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Systematic Review of Media Ecology Theory in the Age of Algorithmic Practices

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Abstract

Media Ecology Theory (MET) faces new research challenges because digital communication systems now employ algorithmic operations that were not part of the theory's original development. This article presents a systematic conceptual review of MET, examining contemporary algorithmic practices through 45 academic works, institutional reports, and books published between 2013 and 2026. The review proceeds across three analytical layers. The first layer examines how foundational MET concepts, specifically McLuhan's notion of media as extensions of human faculties, Postman's critique of technology, and Ong's theory of secondary orality, remain relevant but require substantive reformulation to address algorithm-driven environments. The second layer synthesises the literature on algorithmic mediation, platformisation, and surveillance capitalism to argue that algorithms now function as a structural media environment, not merely as technological tools embedded within that environment. The third layer examines how these patterns are distributed differently across the Global South, drawing on recent African scholarship to demonstrate that Western-derived MET frameworks do not apply universally. The paper introduces a Hybrid Ecology Model that integrates algorithmic governance, data justice, and human agency within a unified analytical architecture. The review concludes that MET retains significant explanatory power but must be expanded to account for the opacity, scalability, and geopolitical asymmetries that define the algorithmic age.

Keywords: Media ecology theory, algorithmic mediation, platformisation, surveillance capitalism, filter bubbles, Hybrid Ecology Model

Introduction

The physical and institutional features of the broadcasting tower, the printing press, and the cable network no longer exert a determining influence on the architecture of contemporary media systems. As computational systems increasingly rely on opaque algorithms to determine which information is shown to whom, and how, these systems are becoming the dominant structuring force in digital communication. The emergence of this algorithmic framework has produced theoretical problems that communication researchers are only beginning to organise and address systematically: to what extent does the existing understanding of media ecology theory (MET) remain useful for analysing these environments, and which changes to its core propositions are necessary? A further requirement is to assess the capacity of Western-rooted theoretical models to represent media user experience in the Global South, given the divergent data systems, colonial histories, and platform control structures that characterise these contexts.

Media ecology can be traced back to Marshall McLuhan: that media are extensions of human capabilities and that they actively reorganise perception and society. The field was formalised at New York University in 1971 when the graduate programme was established, and later extended by the development of the theoretical vocabulary by which media environments could be systematically studied by Neil Postman and Christine Nystrom, which was later extended by Lance Strate, Carlos Scolari and others. Media is not only a means of communication but also a space that influences the way people think, interact with each other and express their cultural identity (Strate & Levinson, 2019; Scolari, 2012). In the digital age, Walter Ong's work on the impact of media technologies on sensory perception and cognitive processing is still at the heart of this tradition. The conditions of visibility and invisibility of information in the process of being transmitted are now decided by algorithms (Bucher, 2018; Just & Latzer, 2017).

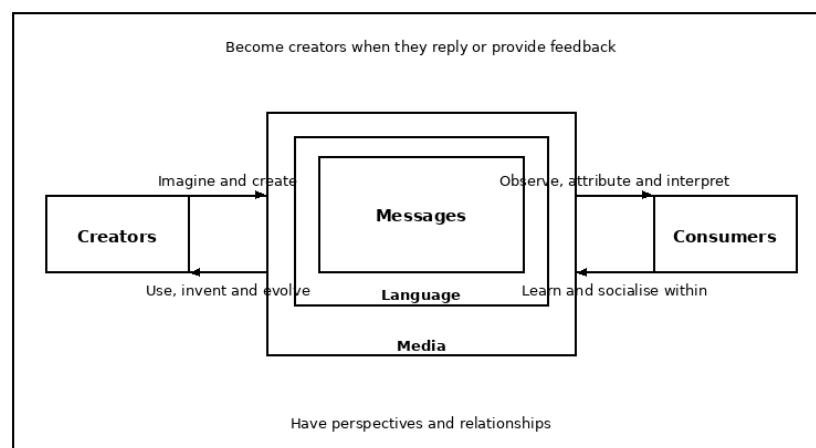


Fig 1: Ecological Model of the Communication Process. Source: (Kumar, Saxena, Jain, & Gupta, 2022),

The theoretical vocabulary of MET, developed through the study of print, radio, and television, did not anticipate the operation of algorithmic systems. Theoretical barriers arise from the opaque nature of machine learning models (Burrell, 2016), the transnational dominance of platform companies by a small number of giants (Van Dijck et al., 2018; Srnicek, 2017), and the data colonialism these systems impose on non-platform societies (Couldry & Mejias, 2019; Madianou, 2019). These barriers, which the current



MET framework is not equipped to resolve on its own, call for an integrated theoretical response, one that links the classical tradition to contemporary scholarship through active synthesis rather than substitution.

