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ORIGINAL SHORT ARTICLE

Anthropocene in a Media Perspective

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Introduction

In this short, I introduce the article *"From Media Evolution to the Anthropocene: Unpacking Sociotechnical Autopoiesis"* and explore the concept of the Anthropocene from a media-theoretical perspective. The Anthropocene is commonly understood as the epoch in which human activity has become the dominant force shaping the planet's climate, ecosystems, and geology. However, this concept is fraught with controversies concerning its dating, naming, causation, and appropriate responses.

This short provides an overview of these key debates while outlining an alternative perspective rooted in **media evolution and sociotechnical systems theory**. Drawing on Luhmann's systems theory, I argue that the Anthropocene's origins can be traced back much further than traditionally assumed - not to the Industrial Revolution or the mid-20th century, but to the emergence of modern spoken language. This shift marked the beginning of human society as an autopoietic system, fundamentally altering the dynamics between human communication, technology, and the environment. The short first introduces the **scientific and philosophical debates surrounding the Anthropocene**, addressing the disagreements over its geological classification and broader sociopolitical implications. It then presents the core argument of my article, which conceptualizes the Anthropocene as an evolutionary process of increasing **media-driven societal complexity**, where each new media phase - oral, written, print, electronic, and digital - has progressively intensified humanity's impact on the planet. Finally, I discuss how this **sociotechnical autopoiesis** has

led to the current environmental crises and what this perspective implies for contemporary discussions on planetary sustainability and digital governance.

By framing the Anthropocene within media theory and sociotechnical systems, this short challenges conventional narratives and highlights the need to rethink humanity's planetary role beyond simplistic industrial and economic explanations.

The Controversies

Since the term was coined by Nobel Prize-winning atmospheric chemist Paul Crutzen in 2000, it has increasingly defined our times as an age of human-caused planetary transformation, from climate change to biodiversity loss, plastic pollution, megafires, and more (Ellis 2024). The term, originally used by Soviet scientists in the 1960s and popularized by algologist Eugene Stoermer in the 1980s, extends beyond geology to encompass human influence on the entire biosphere, the zone slightly above and below Earth's surface where life exists.

The Anthropocene denotes an era where human activities are the dominant force shaping the environment, significantly altering the Earth's climate, ecosystems, and geological processes. This concept, however, is fraught with controversies, primarily surrounding its dating, naming, causation, and appropriate responses.

Dating Controversy: One major controversy involves the timing of the Anthropocene. Some scholars argue that it began with the advent of agriculture around 12,000 years ago, while others suggest the start of the Industrial Revolution in the late 18th century. A more recent proposition marks the mid-20th century, with nuclear fallout as the marker. Each proposed starting point highlights different human impacts on the Earth, reflecting the complexity of pinpointing a single moment of inception. This complexity is why it was controversial when, after over a decade of study and debate, an international committee of scientists – the Anthropocene Working Group – proposed to mark the Anthropocene as an epoch in the geologic time scale starting precisely in 1952, using radioactive fallout from hydrogen bomb tests as the marker. On March 4, 2024, the Subcommission on Quaternary Stratigraphy, responsible for recognizing geologic time units, rejected the proposal to add an Anthropocene Epoch, with 12 of 18 members voting against it. These scientists, experts in reconstructing Earth's history from rock evidence, determined that the standards for defining epochs did not support the addition of the Anthropocene with 1952 as the starting point. This vote, however, does not dispute the overwhelming evidence that human societies are significantly transforming the planet. My contribution (Tække 2024) offers a communication-sociological and media-theoretical framework that suggests a much earlier beginning for the Anthropocene. According to my perspective, the inception of the

Anthropocene should be traced back to the emergence of modern spoken language. This development marked the beginning of the social system as an autopoietic entity, fundamentally altering human interaction with the environment. By viewing the Anthropocene through the lens of media evolution and sociotechnical systems, my work highlights the profound and long-standing impact of human communication and societal structures on the planet.

