratic power structures (WINNER, 1980). Winner's work carries profound implications for comprehending technology's societal role. It contests the concepts of technological neutrality and determinism by highlighting the political aspects of technological artifacts. It

necessitates critically scrutinizing technologies and their development process to ensure alignment with democratic values and promote social equity. Additionally, it underscores the importance of accounting for the broader socio-political and economic contexts that shape technology's development and deployment (WINNER, 1980).

2.3 The Critical Theory of Technology

The Critical Theory of Technology, an intellectual tradition derived from the Frankfurt School's work, offers another impactful perspective. This theory, part of the broader critical theory tradition that critiques societal power structures to foster emancipation (HORKHEIMER, 1972), builds on the works of Marcuse (1964) and Habermas (1970). Feenberg (1991) propounds that technology is deeply interwoven with social and political structures and is far from neutral. According to Feenberg, technological development is guided by dominant social values and interests, reproducing and consolidating existing power relations. His approach emphasizes the political dimensions of technology, arguing that the design and deployment of technologies embody specific social and political arrangements (FEENBERG, 1999). This perspective disrupts deterministic and instrumentalist views of technology prevalent in mainstream discourses (FEENBERG, 2002). Central to Feenberg's Critical Theory of Technology is the concept of "technical codes" (FEENBERG, 1995). Technical codes, defined as cultural and normative frameworks, direct the design and use of technologies. These codes embody dominant social values and interests and affect technology's politics. Feenberg argues that scrutinizing these technical codes critically can help envisage alternative technological configurations that encourage more democratic and emancipatory outcomes.

2.4 The Social Construction of Technology (SCOT)

The Social Construction of Technology [SCOT] theory posits that technological artifacts result from internal dynamics and are substantially shaped by various social and cultural influences (BIJKER, 1995). Central to this theory is the acknowledgment that many actors, including engineers, users, designers, and other stakeholders, actively shape the technology development process through negotiation and social construction (PINCH & BIJKER, 1984). Additionally, SCOT underscores the reciprocal relationship between technology and society. As technology molds social relations, power dynamics, and cultural values, it is reciprocally influenced by these social processes (BIJKER et al., 1989).

This co-construction understanding of technology and society is particularly relevant for assessing the political implications of technology. Moreover, SCOT theory accentuates the need for critical reflection on technology's social and political consequences. Winner (1980)

proposes that we should not solely attribute technologies' implications to social determinism but also attend to the characteristics of technologies themselves and the implications of these characteristics. The SCOT theory posits that technologies possess inherent political values and can shape social and political outcomes. The insights rendered by the SCOT theory carry substantial implications for studying technology and society, particularly in policymaking and governance realms.

According to Bijker and Law (BIJKER & LAW, 1992), social and cultural factors shape technological development and use, recognizing that technology is not an isolated entity but an integral part of the broader societal tapestry. Adhering to this perspective, the design and implementation of technology should involve a democratic and participatory process that includes all relevant stakeholders in decision-making. By ensuring diverse voices are represented and considered, policymakers can foster the development of more inclusive, equitable, and context-sensitive technological systems (BIJKER & LAW, 1992).

3 THE EMERGENCE OF THE TECHNOSPHERE

The accelerated evolution of digital technology has engendered the "technosphere," a global ecosystem marked by a dense web of interconnected digital systems and infrastructures. This grand nexus of digital contrivances, from the internet to artificial intelligence, has precipitated profound societal shifts in communication, decision-making, and cultural evolution. As defined by Haff (2014), the technosphere permeates societal the fabric, transcending geographical constraints and thus enabling a swift global exchange of ideas, commodities, and services. This digital matrix has become a substantial force, shaping the contemporary world's social, economic, and political contours.