This is not simply a case of theory lagging behind technology. MET remains among the frameworks researchers draw on most frequently in studying digital communication, and its continued centrality makes its limitations more consequential, not less, since it was developed for media technologies that function very differently from today's algorithmic systems. Algorithmic communication combines opaque computational operations, individualised interaction, scalability, and continuous behavioural adaptation in ways that earlier media environments did not, and Hepp (2019) and Bucher (2018) both find that existing theoretical models have not kept pace with this development. The algorithmic turn has exposed specific weaknesses in MET's analytical architecture that require systematic theoretical attention: the ecological metaphor was originally developed to describe environments that were shared, relatively stable, and encountered similarly by all inhabitants, whereas algorithmic environments are personalised and continuously and individually readjusted, such that users experience markedly different conditions depending on their behavioural patterns, demographic characteristics, and platform histories (Bozdag, 2013; Shin, 2020).

A further geopolitical dimension concerns the distribution of algorithmic power. MET scholarship has developed predominantly within North American and Western European academic settings, and its central concepts often presuppose a media abundance and a form of democratic governance that does not describe conditions across much of the Global South (Couldry & Mejias, 2019; Milan & Treré, 2019). Recent scholarship, including Obagwu and Shagbaor (2026) and Uche et al. (2025), has identified existing frameworks for understanding algorithmic media in Africa as inadequate, but these findings have not yet been integrated into a comprehensive theoretical update of MET.

This review addresses that gap through a systematic conceptual review of 45 sources drawn from media ecology, platform studies, critical algorithm studies, political economy, and the emerging communication scholarship of Africa. It undertakes a comprehensive examination of MET's basic principles, a thorough review of scholarship on platformisation and algorithmic infrastructure, and an empirical examination of algorithmic gatekeeping's effects on echo chamber formation and cognitive outcomes, before advancing a unified theoretical model that addresses the Global South challenge. The paper concludes by presenting the Hybrid Ecology Model and outlining the limitations of the review.

Research Objectives

This paper aims to develop an integrated conceptual framework for the analysis of algorithmic media environments by systematically reviewing and synthesising classical MET, algorithmic mediation scholarship, platformisation theory, and Global South communication scholarship within a unified analytical architecture.

The objectives of the study are to:

1. Examine the extent to which the foundational propositions of Media Ecology Theory remain analytically adequate for understanding contemporary algorithmic media systems.
2. Assess the degree to which Western-derived MET frameworks account for the conditions of algorithmic media ecologies in Global South communication contexts.
3. Propose a Hybrid Ecology Model that provides an integrated analytical architecture for studying algorithmic media environments across diverse institutional and geopolitical contexts.



Literature Review

Media Ecology Theory: Core Concepts and Definitions

Media Ecology Theory studies human existence by analysing media environments as communication systems that determine human access to cognitive, social, and cultural resources. Strate (2006) and Islas and Bernal (2016) characterise MET as an umbrella meta-discipline that draws together diverse theoretical perspectives through their shared commitment to the ecological metaphor: media environments are understood as analogous to ecosystems in that they support human survival while shaping, and being shaped by, the degree of influence humans can exert over them.

Khalid et al. (2025) provide a detailed account of the discipline's intellectual development, showing that the concept of the media environment has remained the foundation of MET since Postman introduced the term in 1968. They identify three recurring theoretical positions that have characterised MET across its various phases: (1) media exhibit a bias toward particular types of content and forms of social organisation; (2) media shape how people perceive, think, and know, rather than functioning merely as neutral carriers of information; and (3) the cumulative effects of media environments are systemic and ecological rather than individual and isolated.

Algorithmic Mediation: Defining the Concept

Voinea (2026) define algorithmic mediation as the process by which machine learning systems within digital platforms computationally select, order, and present information to users. Their definition identifies three attributes that distinguish algorithmic systems from earlier editorial practices in newspaper gatekeeping and television scheduling: algorithmic systems generate individualised distribution patterns for each user, respond near-instantaneously to user behaviour, and operate at a scale that makes exhaustive human review impractical.

Bucher (2018) extends this definition through the concept of the algorithmic imaginary, the collection of mental models, expectations, and behavioural dispositions that users develop through their interactions with algorithmic systems, regardless of whether these mental models accurately represent the underlying computational reality. The algorithmic imaginary is a particularly useful concept for MET because it captures how algorithmic systems reshape user behaviour and perception, even where users cannot directly observe or verify how those systems operate.

Platformisation: Definition and Scope

Platformisation, a term advanced by Nieborg and Poell (2018), describes the proliferation of digital platform infrastructures, economic models, and computational logics into domains — cultural production, social organisation, institutional governance previously outside their reach. Van Dijck et al. (2018) characterise platforms as programmable systems that mediate interaction between users and service providers, arguing that media and communication systems have undergone a significant structural shift as a result. Srnicek (2017) supplies the political-economic foundation for this account through the concept of platform capitalism, in which data extraction constitutes the primary mode of accumulation, and in which the competitive logic among platform firms tends structurally toward monopolisation.