Naming Controversy: The naming of this epoch as the Anthropocene has also sparked debate. Critics, particularly from eco-Marxist perspectives, argue that the term unfairly attributes planetary changes to humanity, instead of focusing on the capitalist system responsible for significant environmental degradation. Terms like "Capitalocene" have been suggested to emphasize the role of capitalism. Additionally, proponents of Actor-Network Theory (ANT) criticize the name "Anthropocene" for overlooking the significant roles played by non-human actors in shaping the planet. However, others argue that these alternatives, while valid, might obscure the broader human influence on the planet. My contribution, drawing on Luhmann's systems theory, agrees that the economic system is a major player but is only one part of a larger, interconnected social system. This perspective supports the view that while capitalism and economic activities are significant, they are part of a larger, interconnected social system. This view also includes the hybrid/cyborg perspective as it views humans as beings composed of communication, consciousness, biology, and technology, emphasizing the complex interdependencies in our impact on the planet.

Causation Controversy: The causation controversy delves into the root causes of the Anthropocene. Materialist explanations often focus on industrial activities, fossil fuel consumption, and large-scale agriculture as primary drivers. In contrast, idealist perspectives emphasize the underlying worldviews and societal structures that enable such activities. My approach integrates both perspectives, acknowledging that while economic activities like coal and oil burning are crucial, they are intertwined with broader socio-cultural systems and technological developments. My perspective explains how the advent of spoken language initiated the formation of the social system, setting a course that has, over the long term, led to the current climate, environmental, and biodiversity crises. This framework underscores the necessity of considering broader socio-cultural and communicative transformations when discussing the origins and causes of the Anthropocene.

Response Controversy: The response to the Anthropocene is perhaps the most contentious issue. Solutions range from technological fixes and regulatory measures to more radical societal transformations. Mainstream approaches often focus on mitigating impacts through technology and policy adjustments. In contrast, more critical perspectives call for a fundamental reevaluation of human-environment interactions, advocating for systemic changes in how societies operate.

Incorporating ANT and the cyborg/hybrid concepts of Latour and Haraway, my contribution suggests that understanding the Anthropocene requires acknowledging the complex interdependencies between human and non-human actors. These frameworks highlight that societal and environmental changes are deeply interconnected, necessitating holistic and interdisciplinary approaches.

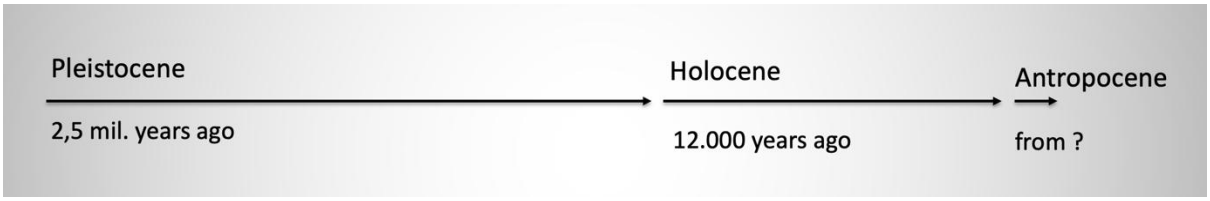
In summary, the Anthropocene represents a critical juncture in Earth's history, marked by unprecedented human influence. The controversies surrounding its dating, naming, causation, and response reflect the complexity of this concept. A comprehensive understanding of the Anthropocene necessitates considering various perspectives, from economic and material impacts to broader socio-cultural and technological systems. In the following, I present the perspective from my article in four steps: First, the evolution of human interaction with the environment is traced from the Pleistocene to the present, highlighting key developments like the emergence of Homo sapiens and the transition to agricultural societies. Next, using Niklas Luhmann's systems theory, I explain how the differentiation of systems into biological, psychic, and social forms the basis for understanding the Anthropocene. Then, I explore the media-historical perspective, examining how different phases of media from oral to digital have intensified human impact on the environment. Finally, the thesis argues that the advent of oral language was pivotal in forming the social system, setting humanity on a path of increasing environmental impact through the interplay of technology, biology, and social norms.

Human Impact on the Environment and Geological Periods

The evolution of human interaction with the environment through media started in the Pleistocene epoch, which began approximately 2.5 million years ago. During this period, early humans, such as Homo Erectus, developed protolanguage, tools, meat consumption, and bigger brains. They also mastered the use of fire, resulting in shorter intestines due to a change in diet. During the period the hunted animals changed habits, and there was some cultivation of nature and some burnings of landscapes.

