

P / REFERENCES OF DESIGN



DESIGN ECOSYSTEM: FUNCTIONING, DIALECTIC, AND BODIES OF KNOWLEDGE.

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DOI: 10.63442/BPDA8638

**KEYWORDS | DESIGN THEORY, DESIGN RESEARCH, DESIGN PHILOSOPHY, TOTAL DESIGN,
METADESIGN**

ABSTRACT | This paper aims to advance Design research methods by introducing the four propositions of the ‘Dialectic of Design’ and understanding the oscillatory tension between Total Design and Metadesign based on the ‘Functioning of Design’ . It argues for a more holistic perspective on Design to genuinely research its discipline. The developed theory is supported by Flusser’s (2012) Design philosophy and guided by Design’s inherently anthropocentrism (Archer, 1979), which emerged in prehistory (Margolin, 2017). It advocates for a paradigm shift inside Design research methods, from a ‘designer-centric’ perspective to a ‘human-centric’ one. This paper proposes a ‘Design Ecosystem’ as a theoretical framework converging Design within itself and with Science and Humanities. It is divided according to the theory’s three main structures, concluding with the ‘Ecosystem’ formulation. A previous MA dissertation (Baldaia, 2021) and the ongoing PhD thesis, Total Design and Metadesign: Implications of a Conceptual and Technological Expansion, support the entirety of this research.

1. Introduction

Design needs a unifying theory. There are increasingly more specialised Design fields, boxing designers into narrower specialisations and struggling to integrate our time's necessary permeability and flexibility. Today's fragmented and often 'designer-centric' perspective on Design (formulated since the discipline began) is problematic. We need a paradigm shift in understanding Design, decentralising it, and taking a more holistic view of Design. This paper proposes a 'Design Ecosystem' as a unifying and more stable theoretical framework, contributing to the advancement of Design research methods. The theory is structured as follows: 'Functioning of Design,' 'Dialectic of Design,' Bodies of Knowledge, and 'Design Ecosystem.'

The 'Functioning' supports the 'Dialectic,' establishing a more comprehensive perspective. The 'Dialectic' configures the 'Design Ecosystem' as a framework for converging Design within and with other bodies of knowledge. Bruce Archer (1979) argued that Design may be a third body of knowledge besides the Sciences and the Humanities, occupied with the material culture and the executive skills that make them. Moreover, he provides an anthropocentric approach towards Design instead of a 'designer-centric' one. Through this multi-level theory, we can holistically frame Design, advancing its research methods and allowing for further investigation of the discipline.

2. Methodology

The theory has a corpus of texts identified by searching for 'total design,' 'metadesign,' 'design ecosystem,' and 'design discipline' (in English and Portuguese) in Design journals such as *Design Issues* and *DRS Digital Library* and also Google Scholar and thesis repositories. It was also considered the broader academic literature, and any reference after 2000 was selected whenever possible. The corpus was analysed following Bürdek's (2015) hermeneutics, focusing on the history and conceptualisations of Total Design and Metadesign. On the triangular frameworks of Design, Costa's (2007) paper helped to compile the most relevant references to cross-reference. Flusser's (2012) insights on Design philosophy also strongly support the theory.

3. Background Research

3.1 Total Design and Metadesign

Total Design traces back to the Arts and Crafts (Margolin, 2017). Nuances exist in recent perspectives. Cruz (2006) links it to blurring natural/artificial boundaries, while Wigley (1998) describes it as 'implosive' and 'explosive,' stating that "all design is total design." Meredith (2008) critiques Wigley, citing the Bouroullec brothers' installations as rejecting totalisation. Holder (2019) expands on Wigley's ideas, suggesting that "all design is interior design," meaning a homogenisation of collective imagination. Ortega (2017) introduces the notion of a 'total designer' as a meta-systematiser, converging Design and technology.

Metadesign's founding interpretations include predating object production (Van Onck, 1965), dematerialisation (Baudrillard, 1981), transcending the anthropogenic (Virilio, 1996), and as an evolutionary process akin to autopoiesis (Maturana, 1997). Wood (2008, 2013, 2022) and Vassão (2008, 2017, 2021) see Metadesign as creating paradigm shifts. The concept lacks a coherent theory, facing issues of vagueness and ambiguity (Giaccardi, 2003; Bentz & Franzato, 2017). Nold (2022) argues for its relevance as a self-reflexive attempt to rethink Design, reacting to contemporary crises (Giaccardi & Fischer, 2008; Backwell & Wood, 2011). Metadesign is used to problematise ecosystems, technology, transition, and decolonisation in Design (Irwin, 2015; Escobar, 2018; Sacchetti, 2022; Colombo et al., 2022).

There is an overall conceptual proximity between Total Design and Metadesign, which is relevant for analysing the expanding discipline and the contemporary role of designers. Chapter 5 explores the dialogical relation between both concepts, contributing to formulating a ‘Design Ecosystem.’

3.2 Triangular Frameworks

Many authors have framed Design's discipline through triangular approaches. Vitruvius' (1st Century) *Firmitas – Utilitas – Venustas*³ concepts and Aristotle's three types of activity diagram (after Keitsch modified it in 2006) may be the oldest triangular conceptions at our disposal. Costa's (2007) book chapter helps to compile the most relevant references of triangular frameworks based on Vitruvius/Alberti: Mijksenaar (2001), Kazmierczak (2003), Leiro (2006), and Providência (2003, 2012)⁴. In this regard, Leerberg's (2009) diagram was also considered. In order to develop a more holistic perspective on Design, the frameworks were cross-referenced on top of Archer's (1979) diagram. The result is explored in Chapter 6.