The interaction between society and the technosphere is a complex, reciprocal dialogue. According to the Social Construction of Technology, theory (SCOT) posited by Pinch and Bijker (1984), the form and function of digital technologies are molded by both social-cultural considerations and inherent technological dynamics. Simultaneously, the technosphere is a societal sculptor, redefining norms, values, and societal structures (Bijker, 1995). The Critical Theory of Technology by Feenberg (1991) deepens our understanding of this interaction, stressing the political facets of technology. Feenberg postulates that dominant social interests and values shape technologies and reproduce and solidify extant power structures through them.

With the technosphere's continued expansion, digital technology has become an indispensable mediator in numerous human endeavors, including communication, commerce,

politics, and governance. The pervasive infiltration of digital technology carries significant political ramifications, possessing the potential to both empower and impair democratic processes, depending on its design and deployment (FEENBERG, 1991). So, digital technology can expedite the flow of information, invigorate political participation, and give voice to marginalized groups. Conversely, it may also engender the propagation of disinformation, facilitate surveillance, and exacerbate social fragmentation (TUFTEKCI, 2017). Thus, the political implications of digital technology within the technosphere hinge on the foundational values, interests, and power that govern its evolution and utilization.

The technosphere's emergence has recalibrated the societal-technology nexus, positioning digital technology as a pivotal catalyst in shaping socio-economic and political processes. However, the current technosphere is essentially commandeered by private entities, often leading to unequal access, diminished democratic participation, and the perpetuation of existing power imbalances. Dominated by a profit-maximization ethos, these corporate entities frequently espouse technological designs that might not align with democratic principles or public interest (FEENBERG, 2002). The privatization of the technosphere potentially triggers a cascade of adverse effects: It can widen digital divides due to economic access barriers, dilute democratic participation due to opaque corporate decision-making, and compromise individual privacy and autonomy through the commodification of personal data (Zuboff, 2019).

3.1 Nature and Characteristics of Digital Platforms

As we unravel the complexities of the technosphere, one of the most salient elements we encounter is the role of digital platforms. These platforms, powered by sophisticated algorithms, serve as the nodes within the technosphere, connecting individuals, systems, and networks. Much like the technosphere, the platforms epitomize the intertwined nature of technology and society. They reflect their creators' power dynamics, values, and interests to shape the political, social, and cultural fabric of societies. While the technosphere encapsulates the overarching digital ecosystem, the digital platforms operationalize the ecosystem's functionalities, turning the abstract into tangible, user-oriented experiences. However, the private ownership of these platforms and the consequent power dynamics prompts a reevaluation of the technosphere's governance, prompting the critical question - Who should govern the technosphere and its integral components, the digital platforms? This question brings us to the exploring characteristics of digital platforms, a pivotal subset of the technosphere.

While private entities operate these platforms, their impact extends far beyond their technical functionalities. Scholars like Cho *et al.* (2020), Gillespie (2018), Ding *et al.* (2015), and Klinger and Svensson (2018) assert that algorithms on digital platforms possess political characteristics. These algorithms are not neutral tools but rather reflect the values and interests of their creators, and they shape the content presented to users, influencing their behavior, opinions, and perspectives on various issues. Consequently, algorithms extend beyond technical tools, becoming influential agents in shaping social and

political realities. Deploying algorithms on digital platforms creates public arenas for civic engagement and discourse. Although privately owned, these platforms have evolved into spaces where citizenship is exercised and interactions occur through algorithmic mediation. Crawford (2016) argues that social media platforms, like Twitter, have transformed into arenas for public expression, where citizens participate in political discourse and effective communication.

Considering the public nature of these digital arenas, it becomes imperative to reevaluate the notion of governance. While private companies own and operate the platforms, they function as spaces where societal interactions and political activities occur. Sanches and Silva (2023) propose that the governance of such algorithmic systems should not be solely the responsibility of private corporations. Instead, it must be shared with the public to incorporate diverse perspectives and ensure more socially just outcomes. In this sense, despite their private nature, digital platforms manifest public characteristics through their algorithms, which significantly influence user behavior and worldviews. These platforms have evolved into public arenas for civic engagement and political discourse, and, as such, the responsibility for governing these algorithmic systems should extend beyond private companies and encompass broader societal considerations.

