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The Past and Future of Anthropotechnology: A Systematic Review of Its Historical Development, Conceptual Divergence, and Emerging Research Trends

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Abstract:

Purpose: This study systematically examines the historical development, conceptual foundations, and emerging research trends of anthropotechnology. It seeks to establish how the term has been defined and used across the disciplines in which it circulates, to determine whether these uses constitute a single developing field, and to identify the research directions that follow from that determination.

Design/methodology/approach: The review was conducted in accordance with the PRISMA 2020 guidelines. Peer-reviewed publications were identified, screened, and qualitatively synthesized through historical reconstruction, conceptual analysis, and cross-citation analysis. Each included study was coded for its disciplinary affiliation, its definition of the term, its theoretical lineage, and the sources it cites for that lineage.

Findings: The corpus does not describe a single concept that spans disciplines. It describes three lineages that share an English name and have almost no citations. The first descends from Alain Wisner's ergonomics of technology transfer and accounts for most of the corpus; the second translates Peter Sloterdijk's Anthropotechnik and addresses human self-formation; the third derives from the francophone bioethical tradition of Hottois and Goffette, in which anthropotechnology is one term in an explicit three-part taxonomy. No source in any lineage cites a source in another lineage. Within the ergonomic lineage alone, a cumulative development is documented, running from intercultural transfer analysis, through methodological consolidation and disciplinary offshoots, to epistemological reflection and contemporary applications in digitally mediated work, offset policy, and innovation systems.

Research limitations/implications: The corpus is small and heterogeneous; screening was not duplicated; and the search covered the anthropotechnology family of terms, but not all cognate forms. The findings, therefore, describe the retrieved corpus rather than measuring a field.

Practical implications: For researchers, reviewers, and editors, the review offers a means of identifying which sense of the term a given study employs and of avoiding conflation of literatures addressing different objects.

Originality/value: Whereas earlier reviews address anthropotechnology within a single domain, most recently technology transfer in the Industry 4.0 era, this article examines the term across the disciplines in which it circulates and tests, rather than assumes, their connection. The cross-citation analysis shows that the term's apparent interdisciplinary breadth is due to homonymy rather than conceptual continuity. The article maps the internal development of each lineage and advances a research agenda whose first task is terminological rather than substantive.

Keywords: Anthropotechnology; Technology transfer; Ergonomics; Conceptual history; Homonymy.

1. Introduction

Technological development has increasingly reshaped not only productive systems but also the conditions of human existence. Contemporary transformations associated with digitalization, advanced automation, and complex sociotechnical integration have intensified interdependence between humans and technological environments. Research on Industry 4.0 and technology transfer shows that technological systems are not neutral artifacts but culturally embedded structures that require adaptation across organizational and national contexts (KOVALESKI, PICININ, KOVALESKI, 2022). Within this landscape, the concept of anthropotechnology has been advanced as a framework for analyzing how technologies are transferred, reconfigured, and integrated into diverse human environments (WISNER, 1995, 1997).

Developed initially within ergonomics, anthropotechnology was articulated by Alain Wisner as an approach to analyzing technology transfer across cultural and sociotechnical contexts. Wisner argued that technological systems designed in industrialized nations often failed when transferred to developing countries because cultural, organizational, and environmental conditions were disregarded (WISNER, 1995, 1997). Wisner (1995, p. 1551) explains that the ergonomics of technology transfer was called anthropotechnology:

> “In order to underline the fact that knowledge that is useful when dealing with difficult questions of the transfer belonged to collective human sciences and not to individual human sciences, as is the case for ergonomics.”

The approach was thus constituted as a comparative and corrective framework for adapting transferred technologies to local realities (GESLIN, 1997; WISNER, 1997).

During the 1990s and early 2000s, the approach was methodologically consolidated and applied beyond its original industrial setting. Hendrick (1997) proposed using macroergonomics alongside anthropotechnology and ergonomic work analysis in technology transfer, arguing that the three are complementary: macroergonomic sociotechnical analysis assesses the culture and environment of both supplier and recipient countries, while anthropotechnology and ergonomic work analysis address the workforce's ethnological characteristics and the design of individual tasks. Anthropotechnology was therefore situated within a broader methodological repertoire rather than becoming a macro-level framework itself. Empirical applications in the same period extended the approach to the transfer of analytical methods (BINDER; DE ALMEIDA; MONTEAU, 1999) and to hospital services (SOUSA; PROENÇA, 2004). A subsequent body of work reflected on Wisner's legacy and emphasized the political and transformative character of anthropotechnological practice, framing it not merely as a methodological tool but as an epistemological position (CLOT, 2006; DANIELLOU, 2006; DWYER, 2006; GESLIN, 2006).

In parallel, and without reference to this literature, the English term anthropotechnology came to be used in two additional senses. In the philosophy of technology, it translates Peter Sloterdijk's Anthropotechnik and denotes practices of human self-formation, environmental design, and anthropogenesis (BLAD, 2010; MUGERAUER, 2016). In francophone bioethics, it names one term in a three-part taxonomy developed after Hottois and Goffette to replace the vocabulary of “enhancement medicine” (ALLOUCHE, 2015). These uses are not extensions of Wisner's approach; as Section 3.2 documents, they do not cite it.

