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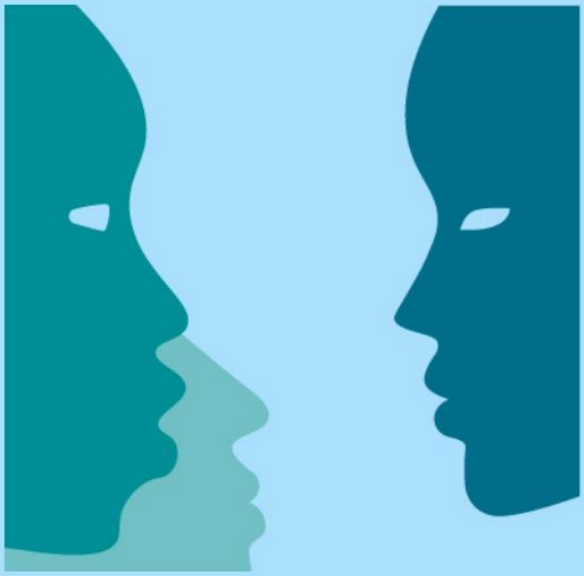
Martin Hoffmann, Achim Lichtenberger, Dorothea Schulz



Münster Working Paper Series in Social and Cultural Anthropology

Universität Münster

Institut für Ethnologie
Dept. of Social and Cultural Anthropology

Münster Working Paper Series in Social and Cultural Anthropology

No. 1, 2026
ISSN 3053-7835

Imprint

Publisher:

Department of Social and Cultural Anthropology
University of Münster
Studtstr. 21, 48149 Münster
Germany

Contact:

anpubl26@uni-muenster.de

Cover Design:

Johanna Schulz

DOI: https://doi.org/10.17879/mwsca-2026-9474

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The temporalities of artifacts. Drafting a research agenda

All artifacts have a temporal dimension: they start to exist at the time of their production, then persist for a certain period of time while fulfilling one or more functions that either coexist synchronously or change diachronically; artifacts can change over the course of their existence; and their existence ends when they pass away or are destroyed. All these processes of artifacts take place in time. Therefore, a central concern of artifact research should be to explore the diverse temporal dimensions of artifacts at once systematically and empirically, by considering historically and regionally specific instances.

Curiously, in spite of considerable inroads made by philosophical artifact theory as well as artifact research in the social sciences and humanities over the past 40 years, the temporal dimension of artifacts has remained a blind spot. The paradox of the "ship of Theseus", intensely debated in philosophy since ancient times, is a prominent example of this scholarly lacunae. According to the legend, already to be found in Plutarch, people of Athens preserved the ship of their king Theseus through constant repairs for a long time, until at some point all the planks of the ship had been replaced. The question, then, is: was it still Theseus' ship? One could argue that, yes, because Theseus' ship persisted as a seaworthy vessel *throughout the entire period*. But one could also argue that, no, because as the end result of *a preservation process*, not a single part of the original ship remained. Although this paradox has a significant temporal dimension, this dimension has been rarely addressed in endeavors to resolve the paradox. Instead, discussions have centered on the fact that artifacts are determined both by their materiality and their functions. As this example illustrates, these two natures of artifacts do not occur separately from each other. Rather, artifacts are hybrid objects.[1] The core problem is usually located at the ontological level: How can a concept of artifacts be developed that adequately captures the relationship between the two natures, which are always intricately intertwined?[2]

Rather than addressing the temporal dimensions of artifacts, artifact research has so far focused on questions of conceptualizing artifacts, on the empirical conditions of their production and of changes in the ways artifacts are manufactured, on their praxeological significance, and on the materiality, functionality, virtuality, and mediality. Moreover, artifact research in the different empirical disciplines (such as history, archaeology, philosophy, and ethnology) has tended to evolve independently, and sometimes in complete isolation from one another. While the different literatures have addressed a few overarching themes, they mostly address highly specialized subject areas and related methodologies, generating a multitude of instructive but divergent and often imcompatible approaches.

To address this scholarly lacuna, in this article, we will outline a research agenda that will allow scholars to treat the temporal dimensions of artifacts in a systematic way while paying attention to empirical variations in the forms, functions, materiality, and nature of

1 Randall R. Dipert (1995). Some issues in the theory of artifacts: Defining 'artifact' and related notions. *The Monist* 78, 119–135.

2 Wybo Houkes/Anthonie Meijers (2006). The ontology of artifacts: the hard problem. *Studies in History and Philosophy of Science* 37, 118–131.

artifacts. At the heart of this transdisciplinary endeavor, then, is an effort to bring into conversation systematic and empirical perspectives on the temporality of artifacts. This requires us first, to take stock of existing approaches to the temporal aspects of artifacts, such as artifact classification based on temporal markers, object biographies, praxeological studies, actor-network theory, and philosophical theories of time reckoning, by ordering these approaches into three research paradigms. Second, on the basis of this literature review, we propose a working definition of the term "artifact," and this with two objectives in mind: Our definition should be broad enough to be applicable to all existing research paradigms and across the disciplines. At the same time, the definition should be sufficiently specific and precise to serve as a heuristic for a methodologically manageable range of phenomena. In a third step, we will relate artifact theory to time theory in a theoretically rigorous way. Here, we first turn to the concepts of time and temporality and distinguish between three different meanings of the notion of transtemporality. This will allow us to point to different temporal aspects of artifacts. We then propose the concept of artifact assemblages to take into account that artifacts never occur in isolation, but always in arrangements and ensembles that exhibit various superimposed temporalities. We will conclude our exposition by outlining the trajectories for a systematic investigation of the temporal dimensions of artifacts and artifact assemblages, an investigation that places time as a central dimension of artifacts on the research agenda.

1. Three paradigms of artifact studies

In presenting an overview of scholarship that touches on the temporal dimensions of artifacts, we adopt an inclusive approach, considering work in a broad range of disciplines of the humanities and social sciences, notably history, classical archaeology, classical philology, philosophy, social and cultural anthropology, and musicology. We order them into three bodies of literature that we label "artifact classification," "artifact praxeology," and "artifact philosophy." Before so doing, we want to specify what meanings each of the three paradigms assigns to the terms “artifact “and “artifacticity”, and how this affects the conceptualization of “time” and “temporality” in each case. We thereby wish to demonstrate how the three research paradigms, by virtue of their divergent perspectives, provide a useful starting point for a comprehensive outline of innovative research on artifacts and time.

Artifact classification: In archeology, musicology, and art history, artifacts, such as mundane objects, works of art or cult objects form a privileged subject of empirical research that considers them in their respective historical and cultural contexts. This scholarship applies artifact classification for empirical reasons, to consider how artifacts and artifact classes can be approached methodologically.[3] Case studies tend to focus on those characteristics of artifacts that are relevant to their appropriation and perception by humans, such as haptics, texture, and function. Because this research paradigm pays primary attention to features of artifacts that invite their use by social actors, it has generated overlaps and dialogue since the 1970s with scholars working along the lines of the second research paradigm, artifact praxeology.
The category of time is key to artifact classification: it defines types of artifacts according to their chronological order and then places them in relation to each other.

3 For example, in archaeology: Henry Hodges (1964). *Artifacts. An introduction to early materials and technology*. London; Joachim Hahn (1993). *Erkennen und Bestimmen von Stein- und Knochenartefakten. Einführung in die Artefaktmorphologie*. Tübingen; Jenny L. Adams (2002). *Ground stone analysis. A technological approach*. Salt Lake City, Utah.

Artifact classification rests on positioning objects in a time line and on identifying temporal continuities and discontinuities. The paradigm is positivist and antiquarian in its approach to time insofar as it treats artifacts as chronological markers and reduces time to "artifact time," that is, a kind of time that can be read from the artifacts.[4] In archaeology, for example, cooking pots are classified into different types according to their changing forms, and these changing formal and stylistic features are incorporated into a chronological time line. In this way, ceramic artifacts become temporal markers.[5] Time is conceived as a yardstick of development, as a linear and directed "arrow of time" that helps classify, categorize, and sort artifacts and classes of artifacts.