Surveillance Capitalism: Behavioural Modification as Environmental Control

Zuboff (2019, 2022) develops surveillance capitalism as a comprehensive theoretical framework explaining how algorithmic media systems function as totalising economic and social orders. Zuboff argues that contemporary capitalism's defining innovation is the systematic extraction of behavioural data,

which becomes the raw material for an economic logic oriented around the prediction and modification of behaviour rather than the satisfaction of pre-existing preferences.

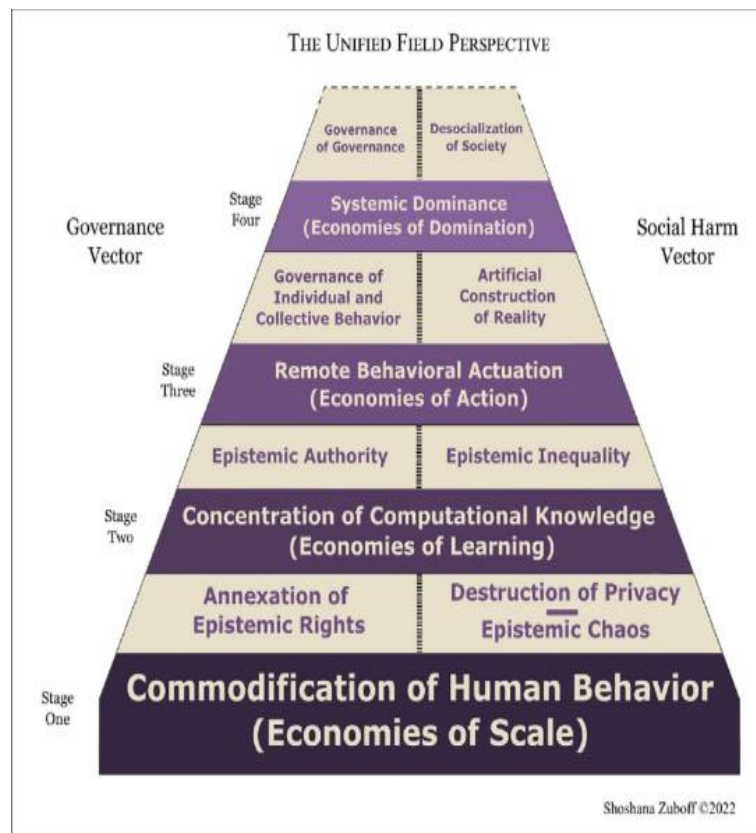


Fig 2: Four Stages of the Surveillance Capitalist Institutional Order (Source: Zuboff, 2022)

Crucially, Zuboff (2019) distinguishes surveillance capitalism from earlier forms of capitalism not only by its data intensity but also by its orientation toward shaping behaviour rather than merely responding to preferences, a distinction with direct implications for MET's account of media environments as constitutive of human possibilities rather than merely reflective of them.

The foundational research within MET traces a path from McLuhan's claim that the medium is the message, through Postman's analysis of technopoly, to the present-day work of Strate et al., (2012) undertakes a detailed evaluation of the ecological metaphor, arguing that it must be extended beyond its original application to print, radio, and television in order to account for digital communication systems organised around interactive networks and multimodal operation. His concept of interface ecology anticipates, in important respects, the platformisation literature that would develop in subsequent years.

Barnes (2002) extends the symbolic dimension of ecological analysis, arguing that media environments are shaped by their physical properties and by their capacity to reveal certain symbols while concealing others. This argument gains particular force in algorithmic systems, where visibility is governed by optimisation rules that convert social and communicative value into measurable engagement statistics and time-on-platform metrics. Hepp's (2019) theory of deep mediatisation builds on this insight, demonstrating that media function not only as instruments of socialisation but as infrastructural components that actively intervene in social institutions.



Algorithmic Power and Code as Infrastructure

Since Bozdag's (2013) influential study on algorithmic power, demonstrating how algorithms generate biased information environments through their filtering and personalisation processes, scholarship on algorithmic power has expanded rapidly. Bozdag (2013) identifies five sources of algorithmic bias: bias in training data, bias in the relevance signals algorithms use, bias in how “user preferences” are operationalised, bias arising from platform operators' revenue incentives, and bias produced by feedback loops between algorithmic output and user behaviour. These sources interact, he argues, to produce cumulative distortions in the information environments users inhabit. Burrell (2016) identifies three forms of machine opacity that prevent users from recognising or correcting algorithmic bias: intentional secrecy on the part of platform operators, the technical illiteracy of most users, and a scale of model complexity that exceeds even its designers' capacity for comprehension.