4. The ‘Functioning of Design’

Design is modeling (Archer, 1979) and projecting simultaneously; one cannot exist without the other. It is a ballistic human activity of throwing artifices into the world (Flusser, 2012). Since prehistory, humans have become highly skilled in throwing things, becoming the best throwers of any species to ever walk on Earth. Researching Design is analysing the way and the attitude in which we transpose any idea to the world, e.g., how we think of a chair until we make/do it. Throwing the idea out of the human mind/spirit is the ballistic essence of Design (modelling/projecting), ending up having to have its own defined body of knowledge (Archer, 1979).

Design functions through three levels (Figure 1): ‘Irradiation’, ‘Extension’, and ‘Amplitude’ (Baldaia, 2023). ‘Irradiation’ is modeling/projecting itself, making ‘things’ and ‘non-things’⁵ appear in the world (pp. 84, 85). ‘Extension’ is Design's phenomenological and praxiological presence, the territory occupied by every ‘Irradiation’ (pp. 85, 86). Design is more ‘Extensive’ the more humanity designs; the more humanity designs, the more it designs over time. Ultimately, this exponential relation also means an exponential rise in cultural complexity. ‘Amplitude’ is the modeling/projecting strength of designing, as each model/project opens new possibilities. It is where we glimpse, design, and meta-design the future (pp. 86, 87). Design is more ‘Ample’ the more ‘Extensive’ it is.

³ This triangular framework is, in fact, more Albertian (1452) than Vitruvian.

⁴ His triangular framework was later analysed by Branco (2014) and by both authors in 2018.

⁵ Everything human-made that is not physical or “impossible to get hold of [...] only open to decoding” (Flusser, 2012, p. 86).

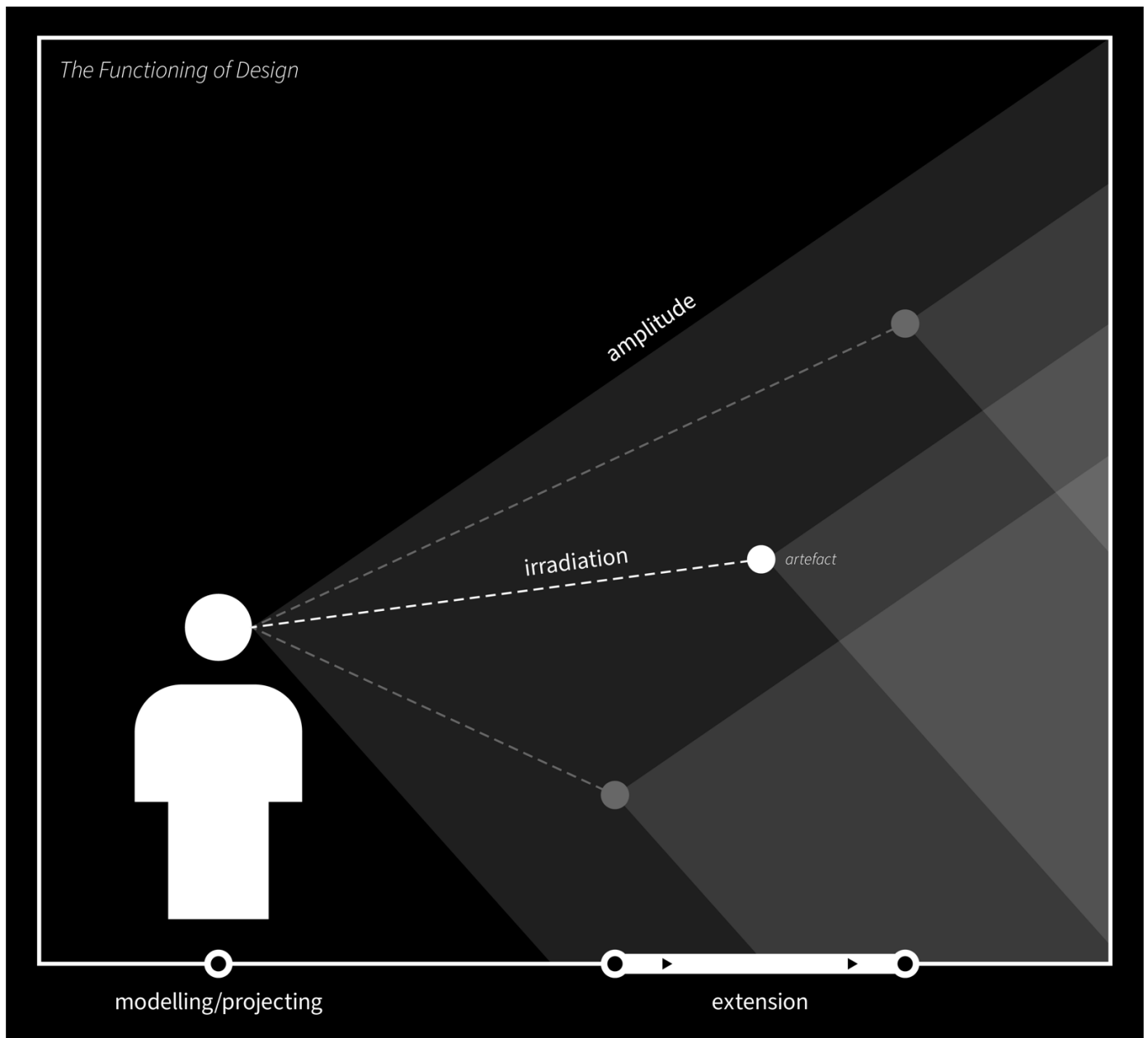


Figure 1. The 'Functioning of Design' through 'Irradiation,' 'Extension,' and 'Amplitude,' beginning with modeling/projecting.