The same linear conception of time underlies studies of **object biographies**. The notion of a "biography of the thing" was coined by Sergei Tretyakov in 1929,[6] yet its underlying idea is older[7]. It posits that not only humans, but also things, objects, and artifacts are not fixed and timeless entities, but have a history and—in analogy to human beings[8] —a life of their own, especially a "social life."[9] Object biography theory has significantly broadened scholarly understanding of the transtemporal nature of artifacts by departing from a classificatory preoccupation with the time period in which an artifact was produced; “biography” highlights that artifacts have a history that extends over their *entire* "lifetime," thereby broadening the range of possibilities and ways to classify artifacts. Yet so far, scholars have applied the concept of “object biographies” almost exclusively to *material* artifacts, while immaterial artifacts have been largely ignored.[10] Scholars who apply a biographical approach to artifacts have also been taken to task for likening objects to living matter and to human beings, a tendency described by Matthias Jung as a “pull toward biomorphization and anthropomorphization” („Sog der Biomorphisierung und Anthropomorphisierung“).[11] Relatedly, Hans Peter Hahn has criticized that speaking of the “biography” of things assumes that they have a "life cycle" that is structurally analogous to the temporal existence of living beings. He traces this idea back to nineteenth century authors (exemplified by Edward B. Tylor's classic *Primitive Culture* (1871)), whose concepts (e.g. evolution, primitivism) were foundational to a scientific approach of biology and to the formation of academic disciplines such as anthropology. Hahn maintains that the biological analogy does not do justice to the complex temporality of material culture, such as the multi-layered, simultaneously ephemeral and temporally stable existence of many artifact fragments and assemblages. The concept of "object biographies" should therefore be used in a purely metaphorical sense.[12]

In response to the critique of “object biographies”, artifact classification now takes into account that temporal developments are not necessarily linear and do not always evolve teleologically. A transtemporal perspective on artifacts may now involve

4 Undine Stabrey (2017). *Archäologische Untersuchungen. Über Temporalität und Dinge*. Bielefeld; Graham Harman/Christopher Witmore (2023). *Objects Untimely. Object-Oriented Philosophy and Archaeology*. Cambridge.

5 Franziska Lang (2002). *Klassische Archäologie.* Tübingen and Basel, 168–250.

6 Sergei Tretyakov (1972). *Die Arbeit des Schriftstellers*. Reinbek bei Hamburg.

7 Mark Blackwell (2007). *The Secret Life of Things. Animals, Objects, and It-Narratives in Eighteenth-Century England*. Lewisburg.

8 Chris Gosden/Yvonne Marshall (1999). The Cultural Biography of Objects. *World Archaeology* 31, 169–178; Nina Hennig (2004). *Lebensgeschichte in Objekten. Biografien als museales Sammelkonzept.* Münster et al.

9 Arjun Appadurai (1986). *The social life of things. Commodities in cultural perspective*. London.

10 Intangible things (such as diseases or scientific concepts) have only been marginally addressed in this theoretical trend (Scott Lash/Celia Lury (2007). *Global Culture Industry: The Mediation of Things.* Cambridge; Siddhartha Mukherjee (2012/2010). *Der König aller Krankheiten: Krebs – eine Biografie*. Cologne.

11 Matthias Jung (2015). Das Konzept der Objektbiographie im Lichte einer Hermeneutik materieller Kultur. In: Dietrich Boschung/Patric-Alexander Kreuz/Tobias Kienlin (eds.). *Biography of Objects: Aspects of a Cultural-Historical Concept.* Munich, 35–65, pp. 40–41.

12 Hans Peter Hahn (2015). Dinge sind Fragmente und Assemblagen: Kritische Anmerkungen zur Metapher der ›Objektbiographie‹. In: Dietrich Boschung/Patric-Alexander Kreuz/Tobias Kienlin (eds.). *Biography of Objects: Aspects of a Cultural-Historical Concept.* Munich, 11–33, pp. 13ff.

references to distant points in time or to periods (archaisms). By speaking of the transtemporality of artifacts, scholars might also relate objects to earlier time periods that were formative for a particular style ("classicisms"), or else, they might refer to the superimposition of different stylistic and formal principles ("stylistic pluralism"). For instance, when studying ancient Greek sculpture in the Archaic and Classical periods, scholars can trace some kind of teleological development. Yet, this becomes rather problematic in the Hellenistic period. Because Hellenism is also characterized by a distinct stylistic pluralism, scholars often cannot establish a precise temporal allocation of individual artifacts to a teleological sequence.[13] As these examples show, the temporal classification of artifacts is a prerequisite for their historical and cultural interpretation. Therefore, the starting point for any appropriate artifact classification are not only linear but also nonlinear, especially cyclical, conceptions of time.[14] Which conceptions of time best fulfill these theoretical requirements is the subject of current debate.[15]

A second research paradigm, **artifact praxeology** and the ***material turn***, which has emerged since the 1970s in history, anthropology, archaeology, and other humanities and social sciences, includes diverse theoretical currents. Among them are studies that work in the tradition of object biography and draw inspiration from Arjun Appadurai's *The Social Life of Things* (1986); work that applies affordance theory, first developed by James Gibson within ecological psychology[16] and later adopted in anthropology and cultural studies by authors such as Tim Ingold;[17] authors who work in the (heterogeneous) praxeological tradition of authors such as Pierre Bourdieu, Anthony Giddens, and Theodore Schatzki;[18] and finally, work that applies actor-network theory (ANT), which was developed in the sociology of knowledge[19] and expanded into a broader theoretical framework for understanding social practice by Bruno Latour.[20]
In spite of its heterogeneity, this scholarship shares certain theoretical preoccupations and assumptions: it is not interested in individual artifacts, but in the **relationships** generated by things (both material things and institutions) in their interaction with human thought and perception-based action. This is why the concept of **social practice** is foundational to all these theoretical approaches. The research paradigm is relevant to artifact theory insofar as its focus on the relationship between people and things allows scholars to account for concrete manifestations of social practices. For example, Appadurai, in his "The social life of things" maintained that things derive their meaning from the historical and social contexts in which they are used.[21] Whereas object biographies treat individual artifacts as agents, the concept of affordance offers an alternative conceptualization of things: "affordance" does not attribute agency to objects but draws attention to the offers for action they make to those who appropriate them.[22]

13 Jerome J. Pollitt (1986). *Art in the Hellenistic Age*. Cambridge et al.
14 Stephen J. Gould (1990). *Die Entdeckung der Tiefenzeit: Zeitpfeil oder Zeitzyklus in der Geschichte unserer Erde*. Munich.
15 Sabine Reinhold/Kerstin P. Hofmann (2014). Themenheft: Zeichen der Zeit. Archäologische Perspektiven auf Zeiterfahrung, Zeitpraktiken und Zeitkonzepte. *Forum Kritische Archäologie* 3, 17–150; See also Undine Stabrey: *Archäologische Untersuchungen. Über Temporalität und Dinge* [note 4]; Graham Harman/Christopher Witmore: *Objects Untimely. Object-Oriented Philosophy and Archaeology* [note 4].
16 James J. Gibson (1979): *The Ecological Approach to Visual Perception*. London.
17 Tim Ingold (2000): *The Perception of the Environment. Essays on livelihood, dwelling and skill*. London/New York.
18 For an overview, see: Andreas Reckwitz (2003). Grundelemente einer Theorie sozialer Praktiken. Eine sozialtheoretische Perspektive. *Zeitschrift für Soziologie* 32, 282-301.
19 Bruno Latour/Steve Woolgar (1979): *Laboratory life: The social construction of scientific facts*. Beverly Hills.
20 Bruno Latour (2007). *Eine neue Soziologie für eine neue Gesellschaft*. Frankfurt a. M., p. 93 ff.
21 Arjun Appadurai: *The social life of things. Commodities in cultural perspective* [note 9].
22 Knappett (2004, 46) defines the term affordance as follows: The "affordance of an object is neither solely an independent property of the object itself, nor is it exclusively an intentional state within the mind of the person engaging with it, but a relational property shared between object and agent." Carl Knappett (2004). The affordances of things: a post-Gibsonian perspective on the relationality of mind and matter. In: Elizabeth DeMarrais/Chris

Additional concepts have been developed within this scholarship to account for the complexity of contexts in which these objects are used; among these concepts are “agency”, “salience” and, in actor-network theory (ANT), the “actant”. These concepts are relevant to understanding the temporality of artifacts because they explicitly address time as a category and deal with the time dimension of artifacts through the concept of action.