More recently, the ergonomic lineage has been mobilized in studies of science and technology policy in Latin America (GOMES; KOVALESKI, 2017), in offset-based transfer in public health (GOMES et al., 2021), in technology transfer in the Industry 4.0 era (KOVALESKI; PICININ; KOVALESKI, 2022), in virtual reality training (SAID; ABDULLAH, 2025), and in augmented-reality-mediated emergency work (BAUDIN; MAILLARD, 2021). This diffusion across domains, combined with the independent philosophical and bioethical uses of the same word, has produced a situation in which the term denotes ergonomic adaptation, political governance of transfer, philosophical accounts of human self-production, or a class of bodily interventions, depending on who is writing.

Despite this dispersion, existing reviews remain domain-bound. The most recent, Kovaleski and Picinin (2022), systematically review anthropotechnological aspects of technology transfer in the Industry 4.0 era, but their search string was restricted to English and French forms of the term, and they do not address its use outside that setting. No synthesis yet reconstructs the development of anthropotechnology across the disciplines in which the term circulates, and none has tested whether those uses are related at all. Existing studies assume relatedness based on a shared name.

This article addresses that gap through a systematic literature review. Three questions guide the study: (1) how has the term anthropotechnology been defined and used in the retrieved literature; (2) do these uses constitute one developing field or several unrelated ones; and (3) what research directions follow from the answer to (2)? The second question is treated empirically rather than assumed, by examining what each source cites to justify its use of the term.

By distinguishing what has developed cumulatively from what merely shares a name, the review contributes a conceptual map that allows readers of this literature to identify which sense of the term is in play in a given study, and it identifies terminological clarification as a precondition for any genuinely interdisciplinary program in this area.

2. Methodology

This study employs a systematic literature review to trace the development, conceptual transformations, and emerging research trends associated with the term anthropotechnology. The review integrates dispersed contributions from ergonomics, the sociology of work, philosophy of technology, bioethics, education, and innovation policy through qualitative conceptual analysis and cross-citation analysis. The methodological approach follows the PRISMA 2020 guidelines (PAGE et al., 2021) for transparency in source identification, screening, eligibility assessment, and inclusion.

2.1 Search strategy and data sources

The literature search was conducted in Scopus and Web of Science, complemented by ScienceDirect, using combinations of the following keywords: (“anthropotechnology” OR “anthropotechnologie” OR “antropotecnologia” OR “antropotecnología”). Equivalent terms in English, French, Spanish, and Portuguese were included to capture terminological and linguistic variation. The search was not restricted by discipline to reflect the term's interdisciplinary circulation. All references were managed with Mendeley v1.19.8, and

duplicates were removed before screening. Database searching was complemented by hand-searching two thematic journal issues in which the concept was collectively reassessed (Le Travail Humain, v. 60, n. 3, 1997; Travailler, n. 15, 2006) and by backward citation chasing from Wisner (1995) and Geslin (2006), which retrieved records not indexed in the databases listed above.

2.2 Inclusion and exclusion criteria

Articles were included and excluded according to the criteria in Table 1.

Table 1 – Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
-Explicitly addressed anthropotechnology or anthropotechnics as a central analytical concept;	-Mentioned the term only as a keyword without conceptual development;
-Contributed to its theoretical, methodological, historical, or applied development;	-Used the concept tangentially without analytical contribution;
-Were peer-reviewed academic publications;	-Focused solely on general technology transfer without anthropotechnological framing.
Fell within the temporal scope (1970–2025).	

Source: The authors, 2026.

2.3 Screening and selection process

The review followed the four PRISMA stages. Identification: database searching, hand-searching, and citation chasing, followed by duplicate removal. Screening: title and abstract review to assess conceptual relevance. Eligibility: full-text assessment against the criteria in Table 1. Inclusion: final selection of the studies forming the analytical corpus. Screening and coding were carried out by one reviewer and discussed with the co-authors; they were not independently duplicated, and the implications of this are addressed in Section 4.6.

2.4 Analytical framework

To enable systematic synthesis, each included study was coded for: year of publication; disciplinary affiliation; the definition of anthropotechnology it adopts; the theoretical lineage it invokes; the sources it cites for the term; level of analysis (micro, meso, macro, ontological); normative orientation (descriptive, critical, transformative); and thematic focus. The fifth of these categories supports the cross-citation analysis reported in Section 3.2, which is the principal analytical instrument of this review: for each included study, the reference list was examined for citations to Wisner, ergonomics, technology transfer, and Sloterdijk, and the resulting citation relations were mapped.

3. Results

The results are presented in three parts. First, the outcomes of the search and selection process are reported. Second, the cross-citation analysis defines the corpus structure. Third, the development of each identified lineage is reconstructed.