Platforms function as custodians of the internet, determining what content users can access while obscuring the basis for these decisions (Gillespie, 2018). Just and Latzer (2017) develop this into a broader account of algorithmic governance, showing how digital platforms have assumed traditionally public functions such as reality construction, information ordering, and social regulation. Seaver (2017) reframes algorithms as cultural practices produced by organisations rather than as purely technical artefacts, while Pasquale (2020) proposes a normative framework requiring governance structures capable of enforcing human oversight and accountability over algorithmic systems.

Platformisation and the New Media Ecosystem

Van Dijck et al. (2018) lay the conceptual groundwork for platformisation scholarship through the concept of the platform society, in which platform corporations attain what MET would term knowledge monopolies, controlling information infrastructure in ways that shape population-wide epistemic possibilities. Poell et al. (2021) extend this to cultural production, showing how the platformisation of cultural industries restructures content production through algorithmically mediated decisions about what becomes available to audiences. Plantin et al. (2018) argue that the conceptual separation of platform from infrastructure is increasingly untenable, as large technology firms now perform functions historically associated with public utility infrastructure. The concepts of data colonialism (Couldry & Mejias, 2019) and technocolonialism (Madianou, 2019) extend this analysis to the geopolitics of the humanitarian and development sectors. Zuboff (2019) situates this within her broader argument that algorithmic platforms operate not merely to forecast user behaviour but to actively shape and modify it through prediction-based intervention.

Emerging AI Paradigms and Global Governance Frameworks

Cools and Diakopoulos (2026) show that the volume of content generated by large language models has made exhaustive human verification impractical, introducing new challenges for editorial oversight in news production. Lewis et al., (2019) demonstrate that human-machine actor networks in algorithmic journalism have developed to a point where human editorial judgment and automated operation are no longer cleanly separable. Qi (2023) and Ghosh (2024) show that intelligent media systems are reshaping the global information environment, with particular consequences for cultural heritage protection in the Global South. De-Lima-Santos et al., (2025) demonstrate that the institutional and cultural power dynamics of different societies have produced markedly divergent regulatory approaches to algorithmic media governance. UNESCO (2023) has sought to translate these normative concerns into concrete governance structures through its guidelines on digital platform governance, which prioritise the protection of cultural diversity and the establishment of standards for freedom of expression in the Global South.



The Global South Challenge to Western-Centric MET Frameworks

Couldry and Mejias (2019) establish the theoretical foundation for this challenge through their data colonialism framework, showing that the ecological effects of algorithmic systems are distributed asymmetrically, structured by the same power relations that characterised historical colonial extraction. The populations whose data sustains dominant platform environments are frequently not the populations for whose benefit those environments are designed, a finding that directly challenges MET's implicit assumption of a shared ecological environment. Madianou (2019) extends this through the concept of technocolonialism, showing that algorithmic environments often compound, rather than ameliorate, the vulnerabilities of already marginalised populations.

Milan and Treré (2019) advance the most direct challenge to Western-centric MET, arguing for a data justice perspective that takes the experiences of Global South communities as its analytical starting point. Their analysis identifies structural features of algorithmic ecologies in peripheral societies, such as mobile-first internet access, the absence of data protection frameworks, politically motivated platform manipulation, and the linguistic marginalisation produced by English-dominated training data that Western-derived frameworks are not equipped to capture. Obagwu and Shagbaor (2026) demonstrate empirically that existing platform governance frameworks fail to address the specific conditions of African media systems, while Uche et al. (2025) show that North Atlantic ethical frameworks for governing AI-generated content are similarly inadequate for African communication contexts.

Theoretical Framework

Media Ecology Theory as the Primary Framework

MET propounded by Marshal McLuhan in 1964, serves as the base framework for this review because it conceives of media environments as the determinants of the cognitive, social, and cultural possibilities available to their inhabitants. The ecological metaphor permits analysis at multiple levels simultaneously: the technical level of algorithmic architecture, the institutional level of platform governance, the cognitive level of individual and collective effects, and the geopolitical level of asymmetric distribution.