Praxeological approaches deal with time in three important ways. First, they (in particular those working with an ANT- perspective), study the social coordination of sequences of actions, such as the structuring of production through the reglementation of working time, or when scientific research and teaching is coordinated through laboratory work schedules and through curricula. Second, the time dimension is addressed (for example, by Pierre Bourdieu) when studying how phenomena become “naturalized”: a chain or a network of actions that initially appears novel, unfamiliar, or unusual will, "over time," come to be seen as normal, customary, unchangeable, and indeed "natural."[23] Third, addressing temporality as a dimension of social practices pushes scholars to acknowledge that social practices do not relate to individual artifacts but to **artifact assemblages** that are open to change and rearrangement over time (cf. section three). A fruitful way to address the category of time in a praxeological perspective is to employ the notion of "practice time", which is also highly relevant to explorations of essential properties of artifacts.[24]

Even if praxeological approaches are highly significant to artifact studies, they rarely work with the concept of “artifact”. Instead, praxeological approaches have tended to work with *notions of the “material”* and “*materiality”.* Daniel Miller, a leading representative of anthropological *materiality studies*, views “artifact” as a conventional subject matter that should be replaced by “material” and “materiality” to address new theoretical interests and research agendas. However, there is a problematic tendency, in Miller’s work and that of others, to operate with an underdetermined concept of materiality.[25] Kalthoff et al. (2016), for instance, conceive of materiality as an „open continuum [that] ranges from artifacts and other material entities that appear as agents, through forms of hybridization and of embodied blending with subjective experience, to practices that transcend the material."[26] In this elusive formulation, the boundary between the material and the immaterial is blurred, leadings to very divergent research agendas. Some studies work in the tradition of artifact classification and focus on materiality in the literal sense, that is, on the texture, surface and layer structure,

Gosden/Colin Renfrew (eds.). *Rethinking materiality: the engagement of mind with the material world*. Cambridge, 43–51. For application in archaeology, see Elisabeth Günther (2021). Mehrdeutigkeiten antiker Bilder als Deutungspotenzial. Zu den Interdependenzen von Affordanzen und frames im Rezeptionsprozess. In: Elisabeth Günther/Johanna Fabricius (eds.), *Mehrdeutigkeiten. Rahmentheorien und Affordanzkonzepte in der archäologischen Bildwissenschaft*, Philippika 147. Wiesbaden, 1–40.

23 Nick Couldry (2008). Actor network theory and media: do they connect and on what terms? In: Andreas Hepp et al. (eds.), *Connectivity, Networks and Flows: Conceptualizing Contemporary*. Cresskill, 93-110.

24 In addition to the references to ANT and Bourdieu already cited, Anthony Giddens should also be mentioned in this context. In his theory of structuration, he refers to the complex interplay between agency and social structuration to explain how social structures are constantly changing as a result of human action, but also exhibit a certain temporal stability and thus provide a framework for orientation (Anthony Giddens (1984). *The constitution of society. Outline of the theory of structuration*. Cambridge). However, Giddens does not provide a detailed concept of the time of action either.

25 "I [...] start this investigation with a theory of the most obvious and most mundane expression of what the term *material* might convey—artifacts. But this definition soon breaks down as we move on to consider the large compass of materiality, the ephemeral, the imaginary, the biological, and the theoretical; all that which would have been external to the simple definition of an artifact" (Daniel Miller (ed.) (2005). *Materiality.* Durham/London, p. 4).

26 „von einem offenen Kontinuum [auszugehen, das] von Artefakten und anderen materiellen Entitäten, die als ein wirkendes Gegenüber auftreten, über Formen der Hybridisierung und des leiblichen Verschmelzens in der subjektiven Erfahrung bis hin zu einer das Materielle transzendierenden Praxis [reicht]“ Herbert Kalthoff/Torsten Cress/Tobias Röhl (eds.) (2016). *Materialität. Herausforderungen für die Sozial- und Kulturwissenschaften*. Paderborn, p. 12.

haptics, and functionality of concrete materials.[27] Other authors adopt understandings of materiality that, while tailored to specific theoretical preoccupations of different disciplines, depart radically from commonsensical and everyday understandings of "materiality".[28]
As critics point out, the tendency to prioritize theoretical concerns in studies inspired by the *material turn* has led to a vague and inconsistent use of the terms material and materiality. Another criticism relating to the vague conceptualization of materiality in these studies is that they have lost sight of the initial objective of the *material turn* (which was to shift attention to the haptics and texture of concrete materials) and, in some cases, have even reversed it.[29] As critics maintain, the resulting "lack of empirical knowledge" („Mangel an empirischem Wissen") in current materiality theory constitutes "a real obstacle to a better understanding of things" ("ein echtes Hindernis für ein besseres Verständnis der Dinge").[30] Relatedly, the concept of artifact has not been used uniformly so far, partly because the conditions of its application remain underspecified. Our research agenda on "Time and Artifact" seeks to counter these tendencies by bringing together exemplary empirical case studies with a systematic and theoretical reflection on how to conceive of artifacts. For this, artifact philosophy offers important points of departure.

Artifact philosophy: Artifact philosophy, which emerged in the English-speaking world in the 1960s, pursues a non-empirical approach, in contrast to the two paradigms discussed so far. Artifact theory is primarily interested in the foundational *meanings of the concept of artifact*. Other research topics include the classification of objects as artifacts, in contra-distinction to non-artifactual objects; distinguishing between different categories of artifacts; and in understanding how artifact production is grounded in human action. In comparison to empirical artifact research, philosophy often conceptualizes as artifacts only those entities that have been *intentionally* produced through human action.[31] Sometimes the word "artifact" is even used synonymously with "work."[32] However, in one important respect, the philosophical concept of artifacts is broader than that of the two paradigms discussed previously: it also includes immaterial artifacts such as literary or musical works of art, theories, and belief systems.[33]
Artifact philosophy generally considers material and immaterial artifacts to be interrelated, not independent of each other. An important conceptual tool for reconstructing these relationships in artifact philosophy is the type/token distinction,

27 A paradigmatic example of such interdisciplinary materiality research was the Heidelberg SFB 933 *Materialale Textkulturen*, in which materials such as stone, clay, plaster, papyrus, and leather were examined in their function as carriers of texts. Michael R. Ott/Rebecca Sauer/Thomas Meier (eds.) (2015). *Materiale Textkulturen. Konzepte – Materialien – Praktiken,* Materiale Textkulturen 1. Berlin/Boston/Munich.

28 An example: "The synthetic capability of actual material forms (rather than the interpretive tropes that have arisen around them) to combine perspectives and domains of knowledge has, in the present day, constituted a new form, rather than subject, of enquiry, one which highlights the importance of things in the making of social relationships and the fundamental importance of materiality for the reproduction of society." in: Haidy Geismar/Heather A. Horst (1992). Materializing Ethnography. *Journal of Material Culture* 9, 5–10, p. 6.

29 Tim Ingold (2007). Materials against materiality. *Archaeological Dialogues* 14, 1–16.

30 Hans Peter Hahn (2016). Die Unsichtbarkeit der Dinge. Über zwei Perspektiven zu materieller Kultur in den Humanities. In: Herbert Kalthoff/Torsten Cress/Tobias Röhl (eds.). *Materialität. Herausforderungen für die Sozial- und Kulturwissenschaften*. Leiden, 45-62, p. 59; Achim Lichtenberger (2021). Keine Angst vor dem Zeitgeist. Optionen der Klassischen Archäologie im 21. Jahrhundert. In: Günther Schörner/Julia Kopf (eds.). *1869–2019. 150 Jahre Klassische Archäologie an der Universität Wien*. Vienna, 207-21,. pp. 217.