5. The 'Dialectic of Design'

The ballistic 'Functioning of Design' defines the basis of the two fundamental attitudes of Design (Baldaia, 2023; Baldaia & Velez, 2023): Total Design and Metadesign (Figure 2). Total Design exists through the exponential colonising capacity of Design in the world and humanity. Metadesign is mainly present in designing forward while looking both backward and forwards. It is a more dynamic and oscillatory attitude than Total Design, which is usually more linear, conquering new territory without ever losing previous ground.

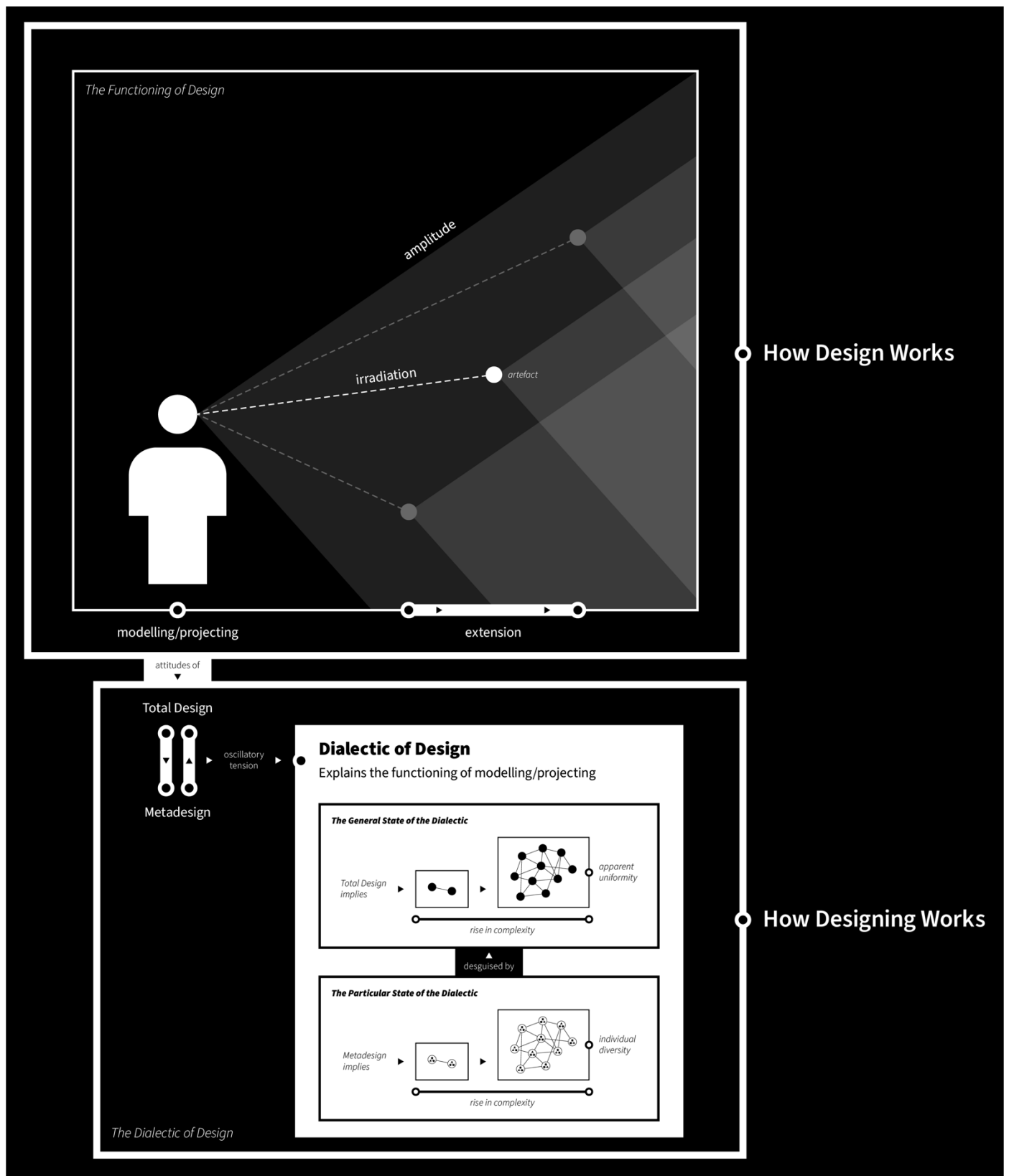


Figure 2. The 'Functioning' and the 'Dialectic' of Design are interconnected.

While modeling/projecting, these two fundamental attitudes relate to themselves through an oscillatory tension (or feedback loop) (Baldaia & Velez, 2023). The result is the 'Dialectic of Design' (Figure 3), which is ever-present while designing. It explains how designing works, another aspect of what Design is, and how it works, integrating the 'Functioning of Design' as a whole. Ultimately, the 'Dialectic' reconciles Total Design and Metadesign towards a synthesis between uniformity and diversity, a more stable homogenisation, and a dynamic heterogenisation.