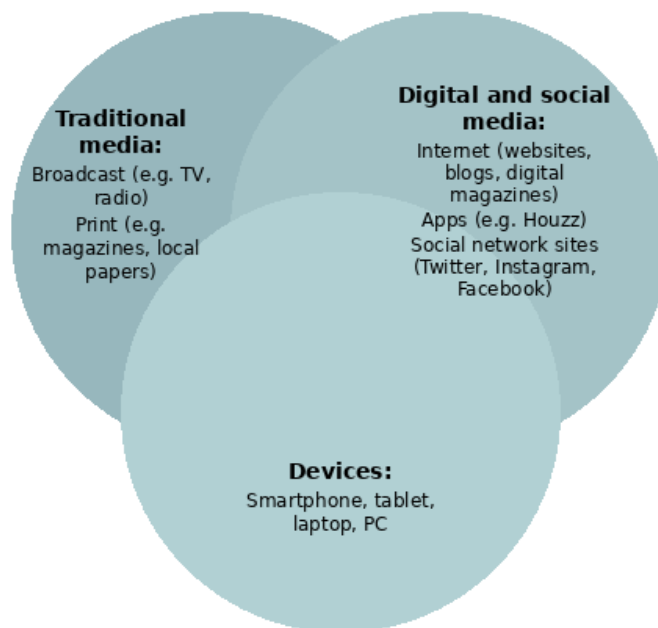


Fig 3: Explaining Media Ecology Theory (Source: Aneta, Esther, Katherine, Tomi and Gavin 2016)

MET requires significant theoretical extension to meet these analytical demands. Classical frameworks were developed to study media that generate common, stable environments experienced similarly across a population (Khalid et al., 2025). The personalised, adaptive behaviour of algorithmic systems instead requires a theoretical apparatus capable of analysing environments that are simultaneously individual and systemically governed by globally standardised infrastructure, yet producing locally differentiated effects.

Surveillance Capitalism as Environmental Totality Theory

Zuboff's (2022) surveillance capitalism framework supplies an additional theoretical lens, one oriented toward algorithmic environments' behavioural modification functions rather than their information-distribution functions. Where broadcast media historically operated under regulatory obligations to serve some conception of the public interest, Zuboff (2022) shows that platform corporations instead use behavioural data to build predictive models, which are then deployed to shape user action toward commercial objectives, a form of environmental power that classical media theory was not designed to analyse.

A third theoretical layer derives from the platform society framework of Van Dijck et al. (2018) and the platform capitalism analysis of Srnicek (2017), which situate the algorithmic environment within the structural imperatives of a specific economic formation. These frameworks show that algorithmic environments possess distinctive features shaped by commercial optimisation logics, monopolistic tendencies, and the systematic subordination of public-interest considerations to engagement metrics. Building on this structural analysis, Plantin et al. (2018) and Couldry and Mejias (2019) extend the argument to global political systems, providing the basis for the Global South evaluation that follows.



Method

This study uses a systematic conceptual review to address a theoretical gap: well-documented findings across distinct research traditions have yet to be synthesised into a unified framework. This method facilitates comprehensive identification, critical appraisal, and theoretical synthesis of scholarship, forming the basis for the Hybrid Ecology Model presented later.

This review includes peer-reviewed articles, monographs and policy reports (2013-2026) related to generative AI and the governance of platforms. The sources were identified using Google Scholar, Scopus, Web of Science, and Communication & Mass Media Complete databases with the keywords: “media ecology theory,” “algorithmic mediation,” “platformisation,” “surveillance capitalism,” “data colonialism,” “algorithmic gatekeeping,” and “Global South communication.” Following deduplication, the search yielded ~210 records, after which title and abstract screening yielded 78 full texts, of which 45 were included. Excluded works were usually only technical aspects of algorithms or were not within the date range.

The ecological nature of media systems, algorithmic systems as communicative infrastructure, or geopolitical inequalities of platforms were all elements of inclusion. The 45 publications that were retained were coded inductively based on the theory of media ecology. Seven themes were identified on the first pass, and four thematic clusters were identified on the second pass. This is the main reliability mechanism for this four-author conceptual synthesis, which is iterative and continuous.

Findings

The thematic analysis of 45 reviewed publications produced four principal themes that organise scholarship on the applicability of media ecology theory (MET) to algorithmic media environments.

Theme 1: Algorithms as Media Environments

A dominant line of argument reframes algorithmic systems not as mere tools but as constitutive media environments that structure communicative possibilities, subjectivity, and knowledge formation. Building on State’s account of media environments as conditions of possibility for communication, authors argue that algorithms determine what content users encounter, what communicative actions are available, and which identities and knowledges register as legitimate. Bucher (2018) shows users experience algorithms as inhabited environments shaping self-presentation and behaviour beyond platform interactions. Voinea (2026) extend this to epistemology, framing algorithms as epistemic infrastructure that reconstruct the criteria for knowledge legitimacy. Just and Latzer (2017) locate this phenomenon within governance, arguing that algorithms have assumed editorial functions of reality construction. Collectively, these works suggest a qualitative shift: algorithmic systems instantiate an environmental logic that requires MET’s analytic vocabulary rather than simple instrumentalist metaphors.