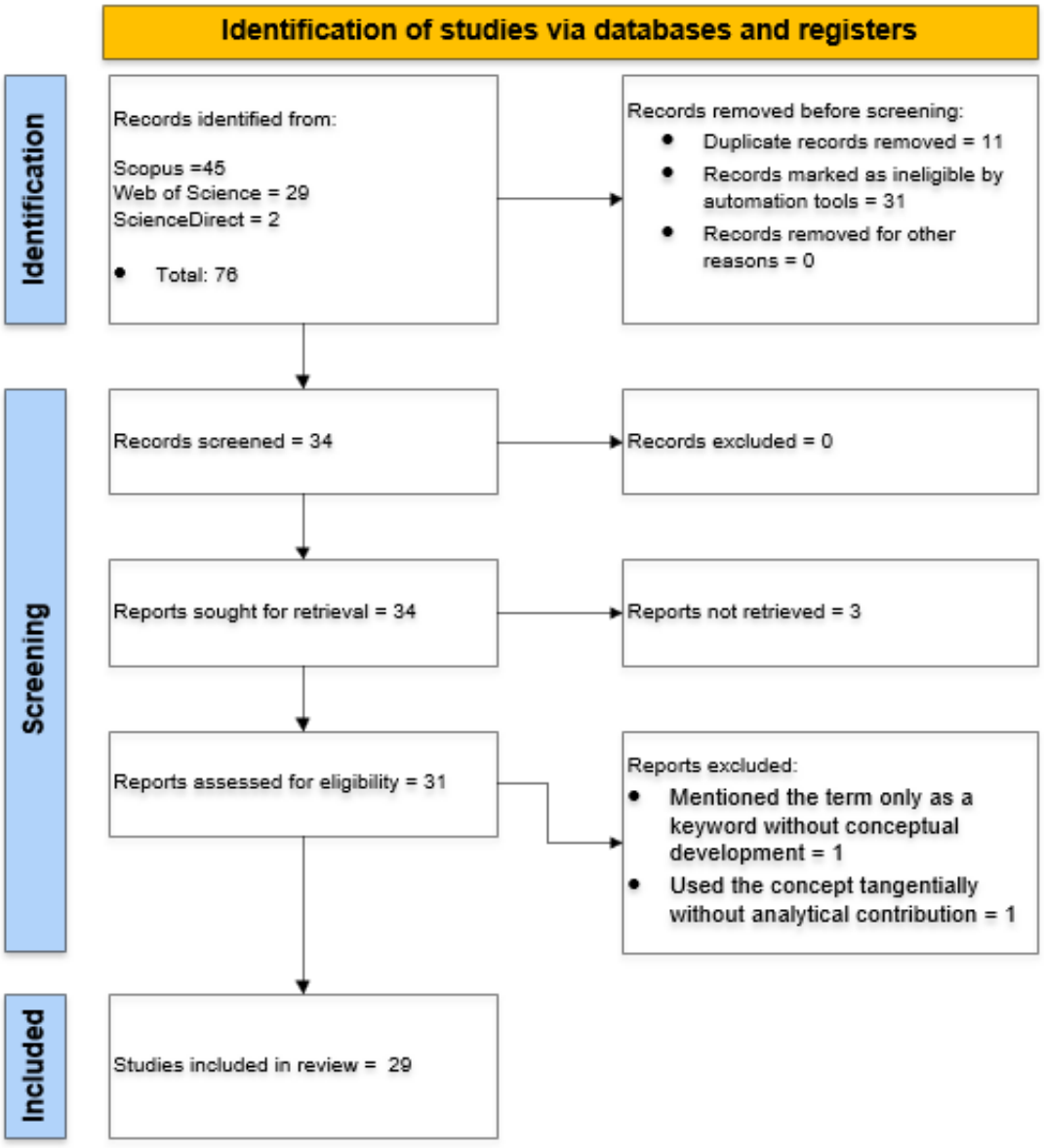
3.1 Search outcomes and composition of the corpus

The search across the selected databases identified 76 records, comprising 45 from Scopus, 29 from Web of Science, and 2 from ScienceDirect. Before screening, 11 duplicate records were removed, and 31 records were identified as ineligible by automated tools; no records were removed for other reasons. Consequently, 34 records were screened at the initial stage, with none excluded. Subsequently, 34 reports were sought for retrieval, of which 3 could not be retrieved, resulting in 31 reports assessed for eligibility. During the eligibility assessment, 2 reports were excluded: one mentioned the term only as a keyword without providing conceptual development, whereas the other used the concept

only tangentially and did not provide an analytical contribution. Therefore, the final corpus comprised 29 studies included in the review. Figure 1 presents the PRISMA 2020 flow diagram summarizing the study identification, screening, eligibility assessment, and inclusion process.

The retrieved corpus spans 1989 to 2025. It is heterogeneous in genre, comprising journal articles, a book chapter, empirical case studies, and commemorative essays, and in language, comprising English, French, Portuguese, and Spanish sources. Two features of its composition bear directly on the analysis that follows. First, no work by Wisner earlier than 1995 was retrieved: the foundational statements of anthropotechnology appeared as monographs, notably *Quand voyagent les usines* (1985) and *Anthropotechnologie: vers un monde industriel polycentrique* (1997), both cited repeatedly within the corpus, rather than as indexed articles, and were therefore not captured by the search. The period before 1989 is consequently reconstructed here from retrospective and secondary accounts rather than from primary sources, a limitation returned to in Section 4.6. Second, the corpus divides into three groups of sources that, as the next section shows, do not cite one another.

Figure 1 – PRISMA 2020 flow diagram



Source: The authors, based on Page et al. (2021).