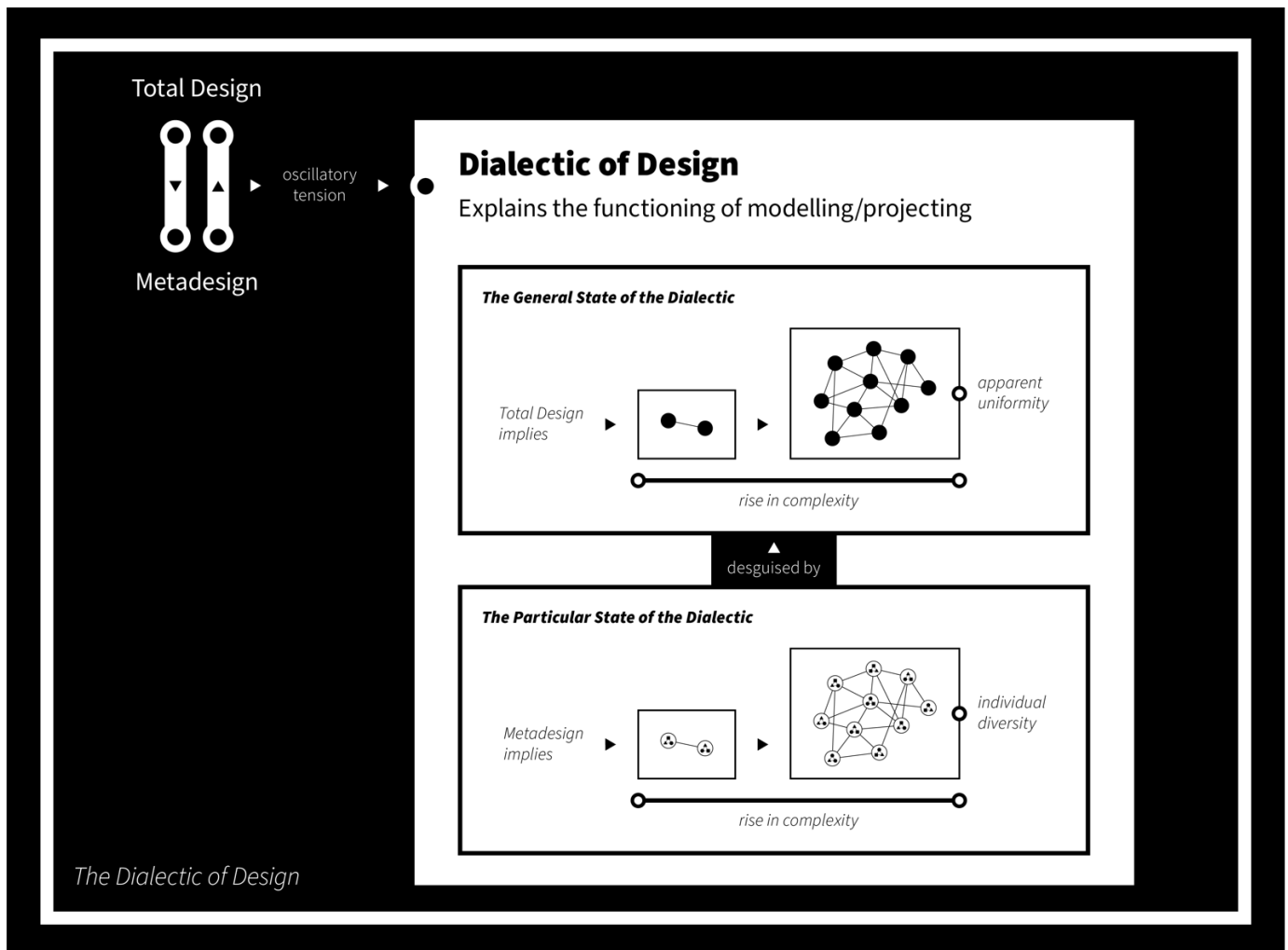


Figure 3. The fundamental states of the 'Dialectic of Design' (second and third propositions).

On the one hand, "all Design is Total Design" (Wigley, 1998), modeling/projecting as a totalizing attitude towards the artificial and cultural world we create, ever-expanding and reaching new possibilities, colonising everything "from the teaspoon to the town" (Rogers, 1952)⁶, "from jeans to genes" (Hal Foster, 2011). On the other hand, Metadesign involves collaboration and participation between multiple parts. It functions as an attitude of self-reflection towards remaking and rethinking traditional Design. The etymology of '-meta'⁷ may indicate that Metadesign has a dynamic attitude while designing. It allows plurality/diversity, dealing with complexity, and expanding Design in a participatory/collaborative way, ultimately supporting a self-reflective perspective towards Design.

Total Design and Metadesign's oscillatory tension support the 'Dialectic' configured by the following propositions:

1. The 'Dialectic of Design' is defined by Total Design and Metadesign's oscillatory tension.
2. **The General State of the 'Dialectic'**: Total Design implies a rise in complexity and apparent uniformity.
3. **The Particular State of the 'Dialectic'**: Metadesign implies a rise in complexity and individual diversity disguised by apparent uniformity.
4. The oscillatory tension between the 'General' and 'Particular' states of the 'Dialectic' supports the emergence of creative synergies.