4.1 Policy of Algorithms or Politics in Algorithms?

In an increasingly digital society, algorithms have become integral tools that affect diverse aspects of our lives, ranging from search engines, social media feeds, financial systems, healthcare diagnostics, and beyond. Despite their seemingly neutral mathematical nature, they are embedded with values, biases, and power structures (GARCIA, 2023). The term "algorithm" is defined as a set of instructions or rules utilized to solve problems or complete tasks (GARCIA, 2023). Within the political and public context, they profoundly impact the presentation and consumption of information, subsequently influencing societal and political landscapes.

Exploring the complexities of the algorithmic realm, scholars such as Sanches and Silva (2023), Gillespie (2018), and Papacharissi (2014) suggest that algorithmic governance predominantly lies in the hands of private entities, with the design and implementation reflecting their cultural values, political interests, and power dynamics. These algorithmic systems, especially those deployed on platforms like Twitter, shape digital landscapes by presenting content that influences user behavior and societal participation. Algorithms are seen as political actors influencing public opinion and outcomes based on their creators' biases and interests (Crawford, 2016).

These algorithms can privilege certain information, reinforcing power structures, creating 'echo chambers,' and shaping public opinion (INTRONA & NISSENBAUM, 2000). Moreover, they can reproduce societal biases, for example, facial recognition algorithms exhibiting racial and gender biases (BUOLAMWINI & GEBRU, 2018). The opaque nature of these "black boxes" raises critical issues concerning transparency and accountability (PASQUALE, 2015), leading to the concept of "algorithmic governance" or "algocracy" (DANAHAR, 2016).

To rectify the centralized governance of algorithms, Sanches and Silva (2023) propose sharing it with the public. Opening up the black box and inviting public participation in algorithmic decision-making can achieve more inclusive, equitable, and socially just outcomes. Moreover, efforts to increase algorithmic transparency and accountability have become a central political issue. Measures such as algorithmic audits (METAXA et al., 2021), explainable AI (ANGELOV et al., 2018), and legislations like the proposed Algorithmic Accountability Act in the United States and Europe Unition Artificial Intelligence Act (MÖKANDER et al. 2022) are examples of these efforts.

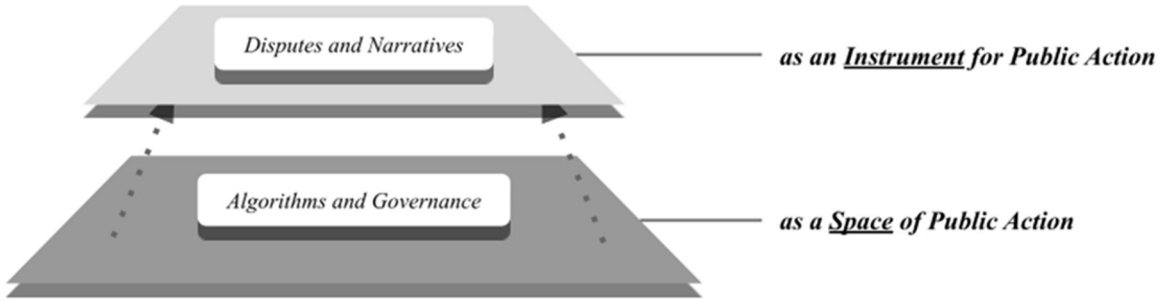
4 TECHNOSPHERE: A HYBRID SPACE BETWEEN PRIVATE AND PUBLIC REALMS

Sanches and Silva (2023) argue that social participation in the digital context comprises two interconnected layers (Figure 01). In the first layer of their framework, Sanches and Silva (2023) highlight the role of digital technology as a facilitator of social participation and emphasize that technology acts as a powerful tool for individuals and groups to engage in public action, providing them with various tools to access, analyze, and disseminate information. For example, search engines and social media platforms offer vast information, enabling people to stay informed about local, national, and global issues and exercise citizenship through platforms, manifesting and giving opinions. This access to information empowers individuals to become active citizens, fostering civic engagement and political participation. Digital platforms also offer multiple channels, such as blogs, podcasts, and social

