

Post-Humanization as a Process: Cyborg Art, Sensory Reconfiguration, and Networked Mediation

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Abstract: This article conceptualizes post-humanization as an ongoing process through which human–technology relations reconfigure bodily experience, cultural meaning, and everyday practices. Drawing on posthumanist theory and accelerated technological transformation, it proposes a four-stage model—preference, possibility, dissemination, and inevitability—to analytically trace how technological innovations move from elective experimentation toward socially dominant or practically required forms. Within this framework, new sensory modalities and cyborg art practices are examined as concentrated manifestations of the preference and possibility stages. The works of Neil Harbisson, Moon Ribas, Manel De Aguas, and Stelarc demonstrate how perception can be technologically reconfigured as a selective and embodied practice rather than as a universal trajectory. These cases reveal that new senses emerge not as inevitable outcomes of technological progress but as situated, context-specific rearticulations of embodied experience. The study further argues that cyborg art operates through a dual structure: while sensory transformation originates in embodied perception, its public intelligibility is shaped within networked digital environments. In some instances, the internet forms part of the sensory infrastructure itself; in others, digital platforms function as mediating infrastructures through which embodied transformation becomes culturally legible and publicly circulated. By situating cyborg art within a staged process model of post-humanization, the article offers a differentiated account of how sensory reconfiguration becomes visible, negotiable, and socially meaningful in contemporary networked digital environments.

Keywords: Post-Humanization, Cyborg Art, Sensory Reconfiguration, Networked Mediation, Human–Technology Relations

1. Introduction

Technological developments today transform the human relationship with the world not only through tools but also at the level of bodily and sensory experience. Digital systems, AI-driven applications, and technologies integrated into the body influence how people sense and perceive their bodies and environments, prompting a renewed consideration of the limits and functions of the senses. This reinforces the idea that perception is not only a biologically given capacity, but also a domain shaped within technical, cultural, and social conditions.

The conceptual space opened by posthumanist debates also enables new approaches that critically address the societal implications of evolving human–technology relations. Gladden defines post-humanization as a process in which human-centered social structures transform together with technological systems (Gladden, 2019). In this context, rather than explaining post-humanization through isolated or exceptional cases, the study proposes a staged framework to discuss how the process operates. The article aims to examine this transformation through a post-humanization process model.

The post-humanization model used in the article was developed in the author’s doctoral research and conceptualizes the process through four stages: *preference*, *possibility*, *dissemination*, and *inevitability* (Gökbayrak, 2022, p. 179–189). These stages describe how technological innovations first appear as individual choices, then become accessible under technical and cultural conditions, spread at the social scale, and eventually become dominant to the extent that they reshape the functioning of social life. The proposed model takes *Diffusion of Innovations* as a conceptual starting point, while rethinking it in light of post-humanization dynamics that are multi-layered, contested, and not strictly linear (Rogers, 1983).

In contemporary technological environments, humans increasingly move beyond biologically innate senses and establish new relations between aesthetics, perception, and embodiment through selected and designed sensory modalities. Within this context, technology is not merely a functional instrument; it becomes an active element through which perception is produced and the body is reconfigured. In artistic practices, the body can function as both the perceiving subject and the site where perception is produced, while perception itself becomes both the means and the outcome of artistic production.

Early and visible examples of post-humanization can be observed in cyborg art practices that integrate sensory technologies into the body. These works provide important references for understanding how new senses are experienced and how perceptual transformation is articulated. In this article, cyborg artists are considered as early and visible examples of a broader social transformation in which new senses and bodily perception become increasingly discussable and practicable.

This article examines how technological developments reconfigure bodily experience and perception within a posthumanist framework, employing a staged post-humanization process model to analyze how these transformations occupy different stages of preference, possibility, dissemination, and inevitability and how they become visible and circulate within contemporary networked environments.

2. Method

This study adopts a qualitative, concept-driven theoretical approach based on conceptual analysis. Its analytical framework is the four-stage post-humanization process model developed in the author's doctoral research (Gökbayrak, 2022), informed by Gladden's account of post-humanization as a transformation of human-centered social structures alongside technological systems (Gladden, 2019) and by Everett M. Rogers' *Diffusion of Innovations* theory (Rogers, 1983). Post-humanization is examined as a staged process through which technological transformations become visible across time and social contexts. Cyborg art practices and selected sensory technologies are included as representative examples to concretize the discussion and to illustrate early and intensified manifestations of the process; these examples also enable an analysis of how sensory transformations enter public circulation and attain cultural intelligibility within contemporary networked digital environments.