⁶ In its original Italian, "Dal cucchiaino alla città". It was a slogan created in the Charta of Athens, explaining the typical approach of a Milanese architect.

⁷ It simultaneously means above, behind, or beyond, configuring the dynamic attribute of Metadesign.

The ‘Dialectic’ inherits entropy’s logic: the tendency of energy (Design) to spread out and reach an equilibrium. The ‘General State’ explains the apparent uniformity in all human-made objects through Total Design. We can witness this in any brand’s/designer’s ecosystem, proving inner coherence and even an influence on other designs. It is essential because the ‘Particular State’ discloses what is underlying it. Metadesign allows us to inspect the inner diversity of a model/project’s system. Any Design is made of different parts (methods, graphics, materials, or people), and the appearance of uniformity and coherency disguises them all. This oscillatory tension supports the continuous ‘Functioning of Design’ over time through the emergence of creative synergies.

6. The Bodies of Knowledge

The ‘Ecosystem’ also depends on what surrounds Design and its inner ‘Dialectic,’ i.e., the other bodies of knowledge (Science and Humanities) that permeably relate to Design and vice versa. On top of Archer’s (1979) triangular diagram, ‘Three Bodies of Knowledge,’ we can cross-reference various triangular frameworks attempting to structure Design’s discipline or to converge Design with other bodies of knowledge, allowing us to develop a more holistic perspective on Design.

Since it is reasonable to overlap *Utilitas* on Archer’s Design and *Firmitas* on Science, let us focus on the *Venustas* edge. Being more related to aesthetics and beauty, *Venustas* would not correctly overlap the Humanities. Instead, we may rename it ‘*Significatio*’ (meaning expression, manifestation, and signification), which better represents the Humanities and what that body of knowledge proposes to do and research. Overlapping Aristotle’s three types of activity (Keitsch, 2006) allows us to find a middle ground between *Utilitas*/'*Significatio*' (*Práxis*), *Utilitas*/*Firmitas* (*Póiesis*), and '*Significatio*/'*Firmitas* (*Theoría*) (Figure 4).

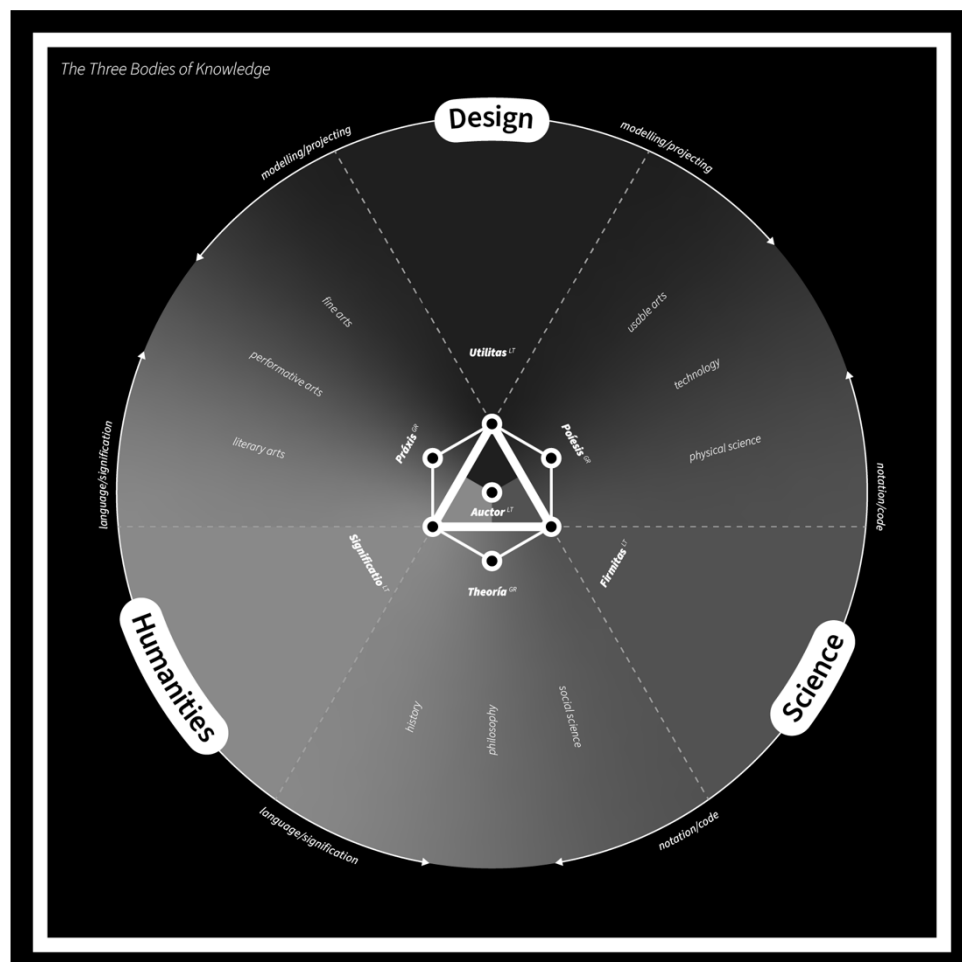


Figure 4. The bodies of knowledge are in an open, interconnected, and expansive system of permeable relations.