Around 300,000 years ago, Homo sapiens emerged. Despite significant developments in human evolution, there was no major escalation in environmental destruction until much later. Between 60,000 and 40,000 years ago, modern language developed, which coincided with a notable extinction event: it is estimated that two-thirds of all mammal species and half of all other species weighing more than 44 kg were extinct by the end of the Pleistocene. The extinction of the megafauna had fundamental effects on ecosystem structure, seed dispersal, surface albedo, and biogeochemical cycles such as nutrient transport across landscapes.

Figure 1: The Timescale



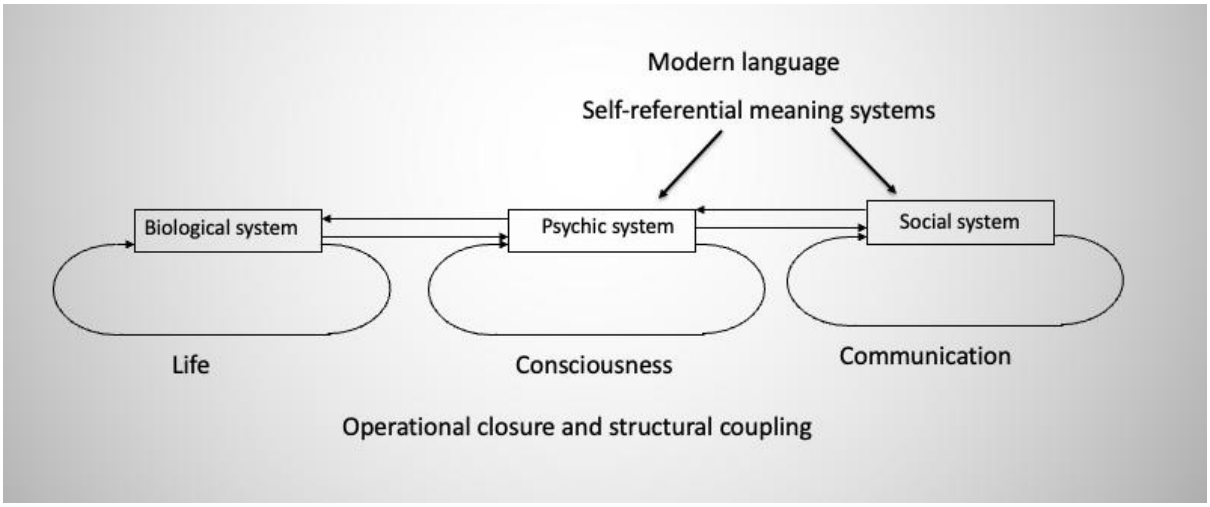
The Holocene, which began approximately 12,000 years ago at the end of the last Ice Age, ushered in the relatively stable climate we have known since. During this period, a significant portion of humanity transitioned from hunter-gatherer societies to agricultural ones. The impact on the environment particularly escalated after the development of writing, which facilitated the consolidation of large territories under a single central administration. After that printing and later electronic and digital media again has meant an escalation in environmental destruction. Today, the biomass of wild mammals constitutes only 4% by weight, with the remaining biomass comprising livestock and humans (Turvey and Crees 2019). This shift highlights the profound impact human societies have had on the planet.

There seems to be a connection between the development of modern language and subsequent technological advancements on the one side and environmental degradation and species extinction on the other. Before this thesis is elaborated, we must look at the article's theoretical basis.

Systems Theory

The article (Tække 2024) builds on Niklas Luhmann's systems theoretical communication sociology, which makes it possible to develop my theory of the Anthropocene. Luhmann (1995) distinguishes between three levels of system formation: the biological, the psychic, and the social. These systems are structurally coupled, meaning they depend on each other to function (e.g., no consciousness without a biological brain), but each operates independently around its own processes (life, consciousness, and communication). The systems are autopoietic, meaning they are self-producing and adapted to their environment, allowing them to sustain themselves upon their emergence. Over time, however, most systems are eliminated by evolution (Luhmann 2009: 36). As a radical and operational constructivist, Luhmann argues that a system's knowledge of its environment is entirely internally produced: “Knowledge is possible, not despite, but because the system is unable to make contact with the environment” (Luhmann 1995b: 7).

Figure 2: Luhmann's Systems Theory



Social and psychic systems are blind and deaf; only the biological system can sense, but it does not create meaning. The social system can only communicate, and the psychic system can only be conscious. They are connected through meaning, but must independently make sense of the sensory inputs received by the biological system.