3. Post-Human, Cyborg and Technological Transformation

3.1 Theoretical Background

The question of how relationships established with technological systems transform human experience has been addressed within posthumanist thought across different historical contexts and through diverse theoretical orientations. In this section, the concepts of the cyborg and the posthuman are considered together around a shared problem: how technology reshapes perception, and the relationship humans establish with the world. Although Donna Haraway, N. Katherine Hayles, Ray Kurzweil, and Matthew E. Gladden approach this transformation on different conceptual levels, they converge on the idea that the human–technology relationship has undergone an irreversible change. This multilayered theoretical framework makes it possible to conceptualize post-humanization as the gradual transformation of human-centered structures in conjunction with technological systems unfolding within historical continuity.

Donna Haraway's *A Cyborg Manifesto* (1985) approaches the concept of the cyborg as a cultural and political rupture that challenges the boundaries constructed by modernity. Haraway emphasizes that by the late twentieth century, the human can no longer be conceived as a pure or originary entity; instead, hybrid forms of existence in which machine and organism are intertwined have become part of everyday life. In this sense, the cyborg is a cultural and political figure that emerges through the dissolution of binaries such as human/machine, nature/culture, and body/mind (Haraway, 1985/2016). Haraway's assertion that we are already cyborgs shifts cyborgness away from a speculative future condition and toward a description of the contemporary subject embedded in technological systems. This perspective frames the cyborg as a mode of existence that entails ethical, political, and cultural responsibilities. Accordingly, for Haraway, the cyborg constitutes a site where representation, identity, and body politics are renegotiated.

N. Katherine Hayles deepens the critical trajectory opened by Haraway by foregrounding questions of information, embodiment, and material instantiation. In *How We Became Posthuman* (1999), Hayles argues that one of the most problematic aspects of posthuman thought is its tendency toward disembodiment. Treating information as an abstract entity independent of its material carriers, and conceptualizing the mind as software while reducing the body to a modifiable hardware, risks collapsing the posthuman into an ideal of disembodied consciousness (Hayles, 1999). Hayles challenges this view by emphasizing that information must always be instantiated in a specific material substrate. Whether produced within a biological body or mediated through a technological interface, information is never disembodied.

Ray Kurzweil approaches cyborgization as a technological continuation of human evolution and situates this process within the context of exponentially accelerating technological development. According to Kurzweil, humanity has already entered a phase in which biological evolution and technological evolution are deeply intertwined; for this reason, becoming cyborg is an ongoing transformation that has already begun (Kurzweil, 2005). Cyborgization is not limited to mechanical components integrated into the body; rather, it is fundamentally characterized by the expansion of human cognitive functions—such as memory, computation, decision-making, and perception—through non-biological systems. Kurzweil's concept of the *Law of*

Accelerating Returns argues that technological development does not progress linearly, but advances through exponential acceleration. Each technological stage produces the tools that enable the next stage, and these feedback loops continuously increase the pace of progress (Kurzweil, 2005; 2024). The concept of singularity refers to the prediction that this exponential trajectory will produce a qualitative threshold in human–machine integration. Kurzweil’s more recent work (2024) emphasizes that the fundamental claims of his earlier predictions persist, but that the rate at which they are unfolding has increased substantially. This perspective makes it possible to understand technological transformation as a process that is already underway.

Matthew E. Gladden extends discussions of the posthuman and the cyborg from the level of the individual body to the societal and organizational scale. Gladden’s concept of post-humanization refers to the transformation of a society from a structure centered exclusively on biological humans into a system in which human, artificial, and hybrid actors operate together (Gladden, 2018; 2019). What changes in this process is not only bodies, but also decision-making mechanisms, institutional structures, relations of responsibility, and social norms. Within this framework, the cyborg is positioned as a hybrid social actor whose cognitive, perceptual, or agentic capacities are extended through technological systems. Gladden’s approach allows posthumanity to be understood as an ongoing, gradual, layered, expanding transformation that operates at the societal level.