Because an author is the one who creates or, as the Latines interpreted it, the one who conquers new territory, it must be at the centre of the diagram representing whoever acts in and through any body of knowledge. Therefore, we have established alongside Archer (1979) how Design is located concerning Science and the Humanities and that the plane of theory (*Theoría*) is what Design continually pursues (Figure 5). Theory may be seen as the archetype of any designer's utopic Design, i.e., the grand model/project in which any other Design could fit without gaps as a perfect Total Design:

“Strong Design presupposes strong theory. Design is [...] the appearance of theory. [...] After all, theory is itself an artwork, something designed. Theorists such as Vitruvius and Alberti insist that the ordering and structure of their respective treatises match that which they prescribe for buildings.” (Wigley, 1998)

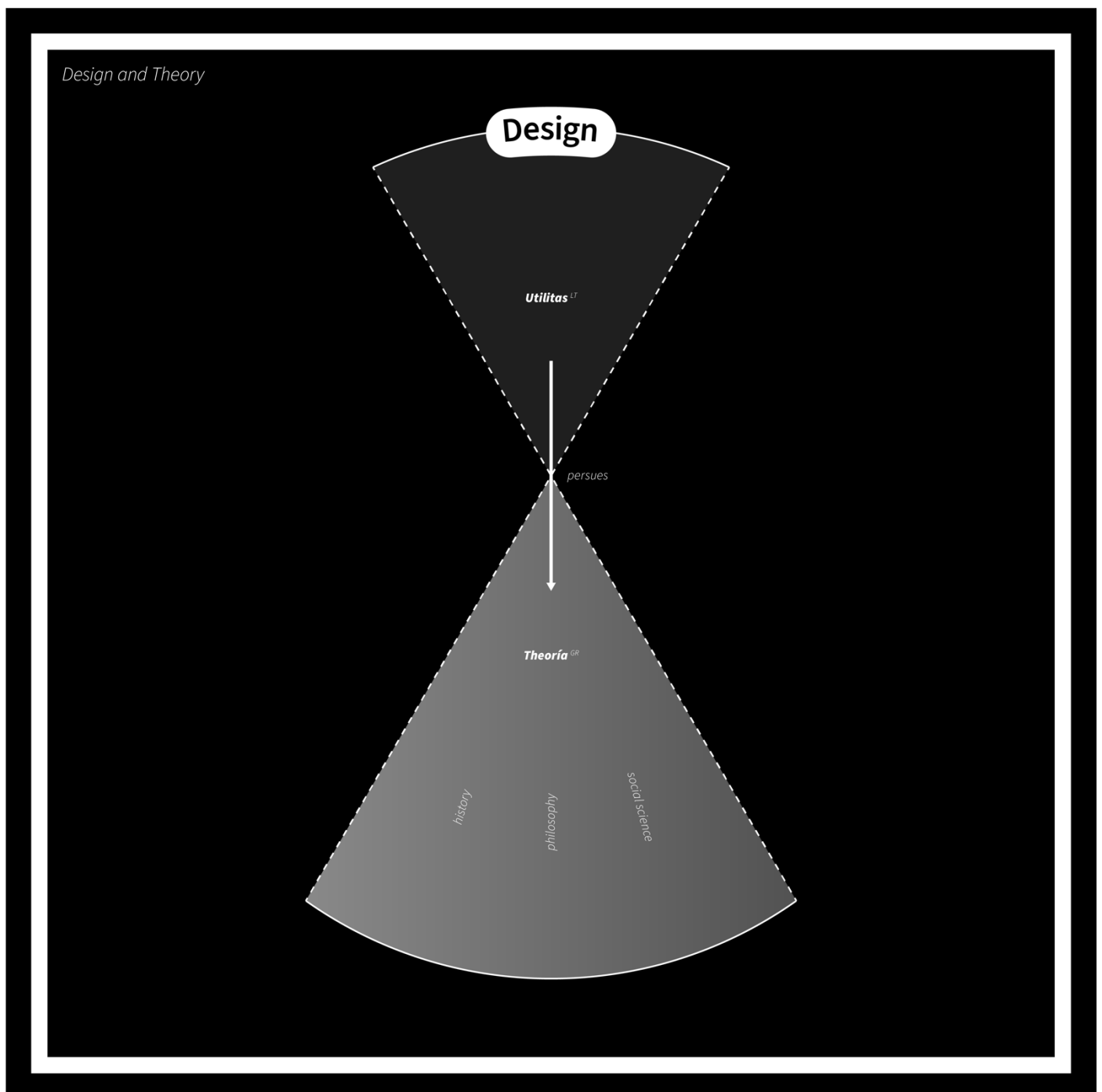


Figure 5. The plane of Design (*Utilitas*) pursues what is mainly theoretical (*Theoría*).

7. Conclusion: A ‘Design Ecosystem’

One can finally and fully framework a ‘Design Ecosystem’ (Figure 6), allowing for further research, e.g., on how design research works within the ‘Ecosystem’ and where/how one could map the discipline and its functioning. The ‘Ecosystem’ embraces all the inner aspects of Design and its relationship with what surrounds it.