media, where people can freely express their opinions, share experiences, and advocate for change. This ease of communication and sharing allows for the organization and coordination of collective action, enhancing the potential for real-time updates and collaboration among different groups. The authors' emphasis on this layer underscores the importance of technology as a democratizing force, providing opportunities for citizens to participate actively in shaping public discourse and societal change. However, the authors also acknowledge room for improvement in ensuring these platforms remain open, inclusive, and unbiased.

Moving on to the second layer of their framework, Sanches and Silva (2023) delve into the idea that digital technology is not a neutral entity but rather a product of designers' interests and ideologies. This layer argues that democratic digital participation should extend beyond the mere use of technology to shape its development and the values it represents actively. By encouraging greater democratic engagement within the technosphere, individuals and communities can exert influence over technology's design and political dynamics. The authors suggest that by doing so, we can create a more inclusive, equitable, and context-sensitive technological landscape that reflects diverse perspectives and needs. In this sense, Sanches and Silva's framework (2023) proposes a comprehensive understanding of digital technology's potential as a catalyst for social participation. By unpacking the layers of technology's role, from a tool for public action to a subject of democratic intervention, they offer insights into fostering a more participatory and accountable technological landscape.

Figure 01 - Two Layers of Social Participation in the Digital Context



Source: Sanches & Silva (2023)

The technosphere, while technological by design, is fundamentally interwoven with societal structures, norms, and values. Rooted in Pinch and Bijker's SCOT theory (1984) and Feenberg's Critical Theory of Technology (1991), the technosphere is viewed as a reciprocal phenomenon shaped by social and cultural factors and their internal dynamics. Feenberg posited that technologies, including those within the technosphere, are informed by dominant

social values and interests, often reinforcing existing power relations. Digital platforms, powered by sophisticated algorithms, form critical nodes within this technosphere. Despite being privately owned, these platforms usually function as public arenas for civic engagement and political discourse, blurring the line between private and public domains. They do not merely reflect their creators' power dynamics, values, and interests but actively shape societal, political, and cultural fabrics.

A pivotal element of the technosphere and its digital platforms is the role of algorithms. Scholars like Cho et al. (2020), Gillespie (2018), and others assert that these algorithms, although technical by nature, possess inherently political characteristics. These algorithmic systems act as influential agents shaping social and political realities, thus prompting the critical question - Who should govern the technosphere and its integral components, the digital platforms? Considering the public nature of these digital platforms, it becomes imperative to reevaluate their governance.