Theme 2: Platformisation and Concentration of Environmental Power

The literature points to a structural power of the dominant platform corporations, and their impact on democracy, cultural diversity and equality. Empirical research (van Dijck et al., 2018) shows how platforms have redefined various media landscapes in terms of commercial interests, and network effects and data benefits are cited as a structural force that stifles competition (Srnicek, 2017). Nieborg and Poell (2018) demonstrate how platformisation reconfigures cultural production in the direction of algorithmic legibility, reducing diversity. Zuboff (2019) places this in the context of surveillance capitalism, which is



defined as the new form of capitalism that is characterized by platforms having an unprecedented degree of control over the environment, influencing interpretation, and shaping behaviour more than just content. This body of work presents platform dominance as a qualitative shift in the media ecology, an extension of monopoly tendencies into a new type of environmental governance, not envisioned by classical MET frameworks.

Theme 3: Ecological Effects on Gatekeeping, Diversity, and Cognitive Well-Being

A significant empirical strand focuses on the impact of algorithmic environments on gatekeeping, information diversity and cognitive well-being. Regarding gatekeeping, researchers have reported a transition from editorial to algorithmic selection criteria, which favour engagement metrics and impact on news visibility and the profitability of public-interest journalism (Carlson, 2018; Wallace, 2018). Cools and Diakopoulos (2026) point to the scale effects of generative AI and its added layers of automation that put pressure on human oversight. As for filter bubbles and echo chambers, results are still not consistent: Bruns (2019) found more than anticipated ideological diversity in many users' feeds, Cinelli et al. (2021) found that the architecture of platforms can modulate the effects of echo chambers, and Bail (2021) found that exposure to opposing views can sometimes exacerbate polarization. Systems-level analyses (Bak-Coleman et al., 2021) highlight that the cumulative use of algorithmic interventions can have negative impacts on collective intelligence, which is also a concern of MET's for systemic environmental effects. Regarding cognitive well-being, VandenAbeeel (2021) and Büchi (2021) report mixed and context-dependent relationships between digital media and psychological outcomes, while Kozinets (2024) proposes algorithmic sociality to demonstrate the need for new evaluative frameworks that go beyond pre-algorithmic contexts.

Theme 4: Global South Challenges to Western-Centric MET

The last theme challenges MET's Euro-centric assumptions and showcases Global South scholarship that requires theoretical reconfiguration. Data colonialism is described by Couldry and Mejias (2019), who demonstrate that the algorithmic effects are a result of extraction logics that are asymmetric and that reinforce historical inequalities. Madianou (2019) refines technocolonialism to demonstrate the vulnerabilities that algorithmic environments create for marginalised groups. Milan and Treré (2019) argue for a data justice perspective based on peripheral experiences that accounts for the fact that many platforms are accessed from mobile devices, the lack of protection of data, the manipulation of platforms by political actors, and the neglect of linguistic diversity in training data, which is largely English. Empirical evidence from Africa (Obagwu&Shagbaor, 2026; Uche et al., 2025) shows that dominant platform governance and ethical frameworks from the Global North are not well-suited to the institutional and cultural contexts of the region. However, De-Lima-Santos et al. (2025) suggest that the algorithmic turn is an attack on cultural sovereignty, meaning that substantive changes to MET are needed to address the different political economies and communicative ecologies.

Synthesis of Findings

Across the 45 reviewed publications, four convergent patterns underpin the proposed Hybrid Ecology Model.

First, scholarship across communication theory, political sociology, technical studies, and political economy converges on the claim that algorithmic systems function as media environments in the full MET sense: they constitute users' epistemic conditions rather than acting as neutral conduits.



Second, opacity emerges as a structural feature of algorithmic environments, driven by proprietary platform practices, limited user computational literacy, and the intrinsic complexity of large-scale models that can exceed designers' interpretability.

Third, empirical research on filter bubbles and echo chambers is divided: some research suggests that personalisation leads to polarisation, while other research suggests contextual diversity, suggesting that the ecological impact of personalisation depends on the architecture of the platforms, the characteristics of users, and the political context.

Fourth, Global South research brings to the fore geopolitical asymmetries not captured by Western-centric MET, calling for frameworks sensitive to data colonialism and peripheral institutional conditions. African work remains limited and needs further empirical testing before theory consolidation.

Discussion

The literature identifies four interlocking challenges to MET's foundational assumptions. First, the personalisation challenge: unlike earlier media environments that were broadly shared and relatively stable, contemporary algorithmic environments are highly individualised and continuously reconfigured. MET retains analytic value but must be extended to account for environments that are at once systemic and heterogeneously experienced, where shared infrastructural properties interact with individual behavioural profiles to yield divergent experiential ecologies. Second, the opacity challenge: algorithmic systems are constituted by computational processes that are largely inaccessible and often inscrutable, which renders traditional media literacy approaches inadequate and means that critical capacities must be reconceived to engage with opaque model-driven infrastructures (Burrell, 2016; Buoncompagni, 2023). Third, the behavioural modification challenge: platforms employ data and algorithmic interventions that actively shape behaviour toward commercial ends at a population scale, and this constitutes an environmental power qualitatively distinct from the symbolic conditioning emphasised in classical MET (Zuboff, 2019; Hepp, 2019). Fourth, the geopolitical challenge: MET's North Atlantic provenance embeds assumptions about liberal-democratic governance, institutional capacity, and media diversity that do not generalise to many Global South contexts, and in those contexts, algorithmic ecologies unfold through legacies of colonial extraction and structural vulnerability (Couldry & Mejias, 2019).