3.2 One term, three lineages: cross-citation analysis

The central finding of this review is negative. Examination of the reference lists of all included studies shows that sources using the term anthropotechnology fall into three groups with no citations between them in either direction.

The first and largest group descends from Wisner. Every source in it cites Wisner directly or cites an author who does, and every source in it treats anthropotechnology as concerned with the encounter between a technical system and the collective, cultural, and environmental conditions of the place where it is installed. This group includes the methodological statements (WISNER, 1995, 1997; GESLIN, 1997, 2006; HENDRICK, 1997), the epistemological essays (CLOT, 2006; DANIELLOU, 2006; DWYER, 2006), the empirical applications (BINDER; DE ALMEIDA; MONTEAU, 1999; SOUSA; PROENÇA, 2004; CARVALHO, 2012; GARRIGOU; BALDI; JACKSON, 2012; SALDANHA; ALMEIDA, 2012; DE SOUZA; LIMA; VARELLA, 2021; GOMES et al., 2021; SAID; ABDULLAH, 2025), the policy and innovation studies (GOMES; KOVALESKI, 2017; DA LUZ; KOVALESKI; DE ANDRADE JÚNIOR, 2016a, 2016b; KOVALESKI; PICININ; KOVALESKI, 2022), the studies of digitally mediated work (BAUDIN; MAILLARD, 2021), and the educational work discussed in Section 3.3.4 (DURAND, 2014; POIZAT; DURAND; THEUREAU, 2016). No source in this group cites Sloterdijk.

The second group takes the term from Sloterdijk. Blad (2010) reconstructs the anthropogenetic argument of the Sphären trilogy as a claim about human evolution; Mugerauer (2016) applies the same source material to environmental design and architectural theory, explicitly describing anthropotechnology as “Sloterdijk's word”; and Caro Plaza (2023) discusses the same material in Spanish under the cognate form antropotécnicas. None of the three cites Wisner, ergonomics, or technology transfer, and none cites either of the other two.

The third group is bioethical. Allouche (2015) proposes anthropotechnology as a replacement for the expression “enhancement medicine”, deriving the term not from Wisner or Sloterdijk but from Hottois and Goffette, and constructing an explicit three-part taxonomy: anthropotechny is the umbrella category covering all possible technical modifications of the human body; anthropotechnology is the part of it grounded in modern scientific methodology; and anthropotechnics covers the remaining non-therapeutic bodily practices found across cultures. Sloterdijk appears in this chapter only in a footnote recording the 1999 controversy over his use of Anthropotechnik; Wisner and ergonomics do not appear at all.

Three consequences follow. First, the apparent interdisciplinary breadth of anthropotechnology is not evidence of a concept that traveled between disciplines; it is evidence of a word that was coined more than once. Second, claims about the development of “the field” can be sustained only within a lineage, not across the corpus, and the remainder of this section is organized accordingly. Third, the distinction most often drawn in this literature, between “anthropotechnology” and “anthropotechnics” as two terms with different emphases, does not describe the actual source of the ambiguity, which is that one English word carries three unrelated referents. This is developed in Section 4.4.

3.3 Development within the ergonomic lineage

Within the Wisnerian lineage, the corpus documents a cumulative development in which later work cites and extends earlier work to new objects. Four moments can be distinguished. They are thematic rather than strictly chronological: their date ranges are indicative, they overlap, and individual studies may bear on more than one.

3.3.1 Foundation: the ergonomics of technology transfer (to 1990)

The founding formulation defines anthropotechnology as the ergonomics of technology transfer and reorients analysis from the individual operator to what Wisner (1995, p. 1551) terms the “collective human sciences”. Its method is comparative: ergonomic work analysis of critical points in the technical system as operated in the selling country, ergonomic work analysis of a similar system in the buying country, comparison of the two, and installation by mixed teams followed by further analysis (WISNER, 1995; HENDRICK, 1997). The concern is with the geographic, historical, and ethnological determinants of whether a transferred system works where it is put.

Because no primary source from this period was retrieved, the characterization above rests on Wisner's own retrospective accounts (WISNER, 1995, 1997) and on secondary descriptions (GESLIN, 1997; HENDRICK, 1997). The one retrieved contemporary source, Meese and Hill (1989), is a survey of ergonomics in Southern Africa that refers to Wisner's notion of “anthropotechnological islands” in two sentences; it documents that the term was in circulation by 1989 but makes no conceptual contribution to it, and it is reported here on that limited basis only.

3.3.2 Methodological consolidation and extension of the object (1997–2012)

During this period, the approach was methodologically specified and tested on objects beyond its original industrial setting. Hendrick (1997) proposed integrating macroergonomics with anthropotechnology and ergonomic work analysis, arguing that the conceptually top-down sociotechnical methods of macroergonomics assess the culture and environment of both the seller and the buyer country, while anthropotechnology and ergonomic work analysis supply the ethnological characteristics of the workforce and the design of individual jobs. The proposal is explicitly one of complementarity: macroergonomics is offered as an addition to anthropotechnology, not as a transformation of it.