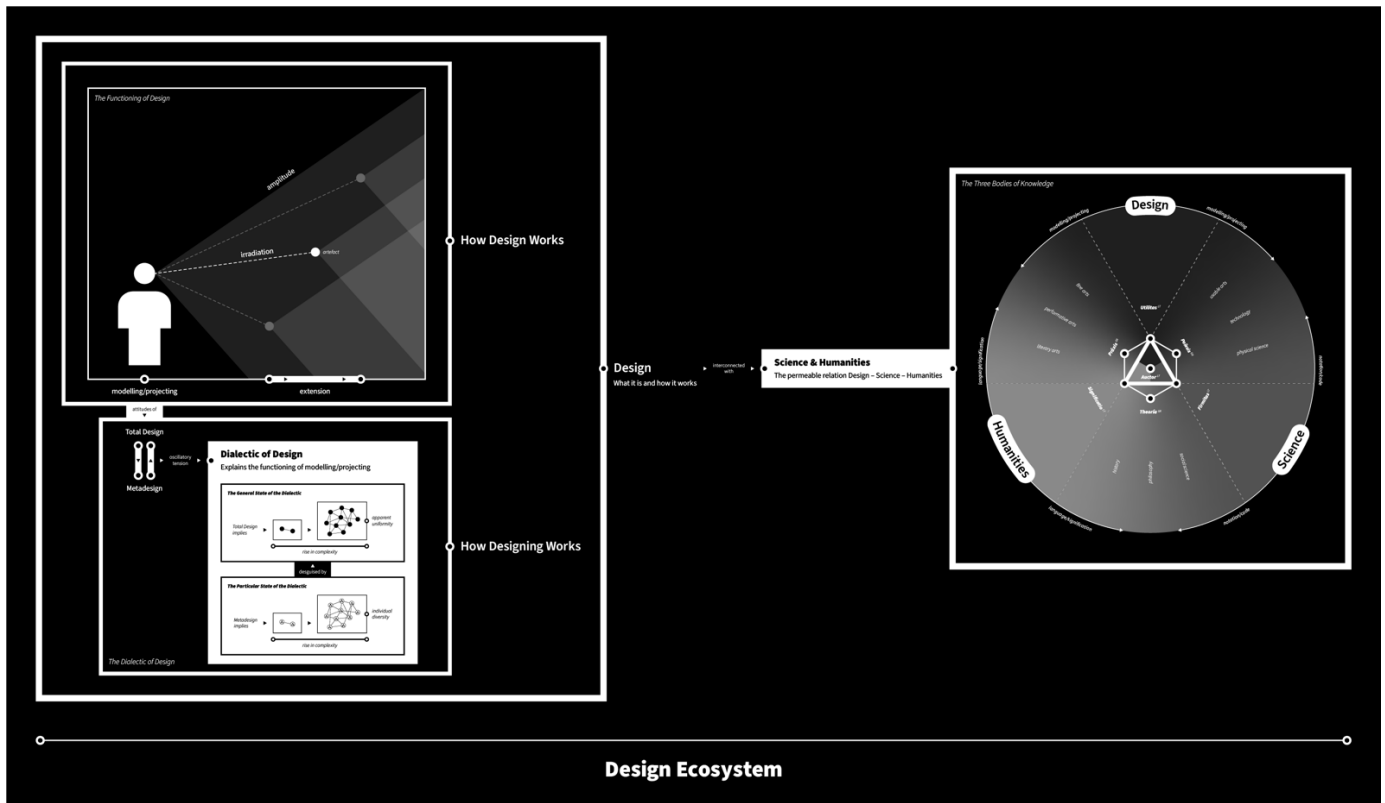


Figure 6. The ‘Design Ecosystem’.

Similarly to biology, the ‘Design Ecosystem’ is an ‘imaginary geography’ (Moura, 2011) where living and non-living parts work together. Its functioning is deeply interconnected to the fact that every individual system is permeable with every other, being intrinsically holistic. While Design is a complex system with its inner functions and oscillatory relations underlying every designing act, it is also inherently interconnected with Science and the Humanities. Designing is not being inside a box labeled ‘Design’ but navigating the other bodies of knowledge, cooperating and contributing while also letting others inside. Even though a broad discipline dedicated to organising and structuring Design’s body of knowledge exists, the ‘Ecosystem’ decentralises it from the ‘expert’ designer (Manzini, 2015) because any human being designs. For a gradual convergence inside Design, every specialised discipline needs a shared core theoretical framework for a more robust and flexible discipline.

Further research is needed to establish a more unified Design theory and true interconnectedness between the bodies of knowledge. We may even involve academics and professionals from other disciplines in this process. Moreover, this theory invokes and supports research on framing the actual Design discipline, its body of knowledge, its methodologies, its practices, and the implications of a conceptual and technological expansion.