31 Lynne Rudder Baker (2007). Artifacts. In: Ibid. *The Metaphysics of Everyday Life. An Essay in Practical Realism*. New York/Cambridge, 49-66, p. 51; Randall R. Dipert (1995). Some Issues in the Theory of Artifacts: Defining 'Artifact' and Related Notions. *The Monist* 78, 119–135; Maria Elisabeth Reicher (2013). Wie aus Gedanken Dinge werden. Eine Philosophie der Artefakte. *Deutsche Zeitschrift für Philosophie* 61, 219–232.

32 Risto Hilpinen (2015). Artifact. In: Robert Audi (ed.): *The Cambridge Dictionary of Philosophy*. New York, 61–62.

33 Richard Wollheim (1980). *Art and its Objects*. Cambridge; Risto Hilpinen (1995). Belief Systems as Artifacts. *The Monist* 78, 136–155; Reinold Schmücker (2014). *Was ist Kunst? Eine Grundlegung*. Frankfurt am Main, 235–270; Maria Elisabeth Reicher (2019). *Werk und Autorschaft. Eine Ontologie der Kunst.* Paderborn.

which it applies to works of art, for example:[34] Each copy of Thomas Mann's *Zauberberg* ("The Magic Mountain") is a *token*, that is, a material artifact that can be localized in space and time. All copies of Thomas Mann's "The Magic Mountain" (token) fall under *the* same *type* because they represent (theoretically infinite) instantiations *of the* same *novel*, that is, the same immaterial artifact. Some theoriticians of artfifact philosophy even argue that the novel as a type would continue to exist even if there were no more copies of the book (tokens) (e.g., Maria Reicher 2019).[35]

Philosophical debate on immaterial artifacts is currently gaining new relevance in several discursive contexts. One of these contexts is the debate surrounding the application of cryptological methods: the so-called *non-fungible tokens* (NFTs) represent a noteworthy special case in ontological terms insofar as one *and only one token* can always be assigned to a specific *type*. The concept of *intangible cultural heritage* introduced by UNESCO in 2001 has also raised the controversial question in what sense immaterial cultural heritage exists and what special protective rights should be attributed to it.[36] Another question — which also has legal relevance — is whether *artificial intelligence*, which in itself constitutes an artifact, can also be considered to *generate* artifacts.[37]

Missing in artifact philosophy so far is a sustained consideration of the temporality of artifacts. This inattention is noteworthy in view of the fact that *time* has been a widely discussed subject of 20th-century philosophy, both in continental philosophy[38] and, since John McTaggart, in the Anglo-Saxon tradition[39]. In the philosophy of time, reflection on artifacts has been mostly limited to determining the relationship between human action and time and temporality. In this, philosophers of time have drawn on a long-standing tradition in the history of philosophy to reflect on the relationship between time and action.[40] Systematic philosophy has only recently turned its attention to these connections.[41]

From our discussion of the three research paradigms, we conclude the following: the three paradigms address artifacts as an object of research and, in some cases, make references to their temporal dimensions. Missing, however, is a comprehensive, interdisciplinary effort to advance scholarly understanding of the exact relationship between the nature of artifacts (what we refer to in German as “Artefaktizität”) and their various temporal dimensions.

Only artifact philosophy has developed an elaborate *concept of artifacts* so far. The primarily empirical research field of artifact classification, on the other hand, has invested little effort in defining artifacts. Finally, artifact praxeology has tended to privilege the concept of materiality, rather than that of artifact. It is our conviction, however, that the concept of artifact provides a useful starting point for advancing scholarly understanding of time and temporality. As a first step toward this research, we

34 It was originally introduced into the debate by: Charles S. Peirce (1906). Prolegomena to an apology for pragmatism. *The Monist* 16, 492-546; pp. 505–506. For textual artifacts, FRBR was developed as a data model for bibliographic metadata, but its specific complexity is only partially transferable to the research agenda we have outlined.

35 See Maria Elisabeth Reicher: *Werk und Autorschaft. Eine Ontologie der Kunst.* [Note 33], pp. 169-187.

36 Intangible Heritage Home - intangible heritage – UNESCO; URL: https://ich.unesco.org/en/home#meet_00057

37 Hans-Georg Dederer/Yu-Cheol Shin (2021). *Künstliche Intelligenz und juristische Herausforderungen*. Tübingen.

38 Henri Bergson (2013). *Philosophie der Dauer. Textauswahl von Gilles Deleuze*. Hamburg; Martin Heidegger (1927). *Sein und Zeit*. Halle.

39 For an initial overview, see: Craig Callender (2011). *The Oxford Handbook on Time*. Oxford; Thomas Müller (2007). *Philosophie der Zeit. Neue analytische Ansätze*. Frankfurt am Main.

40 Alejandro G. Vigo (1996). *Zeit und Praxis bei Aristoteles*. Freiburg/Munich; Friederike Rese (2011). Praxis und Poiesis in zeitlicher Perspektive. In: Walter Mesch (ed.), *Glück - Tugend - Zeit. Aristoteles über die Zeitstruktur des guten Lebens*. Stuttgart/Weimar, 185-200 .

41 Shaun Gallagher (2011). Time in action. In: Craig Callender (ed.). *The Oxford Handbook on Time*. Oxford, 419-437; Roman Altshuler/Michael J. Sigrist (eds.) (2016). *Time and the philosophy of action*. London/New York.

now present our working definition of “artifact” and discuss what we see as the relevant temporal dimensions of the defining conditions of artifacts.

2. A working definition of “artifact”

The artifact definition we propose meets two methodological objectives. First, the definition is formulated so guardedly as to provide a shared conceptual basis for different research goals and perspectives. Here, we depart from existing definitions in artifact philosophy that tend to be tailored to specific philosophical research goals, which means that they are usually too narrowly defined for interdisciplinary discourse. Second, our definition is substantive enough to establish precise criteria for delimiting the phenomenon in a heuristically manageable way. The two objectives, wide applicability and precision, are in a certain tension with each other. To satisfy both objectives to a sufficient degree, we formulate five conditions, of which the first three apply strictly.

The strictly applicable conditions are:

- Condition (1): Artifacts are always caused by the actions of one or more actors (“production condition”).
- Condition (2): Artifacts never arise in a purely natural way (“non-naturalness condition”).
- Condition (3): Artifacts can always be attributed certain functions (“condition of functionalization”).

Two further conditions do not apply strictly:

- Condition (4), which serves to delimit prototypical artifacts, stipulates that artifacts are typically objects, things, or items that exist independently of their producers (“object condition”, “Gegenständlichkeitsbedingung”).
- Condition (5) is an additional, explanatory condition and states that there are material and immaterial artifacts (“condition of materiality”).

The production condition (1) implies that artifacts are produced and thus always owe their existence to an action. Our way of formulating the condition does not specify how large the set of those agents who can produce artifacts is. Not only individuals but also groups, collectives, or entire human societies can produce artifacts. Conceivably, artifacts might also be produced by non-human actors (such as gods or spirits, highly developed animals, robots, or artificial intelligences). Studies working along the line of artifact praxeology, assume that other complex entities are also producers of artifacts. For instance, actor-network theory attributes agency not only to humans and human groups, but also to networks that comprise humans and artifacts[42], which means that artifacts can themselves sometimes produce artifacts. While we purposefully allow for this option, we insist that artifacts are always *produced or created* by one or more actors, but *do* not necessarily have a capacity to act.
In a specific sense, our condition of production is broader than most definitions of artifacts in artifact philosophy.[43] It *does not* state that all artifacts were *intentionally* created. Artifacts can also arise as unintended side effects of actions, such as residual

42 See Bruno Latour: *Eine neue Soziologie für eine neue Gesellschaft*. [Note 20], p. 93 ff.
43 See Lynne Rudder Baker (2007). Artifacts. In: Ibid. *The Metaphysics of Everyday Life. An Essay in Practical Realism,* New York/Cambridge, 49–66, p. 51; Randall R. Dipert (1995). Some Issues in the Theory of Artifacts: Defining ‘Artifact’ and Related Notions. *The Monist* 78, 119–135; Maria Elisabeth Reicher (2013). Wie aus Gedanken Dinge werden. Eine Philosophie der Artefakte. *Deutsche Zeitschrift für Philosophie* 61, 219–232.

stocks, waste products (e.g., a shard reused as a tool) or the ozone hole. Condition (1) merely requires that *the cause* of artifacts must always be an action. If that was not the case, CO_2 molecules exhaled by humans could count as artifacts, which would amount to an overly broad understanding of artifacts.