In the same vein, the review demonstrates that geopolitical asymmetries are constitutive of algorithmic media environments rather than incidental to them. Data extraction by platforms headquartered in the Global North reproduces extractive dynamics analogous to colonial resource appropriation, so it produces ecological conditions that are systematically less favourable to the populations whose data sustain the platforms (Couldry & Mejias 2019; Madianou, 2019). Moreover, specific features of peripheral digital ecologies, such as mobile-first access, weak regulatory protections, language marginalisation, and politically instrumented platform practices, render Western-derived governance and ethical frameworks insufficient (Ahmed, 2026; Uche et al., 2025). Empirical work from African contexts further underscores the need for regionally grounded governance instruments and evaluative concepts.

Additionally, no single extant theory- classical MET, surveillance capitalism, platformisation, or data colonialism- adequately captures the multifaceted phenomena identified in the review. The evidence, therefore, indicates an imperative for an integrated analytical architecture that simultaneously attends to technical-infrastructural properties, concentrated institutional power, cognitive and social effects, and global geopolitical asymmetries. The Hybrid Ecology Model proposed here responds to that imperative by organising these dimensions into a four-node framework that links constitutive infrastructural features, platform concentration, gatekeeping and cognitive impacts, and geopolitical inequality. Two cross-cutting axes, opacity and temporality, address algorithmic systems' structural inscrutability and continuous



evolution, respectively, thereby enabling the model to capture both emergent operational dynamics and historical institutional constraints. By foregrounding systemic regularities alongside contextual contingencies, the Hybrid Ecology Model preserves MET's ecological insights while extending its conceptual apparatus to account for personalisation, opacity, behavioural modulation, and global asymmetry. This integrative orientation reframes classical MET propositions and provides a practical heuristic for empirical and normative inquiry into algorithmic media ecologies.

A Hybrid Ecology Model for Algorithmic Media Environments

Drawing on the systematic review, classical Media Ecology Theory requires substantive reformulation to account for contemporary algorithmic communication systems. The reviewed literature demonstrates that algorithmic systems operate as full media environments that shape epistemic conditions, social possibilities, and cognitive habits while exhibiting properties classical MET did not address: machine learning opacity, personalised environmental experience, behavioural modulation under surveillance capitalism, concentration of environmental power in platform oligopolies, and geopolitical asymmetries producing divergent algorithmic ecologies (Burrell, 2016; Bucher, 2018; Zuboff, 2019; Van Dijck et al., 2018; Couldry&Mejias, 2019).