References

- Alberti, L. B. (1452). *De re aedificatoria*. <https://resources.warburg.sas.ac.uk/pdf/cnh1015b2214989.pdf>
- Archer, B. (1979). Design as a discipline. *Design Studies*, 1(1), 17–20.
- Baldaia, D. (2021). *A atitude do design total na contemporaneidade: Um estudo sobre realidades virtuais ou «novas naturezas»* [MA Dissertation]. Universidade da Beira Interior.
- Baldaia, D. (2023). How does design work? Study for a design ecosystem. In *UD'22: Metamorphosis. 8th edition of the Doctoral Meeting in Design, Aveiro*. <http://ud22.web.ua.pt>
- Baldaia, D., & Velez, S. (2023). Total design and metadesign: Exploring contemporary perspectives. In *12th International Conference Senses & Sensibility'23: Design and Complexity, Malaga-Lisbon*. <https://senses2023.unidcom-iade.pt/home-en/>
- Backwell, J. L., & Wood, J. (2011). Catalysing network consciousness in leaderless groups: A metadesign tool [PDF]. In *Presence in the Mindfield: Art, Identity and the Technology of Transformation* (pp. 36–41).
- Baudrillard, J. (1981). *For a critique of the political economy of the sign*. Telos Press, Limited.
- Bentz, I., & Franzato, C. (2017). The relationship between strategic design and metadesign is defined by the levels of knowledge of design. *Strategic Design Research Journal*. <https://doi.org/10.4013/sdrj.2017.102.06>
- Branco, V. (2014). Design e investigação em design: Algumas reflexões. In Vilar, E., Aires, E., Providência, F., Alvelos, H., Bártolo, J., Cruz, M. T., Moura, M., Parra, P., Branco, V., & Almeida, V. (Eds.), *Design et al.* (pp. 169–185). Dom Quixote.
- Branco, V., & Providência, F. (2017). Design as cultural mediation between matter and what matters. *The Design Journal*, 21(1), 5–13. <https://doi.org/10.1080/14606925.2018.1396025>
- Bürdek, B. E. (2015). *Design: History, theory, and practice of product design* (2nd ed.). Birkhäuser.
- Busbea, L. (2009). Metadesign: Object and environment in France, c. 1970. *Design Issues*, 25(4), 103–119. <https://doi.org/10.1162/desi.2009.25.4.103>
- Cataldo, R., Crocetta, C., Grassia, M. G., Mazzocchi, P., Rocca, A., & Quintano, C. (2021). Sustainable innovation: The Italian scenario studied through higher-order partial least squares-path modeling. *Social Indicators Research*. <https://doi.org/10.1007/s11205-021-02846-w>
- Colomina, B., & Wigley, M. (2021). *Are we human? Notes on an archaeology of design*. Lars Müller Publishers.
- Cruz, M. T. (2006). O artificial ou a era do «design total». In M. V. Cabral, J. L. Garcia, & H. M. Jerónimo (Eds.), *Razão, tempo e tecnologia: Estudos em homenagem a Hermínio Martins* (pp. 327–340). Imprensa de Ciências Sociais.
- Dilnot, C. (2022). The unthinkable practice of designing. In J. Wood (Ed.), *Metadesigning designing in the anthropocene* (pp. xiv–xxiii). Routledge.
- Escobar, A. (2018). *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds*. Duke University Press. <http://dx.doi.org/10.1215/9780822371816>
- Flusser, V. (2012). *Shape of things: A philosophy of design*. Reaktion Books.

Foster, H. (2011). *Design and crime (and other diatribes)*. Verso Books.

Fuller, R. B. (1997). *Synergetics: Explorations in the geometry of thinking* (E. J. Applewhite, Collab.). Estate of R. Buckminster Fuller. <http://dx.doi.org/10.2307/3103256>

Frayling, C. (1993). Research in art and design. *Royal College of Art Research Papers*, 1(1), 1–5.

Giaccardi, E. (2003). *Principles of metadesign: Processes and levels of co-creation in the new design space* [PhD Thesis]. University of Plymouth.

Giaccardi, E. (2005). Metadesign as an emergent design culture. *Leonardo*, 38(4), 342–349. <http://www.jstor.org/stable/20206081> <https://doi.org/10.1162/0024094054762098>

Giaccardi, E., & Fischer, G. (2008). Creativity and evolution: A metadesign perspective. *Digital Creativity*, 19(1), 19–32. <https://doi.org/10.1080/14626260701847456>

Kazmierczak, E. (2003). Design as meaning-making: From making things to the design of thinking. *Design Issues*, 19(2), 45–59. <https://doi.org/10.1162/074793603765201406>

Maturana, H. (1997). *Metadesign: Human beings versus machines, or machines as instruments of human designs?* INTECO. Retrieved April 3, 2024, from <https://www.inteco.cl/articulos-9>

Vassão, C. A. (2021). *Metadesign: Ferramentas, estratégias e ética para a complexidade*. Editora Blucher.

Wigley, M. (1998). Whatever happened to total design? *Harvard Design Magazine: Design Arts and Architecture*, 5. <https://www.harvarddesignmagazine.org/articles/whatever-happened-to-total-design/>

Wood, J. (2013). Metadesigning paradigm change: An ecomimetic, language-centred approach. In S. Walker & J. Giard (Eds.), *The handbook of design for sustainability* (pp. 428–445). Bloomsbury Academic. <http://dx.doi.org/10.5040/9781474294102.ch-027>

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Acknowledgements: This present study is being researched at the University of Beira Interior at the LabCom research unit (doi.org/10.54499/UIDB/00661/2020) and the iA* Arts Research Unit, being funded by the FCT – Fundação para a Ciência e Tecnologia (2023.04811.BD).

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This contribution was presented at Cumulus Budapest 2024: P/References of Design conference, hosted by the Moholy-Nagy University of Art and Design Budapest, Hungary between May 15-17, 2024.

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ISBN Volume 1: 978-952-7549-02-5 (PDF)

ISBN Volume 2: 978-952-7549-03-2 (PDF)

DOI Volume 1: <https://doi.org/10.63442/IZUP8898>

DOI Volume 2: <https://doi.org/10.63442/TADX4016>

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