Relevance to theories of time: because artifacts are produced, their beginning can always be located in time. For every artifact that currently exists, there is a period of time in which it did not yet exist and a period of time in which it was produced (or is still being produced). E*very* artifact is subject to processes of change; no artifact exists in a completely static, timeless, or ageless state. Mathematical objects such as numbers, sets, and geometric polygons or solids are not artifacts. Unlike conventional *descriptions* of a range of numbers (such as Roman or Arabic numerals) or the *scaling* of angles (degrees, neogrades, or radians), they were not created by humans.

Locating artifacts in time allows scholars to clearly establish a difference between objects that count as artifacts and those that do not. Examples include alternative number systems or angle scales, which were invented and developed by humans and are therefore artifacts; truths about triangular polygons (such as that every triangle has the same angle sum) are not invented, but discovered, which is why they lack an essential temporal characteristic of artifacts. The temporal structuring of artifact production therefore constitutes a rich field of research on questions relating to the existence and production of artifacts.

The non-naturalness condition (2) seems to be entailed in condition (1) in that ultimately, everything that has not been caused by action has come into existence in a natural way. Yet condition (1) is underdetermined in one important sense: the phrase "caused by agents" does not mean that artifacts are caused *exclusively* by agents or by actions. The conditions under which artifacts come into being usually involve a complex interplay of natural and non-natural causes, since the components of many artifacts are natural things. Every material artifact consists of naturally generated components at the atomic level. Also, as it has been pointed out in the sociology of knowledge and in cultural studies, there are things that at first glance, appear to be natural objects yet that are, in fact, artifacts. Consider, for example, certain plants that are explicitly advertised as *natural food*, but which nevertheless differ significantly from their natural predecessorss as a result of deliberate breeding and refinement processes on the part of human actors. Such is the case with *seedless grapes* which, created and perduring through human action, are artifacts.[44] In contrast, the celestial body *Pluto* is a natural object and not an artifact, even if humans may argue about whether Pluto should be described as the ninth planet in the solar system or not. Beyond these clear-cut cases, there are numerous others that cannot be unequivocally classified as either natural or not natural. For example, although a river such as the Amazon has been *altered by* human activity in many places along its course[45], it would be implausible to classify the Amazon as an artifact. After all, it was not *created* by human action and existed for most of its temporal existence as a purely natural object. Such phenomena are classified as "socio-natural sites."[46] The same applies to paleontological chance finds (such as dinosaur bones in antiquity) interpreted as evidence of a heroic past at the time. This interpretation alone does not make artifacts out of these (natural) finds; but they could be transformed into artifacts through tradition and assembly with other artifacts.

Condition (2) allows us to state explicitly that a realm of natural objects can be demarcated from that of artifacts as follows: Purely natural objects emerge fully

44 Dan Sperber (2007). Seedless grapes: Nature and culture. In: Eric Margolis/Stephen Laurence (eds.). *Creations of the mind*. Oxford, 124-137.

45 See, for example, Matt Edgeworth (2011). *Fluid Pasts: Archaeology of Flow*. Bristol.

46 Verena Winiwarter & Martin Schmidt (2020). Socio-Natural Sites. In: Sebastian Haumann/Martin Knoll/Detlev Mares (eds.). *Concepts of Urban-Environmental History*. Bielefeld, 33-50.

independently of actors and actions and can also be recognized as such by humans. This clarification is significant for those theoretical strands in cultural studies that submit that things only come into being through human appropriation (that is, its recognition and encoding).This assumption makes the boundary between discovery on the one hand and invention, creation, or production on the other disappear. A prominent example of this blurring of boundaries is Bruno Latour's argument that the tuberculosis pathogen existed only after its description by Robert Koch in 1882 and that therefore, the claim that Ramses II died of tuberculosis was anachronistic.[47] As Latour has it, we cannot know anything about natural things without turning them into artifacts through the act of recognition and encoding. Such a concept of artifact contradicts the established scholarly use of the term. If Latour's assumption was true, the natural sciences would constitute a branch of cultural studies insofar as they treated not natural things but artifacts. This, in turn, would mean that the human sciences would have to abandon their foundational distinction between *valid research results* and methodologically conditioned *artifacts*.[48] Methodologically conditioned artifacts only appear to represent observations of natural things as they have actually been "artificially" produced through the use of experimental or analytical methods. If *all* research results are artifacts, as Latour claims, this distinction, which is a foundational element of research methodologies in medicine, psychology, and the social sciences, loses its heuristic meaning. Rather than subscribe to this challenging view, we posit that in our body of knowledge, we can distinguish between the realm of cultural creations and that of purely natural things; and also, that artifacts pertain to the realm of human creations, even if, for the reasons mentioned above, this boundary cannot always be clearly drawn.[49]

Relevance to theories of time: we can describe the temporality of natural objects through a linear conception of "world time". World time allows to map the temporal order of causal relations and other nomological relationships with sufficient precision. In contrast, the temporality of artifacts, created by subjects capable of action and consciousness, cannot be exclusively captured through linear concepts of time. Our earlier reflections on artifact praxeology clarified that there are domain-specific phenomena of overlapping time levels (in musical works, for example, archaisms and stylistic pluralisms, as in world music). These overlaps and simultaneities need to be rendered through nonlinear concepts of time that may also help to map time loops and temporally variable references to disparate points and phases in time. For this purpose, we propose the concept of practice time ("Handlungszeit"). Our distinction between artifacts and natural objects helps to delineate the areas of application of these different concepts of time.

The condition of functionalization (3) states that not every artifact must have a function, but that all artifacts can be attributed a function. Artifact functions can have various origins. The intentions of the producer of an artifact may be important, and sometimes, the intentions of the artifact's creators play an important role in this, and might even determine an artifact's function. But for artifacts that are not *intentionally* created (see condition (1)), their function(s) can only be attributed through the process of its reception by third parties. And, artifact's different functions might also conflict with each

47 Bruno Latour (2000): On the Partial Existence of Existing and Non-existing Objects. In: Lorraine Daston (ed.). *Biographies of scientific objects.* Chicago, 247-269.

48 Maxim Zaitsev/Julian Maclaren/Michael Herbst (2015). Motion artifacts in MRI: A complex problem with many partial solutions. *Journal of Magnetic Resonance Imaging* 42(4), 887-901; Walter Bungard (1987). Artefacts. In: Dieter Frey/Siegfried Greif (eds.). *Sozialpsychologie. Ein Handbuch in Schlüsselbegriffen*. Munich, 375-380.

49 Anna Maria Heynkes (2013). Natürliche Artefakte – Künstliche Lebewesen. *Deutsche Zeitschrift für Philosophie* 61, 251–265; Nicole Christine Karafyllis (ed.) (2003). *Biofakte. Versuch über den Menschen zwischen Artefakt und Lebewesen*. Paderborn.

other. Such is the case with plastic bags whose production is often geared toward its – temporally circumscribed – use (the fulfillment of a function) for a period of a few days or minutes. Yet because of the longevity of its material (200 to 300 years) and related problems, the plastic bag might accrue additional functions through secondary usage or through recycling technologies. The fact that these secondary functions compete with the intended primary function becomes apparent when recycling does not work optimally and many people call for a ban on plastic bags and the replacement of their primary function with alternatives. Similar shifts in the functions that are attributed to objects are evident in practices of archiving artifacts and of integrating them into museum collections. Through these processes of reinterpretation and reassembly, artifacts are embedded in new functional contexts that differ from, sometimes even emerge in tension to, their original functions and contexts.

Relevance to theories of time: There might be a significant disjuncture between the period during which an artifact exists and the duration of its original function(s). The plastic bag vividly illustrated this disjuncture. As artifacts may lose their original functions over time and gain new ones, even though they remain the same artifact, the same artifact can also have different functions in different phases of its existence. Not only artifacts, but also artifact functions can exist over long periods of time, which can also overlap temporally.