Luhmann also describes how modern society is functionally differentiated into systems such as politics, economy, law, and science, each operating around its own communication codes. For example, the scientific system communicates what is true and false (Luhmann 1994). The point is not that we cannot calculate and experiment to achieve innovations, but that these calculations and inventions do not necessarily make us more adapted to our environment (consider the climate crisis). We do not have direct epistemological access to the environment, and technology cannot change this condition.

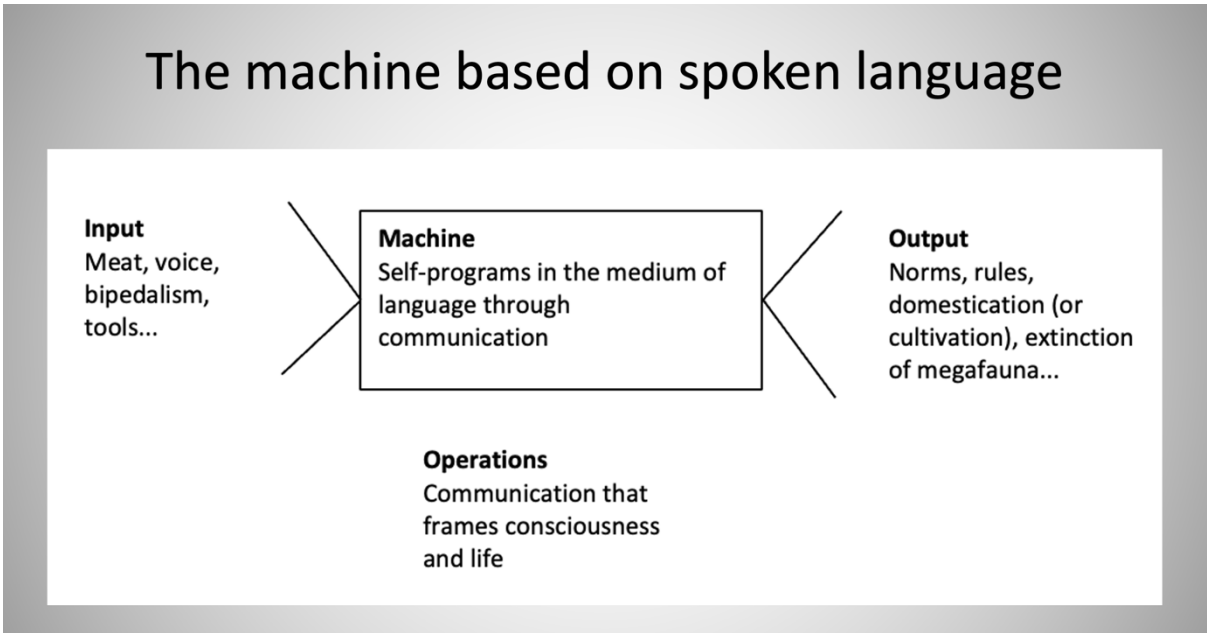
In Luhmann's theory, the social consists of communication, which is the process through which the social system reproduces itself. Communication is defined as a synthesis of three selections: information, utterance, and understanding (Luhmann 1990). Understanding is crucial because it implies that communication cannot be directed externally or established by a single individual. Each instance of understanding creates an element in the communication process, making communication a chain of processes that connect back to earlier processes. A new utterance must relate to what was previously said before it can be considered part of the social.

Communication would not be possible without spoken language, which opens the possibility for communication about communication, enabling the social system to emerge as an autopoietic

system (Luhmann 1995: 193). With the linguistic foundation of communication, the social system differentiated itself from its non-communicating environment, including psychic systems. However, it is the psychic systems that contribute to communication, such that social systems are produced from below by psychic systems but conditioned from above by the encompassing social system.

According to Luhmann (2002), autopoiesis only explains evolution when tied to the structure's compatibility with the environment; either autopoiesis exists, or it doesn't. There is no blueprint, no preordained plan where the seed embodies its final form. Rather, evolution assesses which structures align with autopoiesis. Self-preservation depends on whether the formations emerging in the medium of life (a species, a specific structure) can reproduce under existing selection pressures. The sociotechnical autopoiesis machine introduced here can illustrate how a form of life, human beings with oral language, was differentiated from other life forms long ago and subsequently tied their structural evolution to various environmental structures (like meat, fire, and stone tools). Through these transformative couplings, they increasingly influenced their environment and consequently shifted the selection pressures under which they had to exist.