Three features of this moment in the lineage are analytically significant. First, the object of transfer broadened from machinery to methods: Binder, De Almeida and Monteau (1999) used anthropotechnology to analyze the Brazilian Ministry of Labour's attempt to impose the French causal-tree method of accident analysis on Brazilian firms, concluding that the method's suitability varied systematically with the firm's existing safety conditions. Second, the setting broadened from manufacturing to services: Sousa and Proença (2004) applied the comparative method to the work of dietitians in a French and a Brazilian hospital, finding that the two work situations were shaped directly by the characteristics of their external environments. Third, and in tension with the North–South framing of the founding formulation, Garrigou, Baldi and Jackson (2012) analyzed pesticide use in French viticulture as a poorly controlled technology transfer within an industrialized country, and recorded that anthropotechnology had given rise to a distinct offshoot, ergotoxicology. The transfer problematic is therefore not confined to transfers between countries at different levels of industrialization. Garrigou and colleagues published in 2012, but their contribution belongs analytically here, with the extension of the transfer object, rather than with the contemporary applications treated in Section 3.3.4.

3.3.3 Epistemological and political reflection (1997–2006)

The 2006 issue of Travailler devoted to Wisner's legacy situates anthropotechnology within debates in the sociology of work and the social studies of science. Geslin (2006) characterizes anthropotechnological practice as inseparably political and scientific, arguing that the practitioner's position in the field is itself an object of analysis. Clot (2006) reads Wisner's work as a deliberately unfinished itinerary, with disputes among successors serving as evidence of its openness rather than of its incoherence. Daniellou (2006) reconstructs Wisner's epistemological commitments, particularly the primacy he accorded to the transformative project of ergonomics over disciplinary boundaries. Dwyer (2006)

examines the proximity and distance between Wisner's work and the sociology of work, arguing that the results of ergonomic work analysis and of anthropotechnology are compatible with the methods of phenomenological sociology. Collectively, these essays establish anthropotechnology as an epistemological position, not merely a method, a reading anticipated a decade earlier by Geslin (1997), who examined the concealed kinship between the ethnographer's and the anthropotechnologist's relation to the field.

3.3.4 Contemporary applications (2012–2025)

Recent work applies the Wisnerian apparatus to new objects across four settings. In science and technology policy, Gomes and Kovaleski (2017) argue that Brazilian policy instruments neither promote transfer nor provide tools for analyzing it, and propose the notion of “anthropotechnological acclimatization” to adapt policy to local realities. The same group subsequently applied the approach to an offset-based transfer of radiotherapy equipment in Brazilian public health, showing how contextual and organizational particularities conditioned the program's development (GOMES et al., 2021). In innovation studies, Da Luz, Kovaleski and De Andrade Júnior (2016a, 2016b) examine the role of anthropotechnology in knowledge and technology transfer during the formation of academic spin-offs.

In urban and artisanal settings, the scale of application expanded in both directions. Carvalho (2012) proposes ERGOPOLIS, combining anthropotechnology with macroergonomics, resilience engineering and the situated economy to address the city as a sociotechnical system, and Saldanha and Almeida (2012) use anthropotechnology together with sociotechnical construction to design a drawing workshop for bobbin-lace makers in Ponta Negra, Brazil. De Souza, Lima and Varella (2021) return the approach to its original object, analyzing the transfer of European materials recovery facilities to São Paulo through anthropotechnological and ergonomic work analysis.

In digitally mediated work, three studies apply the approach to technologies that did not exist when it was formulated. Kovaleski, Picinin and Kovaleski (2022) review technology transfer in the Industry 4.0 era and argue that the challenges identified in that literature, organizational, educational, cultural, governmental and human-capital, are precisely those an anthropotechnological study addresses. Said and Abdullah (2025) analyze the sociotechnical block, specifically communication, in a France–Malaysia transfer of a virtual reality training system for aerospace manufacturing. Baudin and Maillard (2021) study augmented vision in firefighting, combining the anthropotechnological approach with embodied cognition to examine the sensory and bodily dimensions of augmented-reality-mediated activity. The first two apply Wisner's transfer framework to a new object without revising it; the third revises the apparatus, situating anthropotechnology within technical, cognitive and sensory anthropology rather than within activity-centered ergonomics, and it is the clearest instance in the corpus of conceptual rather than merely applicational development.

In education, Durand (2014) describes the Néopassaction video-training platform as both product and witness of an “anthropotechnology in education”, understood as the joint conduct of empirical and technological research in which designed artifacts validate or invalidate theoretical presuppositions. Durand's article does not cite Wisner, and read alone it would appear to be a fourth independent coinage. Poizat, Durand and Theureau (2016), however, develop the same program and cite both Wisner and Geslin for the anthropotechnological approach, identifying it as the spatial, organizational, cultural and temporal broadening of course-of-action research. The educational use is therefore connected to the ergonomic lineage, and it is the one documented instance in the corpus of the Wisnerian approach being carried into a domain that is neither industrial nor concerned with transfer between countries.