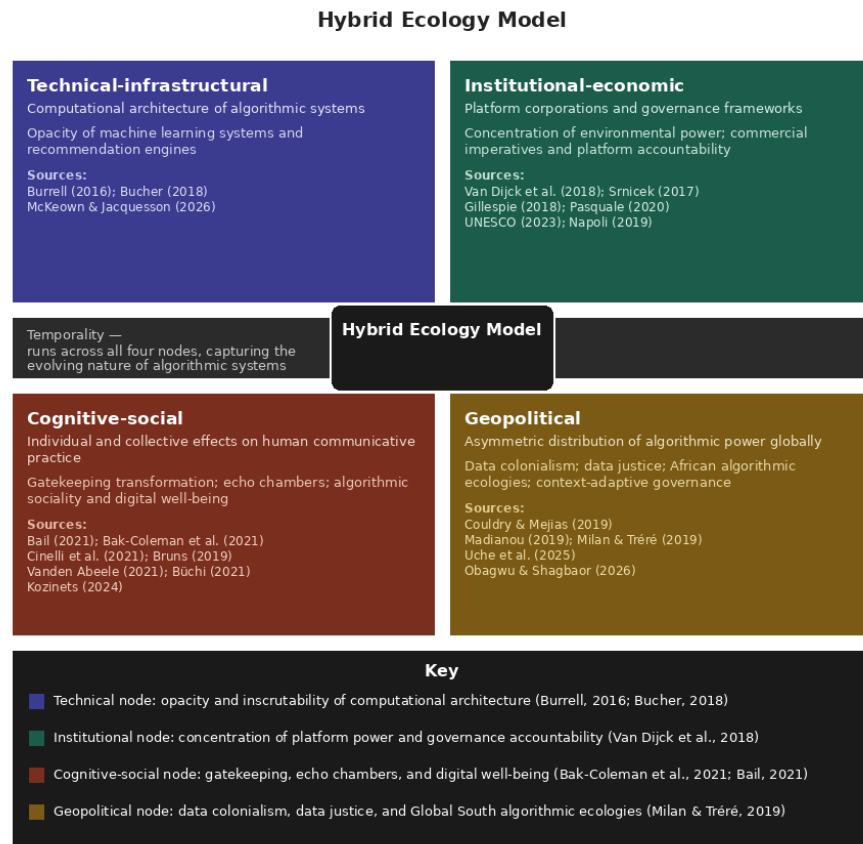


Fig 4: Author's Own Construction of the Hybrid Ecology Model

The Hybrid Ecology Model proposes four analytical nodes in dynamic relation. The technical infrastructural node covers computational architectures, machine learning models, recommendation



engines and content moderation systems that form the substrate of algorithmic environments; it foregrounds opacity and related methodological challenges (Burrell, 2016; Bucher, 2018). The institutional economic node addresses platform corporations, regulators and governance frameworks that structure environments, emphasising concentration of environmental power and commercial incentives shaping design (Srnicsek, 2017; Van Dijck et al., 2018; Gillespie, 2018; Pasquale, 2020; Napoli, 2019). UNESCO and regional studies illustrate governance approaches sensitive to diverse national contexts (UNESCO, 2023; Obagwu & Shagbaor, 2026).

The cognitive social node attends to individual and collective effects on cognition, social organisation and communicative practice, examining gatekeeping change, echo chamber dynamics and digital well-being while stressing mediation by human agency, networks and culture (Bail, 2021; Bak-Coleman et al., 2021; VandenAbee, 2021; Büchi, 2021; Kozinets, 2024; Cinelli et al., 2021; Bruns, 2019). The geopolitical node foregrounds asymmetries between Global North and the Global South and analyses how colonial and postcolonial power relations shape algorithmic ecologies and governance needs (Couldry & Mejias, 2019; Madianou, 2019; Milan & Treré, 2019; Uche et al., 2025; De-Lima-Santos et al., 2025).

Two crosscutting dimensions run through all nodes. Opacity captures varying accessibility of algorithmic logic for users, journalists, regulators and researchers. Temporality captures continuous system evolution via platform interventions and emergent population dynamics. Together these nodes and dimensions extend MET's conceptual apparatus to account for personalisation, inscrutability, behavioural modulation and global inequality.

Limitations

This review is subject to several limitations that should inform how its findings and proposed model are interpreted. First, as a conceptual rather than empirical review, the Hybrid Ecology Model has not been tested against primary data and should be understood as a synthesising heuristic rather than a validated explanatory theory; its analytical value will depend on the empirical research it generates rather than on the review itself. Second, although the search strategy spanned four databases and a broad keyword cluster, the corpus remains anchored predominantly in English-language, Anglo-American, and Western European publishing venues, even within the Global South cluster, which may understate scholarship published in other languages or circulated outside indexed academic databases. Finally, the rapid pace of change in generative artificial intelligence and platform governance means that some sources, particularly those published toward the end of the 2013–2026 window, address conditions that may shift before the review's findings are tested empirically.

Conclusion and Recommendations

The researchers conducted a systematic conceptual review of Media Ecology Theory using 45 peer-reviewed sources to evaluate MET's adequacy for algorithmic environments and to identify a suitable integrative framework.

Three primary findings emerged. First, classical MET remains analytically useful but requires systematic extension to address personalised environmental experience, computational opacity, behavioural modulation under surveillance capitalism, and geopolitical asymmetries. Second, algorithms function as constitutive media environments rather than mere tools; the Hybrid Ecology Model integrates technical, institutional, cognitive-social, and geopolitical dimensions to capture this condition. Third, Western-centric MET cannot be assumed universal: Global South scholarship demonstrates the need for locally grounded analytical and governance frameworks.



Based on the findings and conclusions of this review, the following recommendations are offered to researchers, media practitioners, policymakers, and governance institutions:

1. **Extend MET's core propositions to formally address personalisation, opacity, and behavioural modulation.** Classical MET treats media environments as shared and stable. Researchers should revise its analytical vocabulary to account for environments that are individually adaptive, computationally opaque, and behaviourally interventionist, rather than treating these as secondary technical details.
2. **Build context specific frameworks for the Global South instead of adapting Western models.** Existing MET concepts assume institutional and infrastructural conditions that do not hold across much of the Global South. Priority should go to originating analytical and governance frameworks from African and other underrepresented contexts, not retrofitting frameworks built elsewhere.
3. **Test and refine the Hybrid Ecology Model through empirical research.** The model is currently a synthesising heuristic, not a validated theory. Its four nodes should be examined through longitudinal and comparative studies across different institutional and geopolitical settings, so the model's analytical value can be established through use rather than assumed at proposal stage.

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