Figure 3: Language as a Medium



Medium Theory

Since McLuhan, there has been a media-historical perspective identifying a series of phases, each observed as distinct historical media societies. These phases include a society based solely on oral language, later supplemented by writing, print technology, analogue electronic media,

and now digital media. Each phase has seen comprehensive development, with media emerging through a dynamic process. During this process, society has grown, developed new structures, and abandoned old ones within the possibilities provided by the media. Simultaneously, the media have been gradually refined in interaction with society's ongoing structural evolution.

This phase-based approach is not an expression of technological determinism, as it is the social realm that, based on its own selections, develops social structures within the new possibilities afforded by emerging media (Luhmann 2012). As Neil Postman (1993) articulated, "A new technology adds nothing and subtracts nothing. It changes everything." This encapsulates the media-ecological perspective, wherein media are a crucial part of our environment, and the advent of a new medium changes the entire environment, disrupting society and individuals, who, for a time, find themselves out of sync with each other and their surroundings.

According to Luhmann (2012), there exists a transitional period where new communication media begin to be utilized, leading to initial structural changes, but without corresponding societal self-descriptions. The new communication possibilities introduced by a new medium effect both social structures, by enabling new connections, and the medium itself, which thus evolves (decouples from the specific functions it was initially intended for). During this initial period, society's self-descriptions and explanations do not yet reveal how it starts to function in new ways (Luhmann 1995: 343 ff). It is only later, possibly after new structures have taken hold, that society begins to produce more adequate semantics. This understanding may only be achievable through the now more developed new medium, which has become integrated into societal communication. Gradually, the new media society decouples from both old structures and old self-descriptions, starting to understand itself more in accordance with its new form of differentiation.

In the context of the Anthropocene, understanding these media transitions is crucial, as each phase of media development has significantly shaped human interaction with the environment. These shifts to new media have not only transformed social structures but also how humans impact and conceptualize their environment.

The Thesis

The article's thesis is that with the acquisition of oral language, the social domain transformed into a self-referring system. Previously, cooperation among hominins was governed by inherited instincts mediated through genes. With the emergence of oral language, cooperation began to be governed by social norms and rules mediated from generation to generation

through language. According to Luhmann (1995: 153), language serves as a threshold that enables the emergence of the social as an autopoietic system, a system that increasingly began to regulate larger parts of human coexistence. At this threshold, the psychic system is also differentiated out as a self. From this point onward, humans had to determine themselves to follow socially constructed norms and develop the ability to postpone need satisfaction.

After the emergence of the social system, humans were captured by the social, which in the article is theoretically described and analyzed as a sociotechnical autopoiesis machine. This machine consisted of parts like technology, fire, meat, the dog, and language to coordinate between the psychic and social systems (see Figure 3). The social “machine” thus became dynamic and hyper-adaptive, allowing humans to live in various climates. This highly complex “machine” continuously transformed itself and its environment. Although these transformations occurred slowly by today's standards, they were rapid compared to the animal and plant world. Biological needs were now processed through consciousness guided by social norms and knowledge, leading humans to transform both themselves and their environment.

This transformative process has intensified the impact of the machine with each subsequent media revolution. We now find ourselves in an algorithmically differentiated society, presenting an open situation where it is crucial which values are used as the basis for programming the algorithms (Tække 2022). Whether we move towards an authoritarian state system like in China, an unregulated market system like in the USA, or a democratic state system like in the EU is decisive. Regardless of the chosen path, the biosphere's perspective must be considered. This involves understanding society as presented here, recognizing that epistemologically, we cannot make direct contact with the environment but can only communicate and think about it. Technological fixes alone do not carry the solution. We need to take nature's perspective in the sense that we allow it to govern substantial parts of the planet on its own – though this provides no security for humans, as Earth's developmental history in the long term consists of a series of climatic changes that often result in the breakdown of ecological systems (Francopan 2023).

Two perspectives argue against the idea that humans can do something beneficial for the environment and thereby increase their own chances of survival. First, the fundamental values of society (the machine), and second, functional differentiation.