3.4 The Sloterdijkian lineage

The second lineage reads Sloterdijk's Sphären trilogy and Nicht gerettet, in which anthropotechnology denotes the ensemble of hard and symbolic techniques that, on his account, produced the modern human being. Blad (2010) assesses Sloterdijk's claim that technology has genetic effects against evidence from comparative genomics and epigenetics, treating anthropotechnology as a mechanism of human evolution. Mugerauer (2016) develops the spatial argument of the same trilogy, spheres of immunization, co-isolation, and foams, into a program for architecture, planning, and urban design, in which anthropotechnology denotes the sheltering production of physical and cultural environments. Caro Plaza (2023) examines modern antropotécnicas against a metaphysical account of human nature drawn from Rosmini and Stein, in dialogue with transhumanism. Together, the three address human evolution, environmental design, and philosophical anthropology; what unites them is a common source rather than a common object, and none cites the others.

3.5 The bioethical lineage

The third lineage is represented in the corpus by a single item. Allouche (2015) argues that “enhancement medicine” is conceptually untenable because it presupposes the very boundary between therapy and improvement that it is meant to describe, and proposes the vocabulary of anthropotechny, anthropotechnics and anthropotechnology in its place, following Hottois and Goffette. The relevant point for this review is that the lineage supplies the only explicit and stipulative definition of anthropotechnology in the corpus, and that its definition, technical modification of the human body by means grounded in modern scientific methodology, is unrelated to both other senses of the word.

3.6 Comparative synthesis

Table 2 summarizes the three lineages and, for the ergonomic lineage, the four moments distinguished above. Reading across the rows shows what the shared name conceals: three different objects of analysis, three different theoretical anchorages, and three disjoint citation communities. Read down the first four rows, it shows the one development the corpus does support.

Table 2 – Lineages of anthropotechnology and their development in the retrieved corpus (1989–2025)

Lineage / period	Source of the term	Object of analysis	Level of analysis	Theoretical anchors	Studies in the corpus
Ergonomic lineage I. Foundation (to 1990)	Wisner (anthropotechnologie)	Failure of transferred industrial systems in industrially developing countries	Micro, with collective and national determinants	Ergonomics, activity analysis, ethnology	Retrospective accounts: Wisner (1995, 1997); circulation attested by Meese and Hill (1989)
Ergonomic lineage II. Consolidation and extension of the object (1997–2012)	Wisner	Transfer of methods and of service technologies; transfer within industrialized countries	Micro to meso	Ergonomic work analysis; macroergonomics as a complement; ergotoxicology as an offshoot	Hendrick (1997); Geslin (1997); Binder, De Almeida and Monteau (1999); Sousa and Proença (2004); Garrigou, Baldi and Jackson (2012)
Ergonomic lineage III. Epistemological and political reflection (1997–2006)	Wisner	The practice of anthropotechnology itself	Meta	Sociology of work, social studies of science	Clot (2006); Daniellou (2006); Dwyer (2006); Geslin (2006)

Lineage / period	Source of the term	Object of analysis	Level of analysis	Theoretical anchors	Studies in the corpus
Ergonomic lineage IV. Contemporary applications (2012–2025)	Wisner	Policy instruments, innovation systems, cities, artisanal work, digitally mediated work, training systems	Micro to macro	Innovation policy, Industry 4.0, embodied cognition, sensory anthropology	Carvalho (2012); Saldanha and Almeida (2012); Da Luz, Kovaleski and De Andrade Júnior (2016a, 2016b); Durand (2014); Poizat, Durand and Theureau (2016); Gomes and Kovaleski (2017); Baudin and Maillard (2021); De Souza, Lima and Varella (2021); Gomes et al. (2021); Kovaleski, Picinin and Kovaleski (2022); Said and Abdullah (2025)
Sloterdijkian lineage (2010–2023)	Sloterdijk (Anthropotechnik)	Human self-formation, anthropogenesis, environmental and architectural design	Ontological	Philosophical anthropology, philosophy of technology	Blad (2010); Mugerauer (2016); Caro Plaza (2023)
Bioethical lineage (2015)	Hottois and Goffette (anthropotechnie)	Technical modification of the human body; the vocabulary of enhancement	Conceptual / taxonomic	Continental philosophy of medicine, bioethics	Allouche (2015)

Source: The authors 2026

Within the ergonomic lineage, three transformations can be identified, each evidenced by specific sources rather than asserted.

a) Widening of scale and setting: from the industrial workstation and the North–South transfer of machinery (WISNER, 1995) to the transfer of analytical methods (BINDER; DE ALMEIDA; MONTEAU, 1999), hospital services (SOUSA; PROENÇA, 2004), transfers within industrialized countries (GARRIGOU; BALDI; JACKSON, 2012), artisanal production (SALDANHA; ALMEIDA, 2012), the city (CARVALHO, 2012), national policy instruments (GOMES; KOVALESKI, 2017) and professional training systems (DURAND, 2014; POIZAT; DURAND; THEUREAU, 2016).

b) Epistemological deepening: from applied comparative intervention toward explicit reflection on the practitioner's position and on the political character of the practice (GESLIN, 1997, 2006; CLOT, 2006; DANIELLOU, 2006; DWYER, 2006).

c) Disciplinary differentiation: the emergence of adjacent specialties and articulations, ergotoxicology (GARRIGOU; BALDI; JACKSON, 2012), the integration with macroergonomics (HENDRICK, 1997; CARVALHO, 2012), and the articulation with embodied cognition and sensory anthropology (BAUDIN; MAILLARD, 2021).