Building on this conceptual background, the post-humanization process will be examined through a staged model, and the ways in which technological transformation operates in relation to sensory experience will be discussed.

3.2 The Post-Humanization Process Model

The concept of post-humanization has been addressed in the literature in various contexts to describe the transformation of human-centered social structures alongside technological developments. The works of Matthew E. Gladden provide an important theoretical foundation by extending the discussion of post-humanization beyond the level of the individual body and systematically examining it within social and organizational systems. Gladden defines post-humanization as the increasing visibility of social orders in which human, non-human, and hybrid intelligent agents operate together (Gladden, 2018, p. 18–25; 2019, p. 3–7). This perspective makes it possible to conceptualize post-humanization not as a static condition but as a transformative logic that permeates social functioning.

In explaining post-humanization, Gladden emphasizes historical continuity and structural transformation. He argues that modern societies are built upon human-centered assumptions, whereas contemporary societies increasingly distribute processes of decision-making, guidance, and interaction among non-human or hybrid actors (Gladden, 2018, p. 33–41). In this regard, post-humanization encompasses not only the integration of biological humans with technological systems, but also the emergence of technological actors as functional participants within social orders. This study proposes to think together Gladden’s robust conceptual framework with a process-oriented logic that accounts for the progression of this transformation.

Approaching post-humanization analytically as a process of innovation offers a productive perspective. Drawing on Everett M. Rogers’ definition of innovation as an idea, practice, or object perceived as new within a social system (Rogers, 1983), this approach emphasizes the social processes through which human–technology relations are reconfigured and normalized.

In this study, Gladden’s conceptualization of post-humanization and Rogers’ Diffusion of Innovations approach are considered together to propose a four-stage process model that explains the societal progression of post-humanization. The model is grounded in the detailed discussion of the post-humanization process developed in the author’s doctoral dissertation (Gökbayrak, 2022, p. 179–189). The aim is to conceptualize post-humanization as a predictable form of social transformation unfolding through distinct stages.

The first stage of the model, *preference*, refers to the phase in which technological augmentations or applications that extend human capacities are evaluated by individuals as optional possibilities. At this stage, perceptual extensions, bodily augmentations, or cognitively oriented technologies are approached not as necessities but as matters of personal orientation, curiosity, or exploration. Corresponding to Rogers’ stages of *knowledge and persuasion*, individuals retain the freedom to experiment with, reject, or adopt the technology. In this phase, technology does not yet carry a stabilized social meaning; rather, it is tested and interpreted differently across contexts. Within the framework of post-humanization, the choice stage represents a zone of uncertainty in which new technologies gain visibility through individual experiences and motivations (Gökbayrak, 2022, p. 180–183).

In the *possibility* stage, technologies move beyond being experimental tools subject solely to individual preference and begin to gain technical, economic, and institutional feasibility. Innovation becomes not only possible but also capable of integration into everyday life. Rogers' concepts of *relative advantage*, *compatibility*, and *trialability* are particularly useful for understanding this phase (Rogers, 1983). Within the context of post-humanization, the opportunity stage involves the emergence of social consideration regarding applications that extend human capacities. At this stage, technology is still not mandatory; however, it becomes accessible to broader user groups beyond individual choice.

During the *dissemination* stage, technological applications become standardized, commercialized, and dominant forms of use in specific domains. Innovation shifts from being an exceptional experience to becoming part of everyday practices. Rogers' emphasis on *communication channels and social systems* becomes especially salient at this point (Rogers, 1983). Social networks, institutional structures, and professional practices encourage technological adaptation without explicitly imposing it as an obligation. From the perspective of post-humanization, this stage marks the point at which the effects of technological applications on bodies and perceptual experiences are no longer exceptional but predictable and repeatable.

The final stage of the model, *inevitability*, represents the point at which this study deliberately departs from Rogers' framework. While Rogers theoretically preserves the individual's possibility of rejecting an innovation, the post-humanization process also requires accounting for technological practices that become indispensable to social functioning. The inevitability stage does not denote an absolute loss of individual choice, but rather a condition in which technological practices become practically necessary for participation in public, institutional, and social processes (Gökbayrak, 2022, p. 187–189).