4.1 Multi Governance model of digital platform

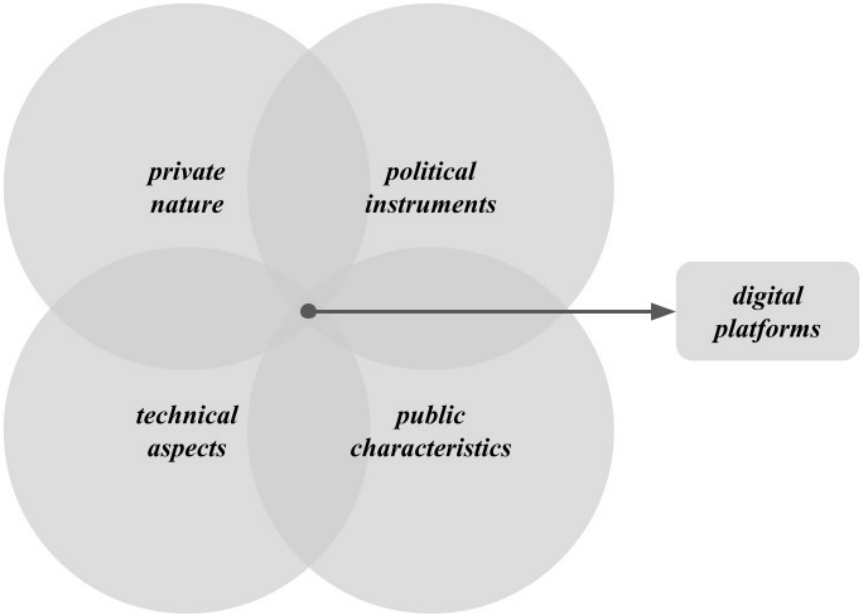
In today's digital landscape, as seen in Figure 02, digital platforms are neither solely private nor public, neither purely technical nor entirely political. They exist as hybrid spaces where these dimensions intersect and interact. Instead of applying binary frames to understand digital platforms, we need to recognize and embrace their hybrid nature, which exhibits private and public technical and political characteristics. Digital platforms, while privately owned, have morphed into influential public arenas that host civic engagement, discourse, and political activities. They have transitioned from mere communication nodes to essential sites of modern-day democracy. This public role is inextricable from their private ownership, thereby revealing the platforms' dual private-public identity.

Similarly, digital platforms are more than merely technical entities, despite being designed, operated, and maintained through complex technological processes. The algorithms and functionalities they employ go beyond simple "technical aspects." They have evolved into "political instruments" that amplify certain voices, suppress others, frame public discourse, and influence electoral outcomes. By acknowledging these intertwined identities, we can deepen our understanding of digital platforms' complex role in contemporary society. But this recognition also demands a nuanced response in terms of governance. A simplistic, one-dimensional governance approach would only partially capture the complexity of these platforms and effectively regulate them. What we require is a multi-governance model for digital platforms. Such a model would move beyond the dichotomy of private versus public and

technical versus political. It would entail a collaborative, multi-stakeholder approach that incorporates platform owners, users, government authorities, and civil society perspectives.

The multi-governance model should aim to safeguard individual rights, privacy, and freedom of expression. It would need to ensure fair access, mitigate the spread of disinformation, and protect against algorithmic biases. Furthermore, it would need to foster transparency, accountability, and public participation in decision-making processes related to digital platform design, operation, and governance. Adopting a multi-governance model will involve exploring new forms of regulation, introducing appropriate legislation, and even redefining the responsibilities of various stakeholders in the digital landscape. It will call for a collective commitment to making our digital platforms more equitable, inclusive, and accountable. Only then can we ensure a socially just and democratic technosphere.

Figure 02 - Nature and Characteristics of Digital Platforms



Source: Authors (2023).

In summary, this model contributes to the academic discourse by advancing beyond the confines of binary categorizations, such as ‘public versus private’ and ‘technical versus political.’ Through a nuanced exploration of the technosphere and digital platforms, the model unveils a more intricate relationship between technology and society in a hybrid nature of digital platforms, which serve as private and public spaces and possess attributes of technical tools and political instruments. Moreover, the model's proposition of a multi-governance model aligns seamlessly with this non-dichotomous approach. By acknowledging the intertwined

identities of digital platforms and promoting a collaborative, multi-stakeholder approach, the model seeks to create a comprehensive governance framework that ensures equitable access, transparent decision-making, and protection against biases. In essence, this model contributes to the academic dialogue by advocating for a more holistic understanding of the interconnections between technology, society, and governance. It highlights the limitations of binary distinctions and underscores the potential benefits of embracing a multi-dimensional perspective.