What the corpus does not support is a fourth transformation of the kind often asserted, in which the ergonomic concept itself broadened into an ontological account of human self-formation. That account exists in the literature, but it belongs to a different lineage and was reached by a different route.

4. Discussion

4.1 What expanded, and what did not

The historical reconstruction supports a narrower claim than the one the shared vocabulary invites. Within the ergonomic lineage, anthropotechnology expanded in scale, setting, and epistemological self- awareness while retaining a stable core: the analysis of what happens when a technical system designed under one set of collective, cultural, and environmental conditions is installed under another. Every application reviewed in Section 3. 3.3 is recognizably an instance of that problem, whether the system in question is a mechanized sorting plant, a causal- tree method, a radiotherapy program, or a virtual reality trainer.

Two claims frequently made about this literature do not withstand examination. The first is that anthropotechnology became a macro- level or governance framework. Hendrick (1997) proposed macroergonomics precisely because anthropotechnology did not supply that level of analysis, and Carvalho (2012) likewise combines anthropotechnology with macroergonomics rather than treating the former as sufficient. What the policy literature (GOMES; KOVALESKI, 2017; GOMES et al., 2021) demonstrates is that anthropotechnological analysis can be brought to bear on the assessment of policy instruments, which is not the same as the concept having become a theory of governance. The second is that the term' s presence in philosophical work evidences an ontological broadening of the ergonomic concept. Section 3. 3.2 shows that the philosophical literature reached its position without reference to the ergonomic literature and could not have broadened it.

The one clear case of conceptual, as opposed to applicational, development in the recent corpus is Baudin and Maillard (2021), who relocate anthropotechnology from activity-centered ergonomics to technical, cognitive, and sensory anthropology and articulate it with embodied cognition to analyze perception under augmented reality. This suggests that where the ergonomic lineage is currently generating new theory, it is doing so through contact with anthropology and cognitive science rather than through contact with the philosophy of technology.

4.2 Epistemological status within the ergonomic lineage: method, program or position?

A genuine tension exists within the Wisnerian lineage over the status of anthropotechnology. Some sources treat it as a methodological toolkit embedded in ergonomic practice, defined by the comparative procedure described in Section 3.3.1 (WISNER, 1995; HENDRICK, 1997; SAID; ABDULLAH, 2025). Others treat it as a politically engaged and epistemologically situated research program in which the analyst's position is part of the object (GESLIN, 1997, 2006; CLOT, 2006; DANIELLOU, 2006; DWYER, 2006). The two readings are not incompatible, but they impose different obligations: the first can be assessed by whether the procedure was followed, the second by whether the analyst's relation to the field was made explicit. Studies in the corpus rarely declare which obligation they accept, and the methodological sections of the recent applied work are generally thinner on this point than the 1997 and 2006 essays would require.

This is a tension within one tradition and should not be confused with the divergence documented in Section 3.2. The question of whether anthropotechnology is a method or a program is a live disagreement among scholars who read one another. The question of whether anthropotechnology concerns technology transfer or human self-formation is not a disagreement at all; it is a coincidence of vocabulary.

4.3 Adaptation and co-evolution: two literatures, not one progression

It is tempting to arrange the senses of the term as a single progression, running from adapting technologies to local conditions, through the mutual shaping of institutions and

systems, to the co-constitution of humans and technologies. The corpus does not support that arrangement. The adaptation claim is Wisner's (WISNER, 1995), and its institutional extension is Gomes and Kovaleski's (2017). The co-evolutionary claim is Sloterdijk's, reconstructed by Blad (2010) and extended to design by Mugerauer (2016), and it was formulated without reference to the first.

This does not make the juxtaposition uninteresting. The two literatures address a recognizably related question, how far technological environments constitute rather than merely serve their inhabitants, from opposite ends, one from the analysis of situated work and the other from philosophical anthropology. That they have not met is a finding about the organization of scholarship rather than about the question itself, and it identifies an opportunity. But the opportunity is for a comparison that has not yet been made, not for a synthesis that the literature has already achieved.

4.4 Homonymy and terminological ambiguity

The ambiguity in this literature is often framed as a distinction between “anthropotechnology” and “anthropotechnics,” two terms with different emphases. The corpus shows that this framing is inaccurate in two respects. First, the principal ambiguity centers on a single word, not a pair: the English anthropotechnology renders Wisner's anthropotechnologie, Sloterdijk's Anthropotechnik, and Allouche's anthropotechnologie, which denote, respectively, an ergonomics of technology transfer, a practice of human self-formation, and a class of scientifically grounded bodily interventions. Romance-language scholarship compounds this by rendering the Sloterdijkian sense as antropotécnicas (CARO PLAZA, 2023), a form that a reader of the Wisnerian literature would naturally take as a variant of antropotecnologia. Second, the pairing of “anthropotechnology” and “anthropotechnics” is not, in its one explicit source, a matter of differing emphasis at all: Allouche (2015) defines them as disjoint subcategories of anthropotechny, distinguished by whether the intervention rests on modern scientific methodology. Treating them as loose synonyms misrepresents the only source in the corpus that defines them.