Kurzweil explains technological development through feedback loops: once a more efficient and powerful technological solution emerges, it directly contributes to the development of subsequent technologies, allowing progress to generate its own momentum without requiring external impetus (Kurzweil, 2005; 2024). These transitions do not halt progress; rather, they sustain its overall momentum. Kurzweil conceptualizes this dynamic through the *Law of Accelerating Returns*, defining technological development as a self-reinforcing process of increasing speed (Kurzweil, 2005; 2024).

This framework explains not only the increasing speed of technological production but also the shortening timeframes through which technologies enter social circulation and are adopted. In analyzing mass adoption, Kurzweil identifies the point at which approximately 25% of the population begins using a technology as a critical threshold, marking the transition from marginal use to socially functional standardization (Kurzweil, 2005). This threshold corresponds with Rogers' concept of *critical mass*, which refers to the point at which an innovation acquires a self-sustaining diffusion dynamic (Rogers, 1983). Within this context, the 25% adoption rate should be understood as an analytical indicator of when technological diffusion becomes socially significant. Within this framework, the stage of inevitability describes a condition in which complete withdrawal from technology remains theoretically possible; however, technological adaptation becomes practically necessary as public services, institutional processes, and social interactions are increasingly conducted through these systems. At this stage, post-humanization becomes visible as an increasingly dominant way of maintaining functional relations with social structures.

This process model provides a theoretical framework for understanding post-humanization not as an abstract future projection, but as a framework for explaining how new senses and cyborg practices emerge, spread, and become normalized.

4. Social Visibilities of Post-Humanization

4.1 Stages of Technologies in the Post-Humanization Process: Preference, Possibility, Diffusion, and Inevitability

The emergence of new senses should be approached, within the context of the post-humanization process, as a multi-layered transformation that unfolds across different domains, for different purposes, and at different speeds. Sensory technologies appear in diverse contexts such as medical rehabilitation, experimental individual use, cultural–artistic production, and limited commercial initiatives; these contexts intersect in different ways with the stages of preference, possibility, diffusion, and inevitability in the post-humanization process.

In the early phases of post-humanization, new senses emerged largely in medical and corrective contexts. The 1990s stand out as a period in which the digital processing of sensation through technology became institutionalized in clinical practice.

From the 2000s onward, sensory technologies began to be discussed not only in terms of clinical necessity but also through experimental and individual preferences. In the 2010s, a distinct trajectory became visible in which new senses gained prominence within cultural and artistic contexts. The Catalan artist Neil Harbisson developed a perceptual system through an antenna permanently integrated into his skull—initially intended as a response to his congenital achromatopsia, which causes him to perceive the world in black and white—converting color frequencies into auditory vibrations and enabling him to “hear” color. Used by Harbisson since 2004, this system extends color perception beyond biological vision and demonstrates that perception can be reconfigured through technical interfaces (Harbisson, 2012). Similarly, Moon Ribas experiences earthquakes as vibrations through seismic sensors integrated into her body and translates this sensory data into artistic performances (Ribas, 2016). These examples can be evaluated as practices in which new senses have not yet been adopted at a mass scale, yet they strengthen the cultural visibility dimension of the *preference* stage. Accordingly, cyborg art practices produce a social imagination that perception is redefinable, rather than emphasizing merely the technical feasibility of new senses.

After 2018, limited but more direct attempts at commercialization in the field of new senses began to appear. North Sense, developed by the CyborgNest, is a sensory interface that enables the user to perceive magnetic north continuously as a vibration. First developed in 2016 as an experimental implant, the system was later tested in everyday life by a limited number of users through wearable versions. North Sense has been evaluated as one of the early examples in which a new sense can become continuous, insofar as it transforms the individual’s orientation to space into a conscious learning process. Overall, current developments indicate that sensory technologies offering individualized and continuous orientation are more readily realizable, whereas more complex and relational senses tend to remain at the fragile threshold between the possibility and dissemination stages of post-humanization.