First, the machine's self-destructive functionality was established with spoken language, after which the destruction of the biosphere has exponentially increased, from the first extinctions and burnings to the extinction of megafauna, the cultivation of landscapes, and the domestication of animals and plants, to the biodiversity and climate crisis characterizing the present. So far, the transformation has replaced other parts of the biosphere with more people, domesticated

plants, and livestock, creating a monoculture that threatens its own existence. The article argues that the machine's self-destructive effects (destruction of its natural basis) are due to humanity's animalistic natural foundation (desire, fear, and aggression on one hand and compassion, love, and protective instinct for one's offspring on the other) and constitute the basis for the machine's initial norms, values and rules of conduct. The machine's initial values evolved over a foundation that can be understood as the primate´s Machiavellian intelligence (Fitch 2010: 428). On this background, our self-destructive way of life will probably continue in the digital society.

Secondly, the concept of functional differentiation, as described in systems theory, posits that modern society is composed of various subsystems, each with its own distinct function and mode of operation. While this differentiation allows for specialized development and efficiency within each subsystem, it also creates significant barriers to comprehensive and coordinated action on complex issues such as the climate crisis. In the context of climate change, the scientific community unequivocally recognizes the severity of the problem, advocating for urgent and decisive action. Scientists warn that the situation is dire and that immediate measures are necessary to mitigate the impending disaster. However, the reactions from other subsystems illustrate the challenges posed by functional differentiation. The economic system, driven by market principles and short-term profitability, often resists actions that do not yield immediate financial benefits. For instance, addressing climate change might negatively impact share prices in the short term, leading to reluctance or outright opposition to necessary but costly interventions. Political systems, operating on electoral cycles and the need for public approval, frequently prioritize short-term gains over long-term sustainability. Politicians may acknowledge the need for action but are constrained by the imperative to secure re-election, which can lead to inadequate or delayed responses to climate issues. The legal system, grounded in established laws and property rights, may also pose obstacles to climate action. Initiatives that infringe upon private property or require significant legal changes can face substantial resistance, further complicating efforts to implement comprehensive environmental policies. Mass media, focusing on capturing public interest and maintaining viewership, often deems climate change a "boring subject." The lack of sustained media attention results in diminished public awareness and urgency, hindering the mobilization of collective action.

In conclusion, modern society appears to be undergoing a fundamental shift in its mode of differentiation - from functional differentiation to a new underlying layer of algorithmic differentiation. As outlined by Tække (2022), this transition reconfigures societal inclusion and exclusion, where individuals are increasingly decoupled from direct systemic participation and instead subject to classification and stratification by machine learning algorithms. These algorithms do not emerge in isolation but continue a trajectory that can be traced back to the earliest stages of societal emergence, where human organization became enmeshed in what can

be observed as a sociotechnical autopoiesis machine - a self-perpetuating process in which technological infrastructures shape and stabilize the conditions for cognition, communication, and coordination.

This long evolutionary trajectory suggests that the values and norms shaping algorithmic selection today are not new; rather, they can be linked to deep-seated social mechanisms that have been reinforced and mediated through successive technological paradigms - from speech and writing to print, electronic media, and now AI-driven infrastructures. Among these mechanisms are the ingroup biases and exclusionary tendencies that have historically structured social cohesion and competition, originally as survival strategies in early human collectives. If such primitive ingroup-chauvinistic norms continue to be reproduced - not only through traditional communicative media but now through automated selection in AI and machine learning - then the consequences could be far-reaching.

The open situation we now face suggests that algorithmic differentiation, as it integrates into the core of societal operations, is not merely a shift in technical infrastructure but a transformation that feeds back into and reinforces inherited patterns of social organization. Suppose climate science, biodiversity research, and environmental studies are correct in their projections. In that case, the continuation of these inherited selection mechanisms under conditions of accelerating ecological crisis appears to undermine the very conditions for life.

Whether algorithmic infrastructures will perpetuate historically entrenched patterns of social inclusion and exclusion, or whether new modes of differentiation will emerge in response to these systemic pressures, remains an open empirical question. However, what is increasingly evident is that digital infrastructures are not merely extensions of previous media but constitute a new layer of operational closure, where selection criteria are no longer explicitly negotiated through human deliberation but instead encoded, optimized, and executed at scale through automated processes (Tække 2025). In this sense, the evolution of sociotechnical autopoiesis reaches a new threshold, where the logics of differentiation themselves become subject to computational reinforcement, potentially reshaping the trajectory of societal evolution in ways that remain only partially understood.

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