5 FINAL CONSIDERATIONS

Our research offers insights into the relationship between technology and society. The main contributions of our study are its ability to move beyond simple categories like 'public vs. private' or 'technical vs. political'. Our analysis shows the mixed nature of digital platforms. We urge scholars to adopt a more detailed view, understanding that seeing things in black and white can mask the proper relationship between technology and societal standards. In our efforts to offer practical solutions for this complex area, we suggest a multi-governance model. This model, based on teamwork and inclusion, aims to cater to the varied natures of digital platforms. It ensures transparent decision-making, and fairness, and addresses built-in biases in technological systems. We believe this approach can lead to better-informed and democratic decisions where technology, society, and governance work well together.

However, our study has its limitations. The technosphere, in its vast and multifaceted expanse, presents unparalleled challenges, demanding both innovation and expansiveness in governance approaches. The opacity characterizing algorithms further complicates matters, establishing hurdles in achieving desired transparency and accountability. While we emphasize the urgency of algorithmic audits, the elaboration of explainable AI techniques, and legislative interventions, the specifics of solutions to surmount these barriers remain a topic of ongoing exploration. Furthermore, our theoretical model requires empirical validation. While the conceptual groundwork has been laid, translating these ideas into tangible outcomes in the real world remains a critical next step.

There's much potential in future research. We must focus on understanding how technological decisions are made and held accountable. Developing ways to check and explain these decisions will bring us closer to a world of transparent and fair technical choices. It's also crucial to look at the broader social effects of these decisions. For instance, how do they influence people's thoughts, reinforce societal biases, or change power dynamics? And as we push for involving more people in these decisions, research should look at how to get

varied groups involved, especially in understanding the unique role of community organizations.

In conclusion, this field, full of possibilities and challenges, is ready for us to explore. This paper showcases our current understanding and is a call to action for everyone. By adopting the multi-governance model and analyzing the suggested research topics, we can move towards a more inclusive, fair, and democratic approach to technology.

BIBLIOGRAPHIC REFERENCES

ANGELOV, P. P.; SOARES, E. A.; JIANG, R.; ARNOLD, N. I.; ATKINSON, P. M. c **Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery,** v. 11, n. 5, e1424, 2021.

BIJKER, Wiebe E. **Of bicycles, bakelites, and bulbs: Toward a theory of sociotechnical change**. MIT Press, 1995.

BIJKER, Wiebe E.; HUGHES, Thomas P.; PINCH, Trevor J. **The social construction of technological systems: New directions in the sociology and history of technology**. MIT Press, 1989.

BIJKER, Wiebe E.; LAW, John. **Shaping technology/building society: Studies in sociotechnical change.** MIT Press, 1992.

BUOLAMWINI, Joy; GEBRU, Timnit. Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification. **Proceedings of Machine Learning Research**, v. 81, p. 1-15, 2018.

CASTELLS, Manuel. **Networks of outrage and hope: Social movements in the internet age**. Polity Press, 2012.

CHO, Jaeho et al. Do Search Algorithms Endanger Democracy? An Experimental Investigation of Algorithm Effects on Political Polarization. **Journal of Broadcasting & Electronic Media**, v. 64, n. 2, 2020. Available at: <https://doi.org/10.1080/08838151.2020.1757365>.

CRAWFORD, Kate. Following you: Disciplines of listening in social media. Continuum: **Journal of Media & Cultural Studies**, v. 23, n. 4, p. 525-535, 2009. Available at: <https://doi.org/10.1080/10304310903003270>.

DANAHAR, John. The Threat of Algocracy: Reality, Resistance and Accommodation. **Philosophy and Technology**, v. 29, n. 3, p. 245-268, 2016.

DUNLEAVY, Patrick et al. **Digital era governance: IT corporations, the state, and e-government**. Oxford University Press, 2006. 304 p. ISBN-13: 978-0199547005.

EUBANKS, Virginia**. Automating inequality: How high-tech tools profile, police, and punish people experiencing poverty**. St. Martin's Press, 2018.

FEENBERG, Andrew. **Alternative Modernity: The Technical Turn in Philosophy and Social Theory**. University of California Press, 1995.