The object condition (4) is not meant to *strictly* delimit the scope of artifacts, but to distinguish a core area of prototypical artifacts from a surrounding area in which the boundary between artifacts and non-artifacts remains *fuzzy*. We limit the realm of **prototypical artifacts** to the class of objects, things, and items (terms that we use interchangeably).[50] This terminology allows us to distinguish three other classes of entities from human-made *objects* that do *not* count as prototypical artifacts: events, dispositions, and processes. Human-created *events* are, for example, historical events or occurrences; *dispositions* are learned competences, abilities, or skills[51]; and *processes refer to both* individual and collective practices. Events, dispositions, and practices constitute the vague border area of non-prototypical artifacts: among them are entities that are not artifacts[52], entities that we consider artifacts, and finally those that cannot be clearly classified.

We limit the scope of prototypical artifacts to the class of objects for two reasons. First, we thereby follow the established convention not to refer to historical events, skills, or (social) practices as artifacts (in contrast to *objects* created by human action, such as clothing, coins, books, works of art, technical products, or even associations, institutions, and states). We can also justify our understanding of prototypical artifacts by refering to the production condition (1), which states that artifacts are essentially *products* of actions. Events, on the other hand, usually correspond to actions and *not* to products of actions: the *founding* of a state is an event, or more precisely, an action of founding a state. Therefore, it is not itself an artifact, but *produces* an artifact (the *state*). Individual and collective practices are also actions that sometimes, but not always, produce artifacts. Competencies and skills are neither artifacts nor actions, but a special

50 In scientific language, the terms object, thing, and item are often defined differently—in different ways in the disciplines involved (cf. e.g.: Hans Peter Hahn (2014). *Materielle Kultur. Eine Einführung*. Berlin, p. 19; Martin Heidegger (1954). Das Ding. In: Ibid. (2000). *Vorträge und Aufsätze*. Stuttgart, 157–175; Steven Shaviro (2010). *The Universe of Things*. Atlanta; Julian Thomas (1996). Material Things and their Temporality. In: Ibid. (ed.). *Time, Culture and Identity*. London, 55–91). These finely grained concepts are not relevant for the purposes pursued here.

51 An important subclass of these abilities and competencies is currently being discussed intensively in archaeology and social and cultural anthropology under the technical term embodied knowledge (cf. Marie Louise Stig Sørensen/Katharina Rebay-Salisbury (eds.) (2013). *Embodied knowledge: Historical perspectives on belief and technology*. Oxford.).

52 This position is explicitly found in artifact theory in: Reinold Schmücker (2013). Schwerpunkt: Philosophie der Artefakte [Einleitung]. *Deutsche Zeitschrift für Philosophie* 61, 215–218.

kind of characteristic. They are therefore not concrete objects, but merely dispositions, i.e., potentialities that cannot cause anything on their own. Only when a skill (such as the ability to make pottery) is actualized in an action (pottery making) will this result in the creation of an artifact (a pot).
Since the object condition does not apply strictly, it is possible to *sometimes* regard an event, a disposition, or a process as the product of an action and to classify it as an artifact. This categorization does not apply generally, but only in exceptional cases that belong to a vague border zone of entities that defy precise classification (or: in which precise demarcation is impossible). We can only illustrate by example the reasons for classifying entities in this border zone as artifacts: a *theater performance* of "Jedermann" is an event or a temporal process, which is why it does not belong to the core area of artifacts. Still, based on the type/token distinction, one can also justify why the performance should be classed as an artifact. The theater performance (*token*) is an instance of an immaterial artifact, namely the *play* of the same name (*type*) by Hugo von Hofmannsthal. The performance counts therefore an artifact insofar as it constitutes a time- and location-specific realization of an immaterial artifact.[53] Our example constitutes an event and a temporal process, but we intuitively perceive it as an artifact. In this sense, we confer an object character to it.
Relevance to theories of time*:* objects created by human action have a special property that relates to their persistence. They can persist independently of other entities over time. In contrast, events, dispositions, and processes caused by actions always depend on the existence of other entities: An action can only occur if there is an agent who is currently acting. The same applies to collective practices: they continue as long as there are corresponding collectives of agents. Similarly, competencies, abilities, and skills are only effective as properties as long as there are subjects who possess them. Created *objects*, on the other hand, can exist independently, i.e., independently of the existence of their producers, recipients, and concrete acts of appropriation, encoding, interpretation, and functionalization. Due to this independence of their existence from other entities, prototypical artifacts have a special form of temporal persistence. This is evident in a variety of temporal phenomena: temporally structured production and reception processes, cycles and rhythms, visualizations of absent temporal modalities, ephemeral and temporally stable functions, and temporal changes can be observed in—and *only* in—the corresponding artifacts.

The **(im)materiality condition (5)** is an explanatory condition which we include to highlight that there are material and immaterial artifacts. By adding this condition, we expressly depart from two of the research paradigms discussed above that limit the concept of artifacts to *material* artifacts. We disagree with the claim that those who abandon "materiality as a prerequisite for artifacthood" can no longer view artifacts as things, but at best as "entities of their own kind" (“Entitäten eigener Ordnung”) whose content can only be vaguely characterized.[54] As our definition delimits the domain of relevant phenomena in a sufficient and theoretically productive manner, such objections are unfounded.
If intangible things were generally excluded from the category of artifacts, this would narrow the scope of the phenomena in a theoretically implausible way and invite a

53 Another example are entities such as atmospheres, melodies, and songs. These are also entities that cannot easily be regarded as objects, as they lack clear boundaries and often also a clearly identifiable material basis. At the same time, however, they can be localized in space and time and have causal effects, which is why Hermann Schmitz has assigned them the status of "half-things" (“Halbdingen”) in his neophenomenology. See: Hermann Schmitz (2003). *Was ist Neue Phänomenologie?* Rostock, p. 14.
54 Christina Tsouparopoulou/Thomas Meier (2015). Artefakt. In: Michael R. Ott/Rebecca Sauer/Thomas Meier (eds.). *Materiale Textkulturen. Konzepte – Materialien – Praktiken*, Materiale Textkulturen 1. Berlin/Boston/Munich, 47-61, p. 52.

number of questions, such as: is it plausible to regard the score of a musical composition as an artifact, but not the composition itself? Does a composition exist only as an artifact during the moment of its performance? Are Smetana's *Vltava* ("The Moldau*")*, Einstein's *Theory of Relativity*, and Gabriel Garcia Marques *Cien años de soledad ("*One hundred years of solitude"*)* not artifacts? Anyone who does not answer all these questions with a clear "yes" must accept that there exist not only material artifacts but also immaterial ones. Moreover, numerous complex artifacts contain both material and immaterial parts. This is evident in the artifact of money, which can only be adequately classified if one considers that it contains immaterial *and* particular material elements (see Text Box 1).

Text Box 1: Money as a complex artifact
Not all artifacts can be classified as either purely material or purely immaterial. There are also complex artifacts that have both material and immaterial elements. A paradigmatic example of such an artifact is money. On the one hand, money always has a material basis, which has been changing significantly and has taken on numerous forms over time. Coins, bars or pieces of metal of other types and shapes, pearls, shells or snails, as well as chains or other artifacts made from such materials, and finally printed pieces of paper and entries in books all serve as money. Even so-called virtual money, such as Bitcoin, is purely virtual only at first glance. Without suitable computer hardware or networked servers and without the necessary amounts of energy (especially for "mining" Bitcoin on a large scale), the material basis for virtual money would be absent. Yet money is not only a material artifact but also necessarily contains immaterial components. John Searle (1995, 44ff.) has called money a paradigmatic example of a social fact: money only exists where corresponding social institutions and practices of social recognition are established. Here, one only has to ask who produces money, what creative acts endow money with its function, and how money is devalued or abolished. The persistence and transience of money do not depend solely on its material nature: a coin can continue to exist completely undamaged, even if it is no longer recognised as a medium of exchange or payment. This shows that the immaterial („intangible") social and institutional functions of money constitute a completely different temporal structure of the artifact of money than its material basis. So far, the multiple relations and interactions between the material and immaterial elements of the complex artifact of money have received limited attention in philosophy and cultural studies.