By contrast, certain technologies are clearly approaching the inevitability stage of the post-humanization process. Smartphones, digital banking and online payment systems, biometric identification technologies, and algorithmic decision mechanisms have moved beyond the realm of individual preference to become integral components of public, institutional, and social infrastructures. Although it remains theoretically possible to avoid these technologies, interaction with them has become practically necessary for sustaining everyday life. Thus, the transformation of the smartphone from a communication device into a multifunctional interface for identity, payment, location, health data, and social interaction exemplifies a form of post-humanization that does not directly intervene in the body yet continuously externalizes bodily and cognitive capacities. Similarly, biometric systems and AI-based tools embed bodily features and cognitive tasks into technical infrastructures, increasingly positioning technological mediation as a *de facto* requirement for social participation rather than a purely optional choice.

Taken together, these examples indicate that “inevitability” is often produced by networked and algorithmic infrastructures that make technological mediation practically required for everyday participation. In contrast, new senses largely remain elective and context-dependent, clustering around preference and possibility: medical uses tend to move toward wider integration, while cyborg art foregrounds the cultural visibility of selectable perception, and commercial attempts remain limited and uneven. This asymmetry makes new senses a useful lens for discussing both the current limits and potential trajectories of post-humanization. In this respect, new senses provide a functional field of analysis that opens the post-humanization process to discussion in terms of both its current limits and its possible trajectories.

4.2 Cyborg Art as Embodied Sensory Reconfiguration and Networked Mediation

The integration of new senses into the body should be approached not merely as a technological innovation, but as a process through which perception, identity, and modes of expression are reconfigured. In this respect, cyborg art practices demonstrate that sensory expansion constitutes not only an increase in functional capacity, but also an aesthetic, cultural, and subjective transformation. Emerging prominently since the early 2000s, these practices provide early and intensified examples of how post-humanization can be experienced at the bodily level and articulated through artistic production (Haraway, 1991/2016; Hayles, 1999; Gladden, 2018; 2019).

In cyborg art, the artwork is not primarily an external object but the creation of a new sense. The body becomes simultaneously the site of perception, production, and exhibition. As Neil Harbisson formulates, “Cyborg Art is

an art movement where artists create their own senses by merging cybernetics with their own organism” (Harbisson, 2012). The artwork unfolds within the embodied perceptual condition generated by the integration of technology into the organism.

Harbisson’s practice exemplifies this structure. Born with achromatopsia, he experiences colour through an antenna permanently integrated into his skull that translates colour frequencies into auditory vibrations. He describes this system as “a new body part” and “an extension of my brain” (Harbisson, 2012). In works such as his *Colour Concerts*, colour–sound correspondences are organized into tonal compositions. What is presented to the audience is not a representation of colour, but the aesthetic structuring of an expanded perceptual mode. Art here is not an expressive layer added onto the body; it is the direct consequence of an altered sensory configuration (Harbisson; Gökbayrak, 2022).

Moon Ribas similarly developed a sensory system that allows her to perceive seismic activity as bodily vibrations. Since 2013, her body has been permanently connected to online seismographs, enabling earthquakes occurring anywhere in the world to be experienced in real time as physical impulses. In performances such as *Waiting for Earthquakes*, movement is not choreographed in advance but emerges in response to global seismic data. Ribas states: “My seismic sense is my artwork but I’m the only one in the audience. So in order to share my experience I create external artworks through this new sense.” This formulation reveals a structural feature of cyborg art: the artwork first occurs as embodied perception and subsequently requires externalization in order to become publicly accessible.

Manel De Aguas extends this logic by transforming atmospheric variables—such as humidity, temperature, and air pressure—into sound through cranial fin-like sensory structures. In works such as *Cyborg Music I*, environmental data function as compositional parameters, shaping tonal variation (Gökbayrak, 2022). The artwork does not represent environmental conditions; rather, it materializes a reorganized perceptual relation to them. The aesthetic outcome emerges from the translation of sensed data into audible form.

Stelarc’s practice foregrounds the expansion of bodily capacity through technological extensions. In *Ear on Arm*, a surgically constructed ear implanted on the artist’s arm is designed as an internet-connected organ, capable of transmitting sound through networked systems (Gökbayrak, 2022). Here, the body is not a fixed biological entity but a mutable interface. The project suggests that perception can become distributable and networked, extending beyond the confines of biological location.