FEENBERG, Andrew. **Critical Theory of Technology**. Oxford University Press, 1991.

FEENBERG, Andrew. **Questioning technology**. Routledge, 1999.

FEENBERG, Andrew. **Transforming technology: A critical theory revisited**. Oxford University Press, 2002.

GILLESPIE, Tarleton. **Custodians of the internet: Platforms, content moderation, and the hidden decisions that shape social media**. Yale University Press, 2018. Available at: <https://yalebooks.yale.edu/9780300261431/custodians-of-the-internet>.

HAFF, Peter K. Humans and technology in the Anthropocene: Six rules. **The Anthropocene Review**, v. 1, n. 2, p. 126-136, 2014. Available at: <https://doi.org/10.1177/2053019614530575>.

HORKHEIMER, Max. **Critical Theory: Selected Essays**. Herder and Herder, 1972.

INTRONA, L.; NISSENBAUM, H. Defining the Web: The politics of search engines. **Computer**, v. 33, n. 1, p. 54-62, 2000. Available at: <https://doi.org/10.1109/2.816269>.

KAMPEN, Jarl K.; SNIJKERS, Kris. E-Democracy: A Critical Evaluation of the Ultimate E-Dream. **Social Science Computer Review,** v. 21, n. 4, 2003. Available at: <https://doi.org/10.1177/0894439303256095>.

LATOUR, Bruno. **Reassembling the Social: An Introduction to Actor-Network Theory**. Oxford University Press, 2005.

LAW, John; MOL, Annemarie. Notes on Materiality and Sociality. **The Sociological Review**, v. 43, p. 274–294, 1995.

MARCUSE, Herbert. **One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society**. Beacon Press, 1964.

MÖKANDER, J. et al. The US Algorithmic Accountability Act of 2022 vs. The EU Artificial Intelligence Act: what can they learn from each other? **Minds and Machines**, v. 32, n. 4, p. 751-758, 2022.

METAXA, D. et al. Auditing algorithms: Understanding algorithmic systems from the outside in. **Foundations and Trends® in Human–Computer Interaction**, v. 14, n. 4, p. 272-344, 2021.

NEGROPONTE, Nicholas. **Being digital**. Vintage Books, 1995.

PASQUALE, F. The **Black Box Society: The Secret Algorithms That Control Money and Information**. Harvard University Press, 2015.

PINCH, Trevor J.; BIJKER, Wiebe E. The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. **Social Studies of Science**, v. 14, n. 3, p. 399-441, 1984. Available at: <https://doi.org/10.1177/030631284014003004>.

RANCHORDÁS, Sofia. Digital agoras: Democratic legitimacy, online participation and the case of Uber-petitions. **The Theory and Practice of Legislation**, v. 5, n. 1, 2017. Available at: <https://doi.org/10.1080/20508840.2017.1279431>.

RHEINGOLD, Howard. **The virtual community: Homesteading on the electronic frontier**. Addison-Wesley, 1993.

SCHULER, Douglas; NAMIOKA, Aki. **Participatory Design: Principles and Practices**. 334 p. ISBN 9780805809510. Available at: <https://www.routledge.com/Participatory-Design-Principles-and-Practices/Schuler-Namioka/p/book/9780805809510>, 1984.

SHIRKY, Clay. **Here comes everybody: The power of organizing without organizations**. Penguin Books, 2008.

VAN DIJK, Jan A.G.M. **The network society: Social aspects of new media**. Sage Publications, 1999.

WILLIAMS, Raymond; EDGE, David. The social shaping of technology. **Research Policy**, v. 25, n. 6, p. 865-899, 1996. Available at: <https://doi.org/10.1016/0048-7333(96)00885-2>.

ZUBOFF, Shoshana. **The age of surveillance capitalism: The fight for a human future at the new frontier of power**. Public Affairs, 2019.