Notably, different disciplines of the humanities diverge on the question of how to distinguish between the material and the immaterial. In philosophy, both performances of compositions and musical performances are categorized as material artifacts. The underlying reasoning is that performances can be clearly localized in space and time and have an effect on other events. Musicologists, on the other hand, tend to classify the performance of a composition or a musical performance as an immaterial artifact. This view reveals the legacy of Western music studies and their focus on musical traditions with notation systems that generate written versions of a piece of music. This distinction is not consistently adopted by ethnomusicological scholarship that deals with musical traditions without a notation system in which the concept of an original composition (in contrast to its instantiations in the form of performances) is absent (as is the case in many societies of the Global South) (see Text Box 2). These examples show that at present, the relationship between material and immaterial artifacts is insufficiently defined. Here, we see a significant lacunae that can be only closed through interdisciplinary research and dialogue. For this to happen, we need to anchor

acknowledgement of the existence of both material and immaterial artifacts in our working definition.

Relevance to theories of time: Our recognition of the existence of both material and immaterial artifacts opens up two sets of questions relevant to the theory of time. The first set of question follows from the earlier-mentioned scholarly tendency to privilege research on material artifacts over than on immaterial artifacts, a trend that has been reinforced by the *material turn*. Numerous studies have addressed some temporal dimensions of material artifacts, whereas the variability and changes in time of immaterial artifacts have been largely ignored. Plainly, immaterial artifacts are not subject to the same processes of decay and decomposition to which material artifacts are exposed because of their material constitution. This raises questions as to whether immaterial artifacts are less perishable or even imperishable, or whether they, too, are subject to temporal decay processes; if so, what kind of processes are taking place and how they differ from those of material artifacts? The second set of time-relevant questions relating to the theory of time relates to the fact that material and immaterial artifacts usually do not exist independently of one another. Rather, they are arranged in ensembles or “assemblages” whose elements vary in stability. The question is how these assemblages might help us understand the temporality of artifacts and whether such assemblages can themselves become carriers of artifactual temporalities. We propose the concept of term **"artifact assemblage"** to take account of these complex temporal relationships.

Text Box 2: *alguitara* music

The *alguitara* music genre is a good illustration of the multi-composite and multi-temporal structure of artifact assemblage, and if its integration of material and immaterial artifacts. *Alguitara* music combines elements of traditional tinde music played by Tuareg women with influences from Western pop and rock music. It originated in the 1970s, when Tuareg musicians (exclusively men) processed their experiences of violence and expulsion from their homeland of Mali and Niger in musical form for a Tuareg diaspora located in Algeria and Libya. *Alguitara* became a genre of nostalgic remembrance of home, but also of protest against the decades-long policy of marginalization of Tuaregs there, thus creating trans-temporal references between past, present, and future.

From the 2000s onwards, alguitara became a commercial hit on the international "world music" market as so-called "desert rock," which was accompanied by stylistic changes, such as the integration of pop and rock music elements and collaborations with Western musicians, while the lyrics continued to deal with the themes of exile, struggle, and homeland in the Tamasheq and French languages. However, the tonal and rhythmic elements of this musical style—adapted to a global "pop beat"—are now gaining in importance over the lyrics; at the same time, this musical style is internationally regarded as the quintessence of a "local" and "authentic" culture "of" the Tuareg, which previously existed neither in this homogeneity nor in its clearly local location.

The working definition of artifacts we introduced so far does not include a condition that *explicitly* addresses time and temporality. This is so because it remains unclear for the moment whether the temporal dimension of artifacts is *definitional* in nature or whether their temporal dimension can only be ascertained through empirical investigation. In refraining from stipulating a condition that specifies temporal aspects, we mirror the

current state of artifact theory and research, in the definitions of which systematic references to time are largely absent.[55]

3. Relationships between artifact theory and theories of time

The temporal dimensions of artifacts and artifact-related actions pose the analytical and conceptual challenge of describing these dimensions in a systematized and methodically sound way. Several case studies have recently addressed this challenge, such as cultural studies explorations of artifact-related aspects of the phenomenon of fetishism in different historical epochs[56]; art history scholarship on the temporalities of looking at images[57]; literary studies work on conceptions of time in literary texts of late antiquity[58]; and historical scholarship that engages the *temporal turn*.[59] Drawing on this work, we will outline concepts that we consider foundational to our interdisciplinary research endeavor to address the various connections between time and artifact. In a first step (3.1.), we introduce the concept of "transtemporality" to account for the different dimensions of time and temporality. “Transtemporality” contains three different meanings that can be associated with three distinct theoretical approaches. As a second step (3.2.), we introduce “artifact assemblage” as a conceptual tool to explore the various ways in which artifacts and time interrelate. Finally (3.3.), we will demonstrate the usefulness of the concepts of “transtemporality” and “artifact assemblage” to refine the theoretical approaches to the time of artifacts that we outlined in 3.1.

3.1 Transtemporality

The term "transtemporality" has three meanings that can be assigned to different theoretical approaches, each with its own perspective on temporality. Transtemporality refers, f**irstly**, to a temporal extension, to a duration *over* time. This understanding of "transtemporality" is foundational to **object biographies**. We already pointed out that drawing an analogy between object transtemporalities and biographies bears the risk of a one-sided application of linear concepts of time and of transposing a biographical approach, developed for humans, to artifacts. We also find the paradigm of object biographies of limited use in that its strong adherence to the traditions of artifact classification and the *material turn* has averted analytical attention to immaterial artifacts. In short, we consider both the lack of consideration of nonlinear concepts of time and the failure to investigate immaterial artifacts to be extremely limiting for realizing our interdisciplinary research agenda. The **second** meaning of "transtemporality" refers to the relationship between different points in time or time periods *across* time. It concerns temporal **relationships** on a second-order level. This understanding of transtemporality is at the basis of Achim Landwehr's concept of **chronoference**, which describes a specific type of relationship between present (in the sense of attendant) and absent times.The present (“attendant”) time is always in the present. The absent times, on the other hand, are in the past or in the future, and they

55 See Christina Tsouparopoulou/Thomas Meier: *Artefakt* [Note 54], pp. 47–61; Manfred K. H. Eggert (2014). Artefakt, In: Stefanie Samida/Manfred K. H. Eggert/Hans Peter Hahn *(eds.). Handbuch Materielle Kultur. Bedeutungen, Konzepte, Disziplinen*. Stuttgart/Weimar, 169–173; Martin Hoffmann/Reinold Schmücker (2022). Artefakt. In: Judith Siegmund *(ed.). Handbuch Kunstphilosophie.* Bielefeld, 167–178.

56 Hartmut Böhme (2006). *Fetischismus und Kultur. Eine andere Theorie der Moderne*. Reinbek bei Hamburg.

57 Johannes Grawe (2022). *Zeit und Bild. Eine Theorie des Bildbetrachtens*. Munich.

58 Simon Goldhill (2022). *The Christian Invention of Time: Temporality and the Literature of Late Antiquity*. Cambridge.

59 Caroline Rothauge (2017). Es ist (an der) Zeit. Zum „temporal turn“ in der Geschichtswissenschaft. *Historische Zeitschrift* 305(3), 729-746.

need to be made present ("attendant") through active references. For Landwehr, chronoference is first, a specific form *of rule-guided action* and second, a *process* that remains uncompleted and in this sense "inconclusive" and without an end ("unabschließbar")[60]. Yet, since Landwehr only explains the relationship between chronoference and artifacts by way of example, it remains unclear to what extent chronoference, as a practice and a process, can contribute to the production of artifacts. Questions such as under what conditions chronoferences can produce artifacts and whether these artifacts are material or immaterial remain unanswered. Nevertheless, the concept of "chronoference" is a good starting point to raise and reflect on these questions with respect to empirical case studies.