In certain cyborg practices, therefore, the internet functions as part of the sensory infrastructure itself. Harbisson’s antenna includes internet connectivity that allows him to receive images and sounds directly into his skull from remote locations (Harbisson, 2012). Ribas’s seismic sense relies on global online data streams. In such cases, networked digital systems are not merely channels of representation or dissemination; they constitute the material conditions of perception.

At the same time, cyborg art practices reveal another dimension of digital mediation. Because newly integrated senses cannot be directly experienced by others, performances, recorded demonstrations, lectures, interviews, and online documentation become necessary modes of articulation. Institutional websites, video-sharing platforms, and social media environments operate as spaces in which embodied sensory transformation is explained, documented, and circulated. These platforms do not reproduce the sensory experience itself; rather, they render it culturally intelligible. Bolter and Grusin argue that mediation is not secondary to reality; rather, it constitutes the condition through which experience becomes culturally legible (Bolter and Grusin, 1999). From this perspective, the digital documentation and circulation of cyborg practices do not merely represent an already completed sensory event; they participate in making that event publicly intelligible.

Thus, in cyborg art, embodied sensory transformation attains visibility and public intelligibility within networked digital environments.

5. Discussion and Conclusion

This article approaches post-humanization as a process through which human–technology relations reshape bodily experience, cultural meaning, and everyday practices. Drawing on posthumanist critiques alongside accelerated technological change and broader social transformations, it introduces a four-stage model—preference, possibility, dissemination, inevitability—to examine how technologies shift from individual adoption toward broader forms of social integration. The model highlights that post-humanization does not unfold in a uniform manner; instead, different domains and practices may occupy different stages simultaneously.

Within this analytical perspective, new sensory modalities and cyborg art practices are explored as concentrated sites in which post-humanization becomes perceptible. These cases illuminate how embodied perception can be transformed at a stage when such transformations have not yet become widely diffused or structurally dominant. In doing so, they reveal that bodily experience may be reshaped in personal, selective, and context-dependent ways.

The practices of Neil Harbisson, Moon Ribas, Manel De Aguas, and Stelarc provide concrete illustrations of this perceptual reconfiguration. Harbisson's color-sound system, Ribas's seismic sense, De Aguas's atmospheric-to-sonic translations, and Stelarc's networked bodily extensions demonstrate how technological intervention can generate sensory transformation as an embodied and situational practice rather than as a universal trajectory.

While technologies such as smartphones, digital banking systems, and AI-based tools have become dominant components of everyday life, newly integrated senses remain limited, experimental, and context-dependent. This disparity indicates that post-humanization does not progress at a single speed or along a single trajectory; different technological and bodily configurations may coexist at different stages of the process.

Moreover, the study demonstrates that cyborg art practices extend beyond embodied transformation alone. The public intelligibility of these sensory reconfigurations is shaped within networked digital environments. In some cases, the internet constitutes part of the sensory infrastructure itself; in others, performances, recorded demonstrations, lectures, video platforms, and online documentation function as mediating environments through which embodied experience becomes culturally legible. In this context, digital platforms operate as mediating infrastructures that shape the public circulation and intelligibility of cyborg art.

In conclusion, post-humanization refers to a continuing transformation in which modes of being human are reconfigured alongside technology. New senses do not provide the sole explanatory key to this process; rather, they offer embodied manifestations of perception's transformability. Cyborg art practices make visible how sensory reconfiguration unfolds selectively and contextually, while simultaneously becoming articulated within such environments. Therefore, post-humanization should be understood as a differentiated, layered, and network-conditioned process.

Ethics Declaration

This article is a conceptual and theoretical study based on the analysis of existing literature and artistic practices. It does not involve human participants, empirical data collection, experiments, interviews, or the use of personal or sensitive data. Therefore, ethical approval was not required for this study.

AI Declaration

AI-based tools were used during the preparation of this manuscript to support language-related processes and literature exploration. Specifically, AI tools were utilized as translation aids and for structural organization of the text. The use of AI did not involve the generation of original theoretical content or analytical arguments. All conceptual arguments, interpretations, and final editorial decisions remain the responsibility of the author.

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