Homonymy of this kind has practical consequences. A search on the English term returns three literatures; a reviewer assigned a manuscript from one may assess it against the standards of another; and bibliometric statements about “the field” aggregate incommensurable items. The problem is exacerbated by the fact that the three lineages publish in different venues, ergonomics and production engineering journals, philosophy of technology journals, and bioethics collections, so that a reader is unlikely to encounter more than one of them.

4.5 Toward a research agenda

Four directions follow from the synthesis, with the first serving as a precondition for the others.

a) Terminological clarification. The immediate task is not to extend anthropotechnology to new topics but to determine which sense of the term a given literature uses. Two options are available: formal differentiation, in which each lineage adopts a qualified form (for example, anthropotechnology in Wisner's sense, Sloterdijkian anthropotechnics, bioethical anthropotechny following Allouche's own taxonomy); or deliberate convergence, which would require at least one lineage to argue explicitly for the relevance of another. The first is achievable by editorial convention; the second would be a substantive research contribution and has not yet been attempted (ALLOUCHE, 2015; BLAD, 2010; MUGERAUER, 2016; WISNER, 1995).

b) Anthropotechnology of digitally mediated work. The clearest opening in the ergonomic lineage is the one Baudin and Maillard (2021) begin: extending the analysis from the

transfer of systems between places to the mediation of perception and action by augmented, immersive, and algorithmically governed tools, where the “distance” to be analyzed is no longer only geographical. Existing Industry 4.0 work (KOVALESKI; PICININ; KOVALESKI, 2022; SAID; ABDULLAH, 2025) identifies the setting but retains the original apparatus.

c) Policy and governance integration. The notion of anthropotechnological acclimatization (GOMES; KOVALESKI, 2017) and its application to offset policy (GOMES et al., 2021) indicate a route from workplace analysis to the assessment of policy instruments. What is missing is a specification of how anthropotechnological evidence should enter policy appraisal and of what would count as confirming or disconfirming such an analysis.

d) Comparative cross-cultural analysis under contemporary conditions. The original intercultural transfer paradigm (WISNER, 1995) assumed identifiable seller and buyer countries and a discrete installation event. Distributed development, cloud-delivered systems, and transfers within industrialized countries (GARRIGOU; BALDI; JACKSON, 2012) all strain that assumption and invite its revision.

4.6 Limitations

Five limitations qualify these findings. First, the corpus is small (n = 29) and heterogeneous in genre, spanning journal articles, a book chapter, empirical case studies, and commemorative essays. This restricts the review to qualitative synthesis and precludes bibliometric inference; claims about research trends should therefore be read as descriptions of the retrieved corpus rather than as measurements of a field. Second, screening and coding were carried out without independent duplication, so the identification of lineages and the periodization of the ergonomic lineage are interpretive products that another reader might organize differently. Third, the search string covered the anthropotechnology family of terms but not the cognate forms anthropotechnics, antropotécnica, and Anthropotechnik, so the philosophical and bioethical lineages entered the corpus only where authors used the English form; their representation here is consequently partial, and the bioethical lineage is represented by a single item. Fourth, the databases searched index the anglophone literature more completely than the francophone and Latin American literature, in which much of this work appeared, and several retrieved items were obtained only through hand-searching and citation chasing; Wisner's foundational monographs and an edited volume on anthropotechnology published in 2017 that is cited by Baudin and Maillard (2021) were not themselves retrieved, so part of the primary literature of the ergonomic lineage is represented only indirectly. Fifth, the cross-citation analysis establishes the absence of citation relations within the retrieved corpus only; it cannot exclude the existence of unretrieved work that bridges the lineages, and a negative finding of this kind is contingent on the search.

5. Conclusion

This study set out to reconstruct the development of anthropotechnology across the disciplines in which the term circulates. Its principal finding is that those disciplines do not share a concept. The corpus contains three lineages, Wisner's ergonomics of technology transfer, the Sloterdijkian account of human self-formation, and the francophone bioethical taxonomy after Hottois and Goffette, which use the same English word, define it differently, and do not cite one another in either direction.

Within the ergonomic lineage, which accounts for most of the corpus, a cumulative development is documented. Formulated to explain why industrial systems fail when installed in industrially developing countries, the approach was methodologically specified, extended from machinery to methods, services, artisanal production, cities, and policy instruments, subjected to explicit epistemological reflection, and, more recently, applied to

digitally mediated work. Its core problem has remained constant throughout: what happens when a technical system meets collective, cultural, and environmental conditions other than those for which it was designed.

Three contributions follow. First, historical: the article reconstructs the development of the ergonomic lineage from a dispersed, multilingual literature and identifies the applications and offshoots through which it broadened. Second, terminological: the cross-citation analysis demonstrates that the term's apparent interdisciplinary reach is due to homonymy rather than conceptual continuity and provides the evidence needed to distinguish the three senses in practice. Third, programmatic: the article identifies terminological clarification as the precondition for any genuine interdisciplinary program in this area and sets out the substantive openings, digitally mediated work, policy appraisal, and the revision of the transfer paradigm under contemporary conditions that the ergonomic lineage now faces.

Anthropotechnology should therefore not be described as a single transdisciplinary paradigm spanning ergonomics, philosophy, and policy. It should be described as a well-defined and still productive research approach within ergonomics, which happens to share its English name with two unrelated bodies of work. Recognizing that is the condition for any future convergence between them.

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