The third **meaning** of "transtemporality" connotes "transcending time" and hence a-temporality "("Unzeitlichkeit") or **timelessness** ("Zeitlosigkeit"). This meaning of transtemporality applies to objects that exist beyond all time constraints or are treated or experienced as such; it is the subject of intense debate in contemporary philosophy[61] and is also relevant for artifact studies. Each artifact has a temporal reference point because it was produced at a specific time, yet we sometimes refer to artifacts as "timeless". By this, we mean firstly, that the artifact in question is perceived as timeless (a "timeless" masterpiece) or that it was produced for a "timeless" existence (the case of memorials and monuments). But "timelessness" is also used in a literal sense, for example in the philosophy of art, when scholars assume that works of art are immutable after their creation and can neither perish nor be destroyed[62], and validate this claim on the basis of the type/token distinction: in case of the destruction of a sculpture or painting, not the *work* itself (the abstract *type*) is destroyed, but only one (potentially the only) *realization* of the work (a *token* localized in space and time). If the work had been truly destroyed, *the same work* could no longer be restored; at best, a *new* work would be created. In this line of reasoning, restoration processes do not restore *works* (types) (this is not possible because works as *types* are indestructible), but are *realizations* of works. The complex relations between the *work type* and its realizations is illustrated by the historical case of the sculpture group of the so-called *tyrant slayers* (see Text Box 3). Such examples demonstrate that some artifacts are more stable over time than their realizations. Understanding transtemporality as "timelessness" or "a-temporality is therefore highly relevant for artifact theory.

As we have seen, all three approaches to transtemporality discussed so far do not spell out clearly how they relate to artifacts. We therefore propose "artifact assemblage" as an alternative approach to conceptualizing the various temporal dimensions and references of artifacts.

Text Box 3: The Tyrant Slayers – Type and Token

The famous "tyrant slayers" – a statue group representing Harmodios and Aristogeiton – exemplify how the temporality of artifacts and the distinction between type and token illuminate each other. The original statue group, created in bronze by the sculptor Antenor around 508/507 BC, shortly after the introduction of democracy in Athens and placed in the Agora, was highly significant as a political testimonry to Athen's young democracy.[63] It commemorated the tyrannicide of 514 BC, which was anchored as the founding act of democratic freedom in the collective memory of Athens' citizens. The statue group developed an exemplary transtemporality: despite being stolen and

60 Achim Landwehr (2016). *Die anwesende Abwesenheit der Vergangenheit. Essay zur Geschichtstheorie*. Frankfurt am Main; pp. 150, 152.

61 Sam Baron/Kristie Miller/Jonathan Tallant (2022). *Out of time. A philosophical study of timelessness*. Oxford.

62 See Maria Elisabeth Reicher: *Werk und Autorschaft. Eine Ontologie der Kunst.* [Note 33], pp. 54–67.

63 Burkhard Fehr (1984). *Die Tyrannentöter oder: kann man der Demokratie ein Denkmal setzen?* Frankfurt am Main; Sascha Kansteiner et al. (2014–). *Der Neue Overbeck*. Berlin/Boston.

restored, it persisted in a way that illustrates the difference between the work as an abstract type and its realizations (tokens).
The statue group was not only a historical artifact, but also an example of how an immaterial type of work can outlive the temporal distance of its material tokens. The original statue group was looted and taken to Persia during the Persian Wars in 480/479 BC, but the work continued to exist as a type, so that a new realization could be created later. A replacement, created by the sculptors Kritios and Nesiotes as early as 477 BC, was not a copy in the craftsmanship sense, but a new realization of the same type of work: The idea of the tyrant slayers monument was updated, not reinvented, and it can be assumed that the new group looked different from the original, since in the early classical period around 477, completely different forms of artistic expression were used than in the late archaic period around 508/507 BC. It was also erected in the Agora of Athens in the same place. Remarkably, the group stolen by the Persians was brought back to Athens by Alexander the Great, so that from that time on, two versions (tokens) of one type were placed side by side in the Agora. But the story does not end here; in Roman times, the early Classical group was copied many times and taken to other places. Copies currently kept in the Museo Nazionale in Naples and the Louvre in Paris are also tokens of the same type, even though they are made of different materials (marble instead of bronze) and exist in different locatities. These copies are the only remaining versions of the group, as the two original bronze groups have been lost.
This history of the tyrant slayer statue group points to the complex relationship between the abstract type (work) and its spatially and temporally specific tokens. The tokens can be lost, destroyed, or altered without necessarily destroying the type itself. The persistence of the work type is based on tradition, attribution, and relative stability of meaning; the persistance is therefore not purely ontological, but culturally grounded. Herein resides its connection to the transtemporality of artifacts lies: the tyrant slayers appear "timeless" because the work type remained stable as a political and aesthetic symbol over centuries, even though its tokens were subject to historical transformation and destruction.
But the group of the tyrant slayers also forces us to consider the limits of the type/token distinction. Although the sculpture group is a single work with multiple realizations, the materiality, context, and historical reception of each token create additional layers of meaning that are not fully absorbed into the work type. For instance, the Roman copies do not simply render the original Greek type but also mirror the Roman reception of Greek art. They thus form new artifact assemblages, as do the current museum displays in Paris and Naples.

3.2 Artifact assemblage

Our exposition of the concept of artifact assemblage starts with the theoretical foundations of the concept of assemblage developed in the humanities and social sciences over the past 40 years. We then employ the concept as a heuristic tool to understand the temporal dimensions of artifacts.
Mikhail Bakhtin's notion of "chronotope"[64] refers to the fact that humans always perceive the imensions of time and space in relation to each other, for instance when they describe spatial relationships through temporal structures, and the other way round. Chronotopes, as space-time connections, always relate to a specific perspective and thus enable an empirical approach to concrete meanings (and practices of attributing

64 Mikhail M. Bakhtin (1981). *The dialogic imagination: Four essays by M. M. Bakhtin*. Translated by Caryl Emerson and Michael Holquist. Austin.

meaning).[65] After the broad reception of Bakhtin's concept of "chronotope" in literary studies, it was also adopted in social and cultural anthropology to make sense of the "spatialization of time". In spite of its broad application, its major shortcoming, consisting in its semantic indeterminacy, persisted. The failure to clearly spell out the exact meanings of the concept continues to haunt contemporary scholarship, such as when Kristina Wirtz variously refers to "chronotope" as an object founded on signs (hence, an artifact), as an interactional performance (that is, an ability or skill), and as a "moment" (that is, a specific act?).[66] As a result, the relation between chronotopes and artifacts remains underdetermined. The same observation holds true for archaeology, where the concept has recently been applied to urban settings and performances, yet without explicit reference to artifacts.[67]

The concept of assemblage offers a first step to determine the relation between chronotopes and artifacts. Initially coined by Gilles Deleuze and Félix Guattari, this concept[68] goes beyond "chronotope." It emphasizes the composite nature of an entity rather than the properties of its elements.[69] Similar to chronotopes, assemblages also refer to the dimensions of time and space, such as when Deleuze and Guatarri speak of “content” and “expression” (i.e., categories of semiotics that address the attribution of meaning) and of "(de)territoriality" (which renders concrete the category of space). Still, Deleuze and Guatarri's concept of assemblage is similarly underdetermined as the concept of chronotope in that they, too, fail to specify which types of individual entities can be organized into assemblages and also, whether artifacts count as such individual entities or even must count as such. Even in further elaborations of assemblage theory by authors such as Manuel DeLanda, there is no systematic consideration of the concept of artifact.[70]

Theodore Schatzki goes further in that he does not use the term "assemblage" but instead speaks of “arrangements”, which he conceives as composite, material entities. He distinguishes between four types *of material entities*: humans, organisms, natural things, and artifacts.[71] He understands the relations between the individual elements not merely as spatial, but as *causal relations*. These are primarily established through causal action.[72] Still, even in Schatzki's more recent publications, there is no precise definition of the term "artifact."[73]

We draw on the different elements of assemblage theory to develop a conceptual framework that will allow scholars to shed light on the various relationships between time and artifact. We conceive of the objects of investigation as "artifact assemblages" and define their constitutive artifactual elements on the basis of our working definition of "artifact". We purposefully depart from other authors’ tendency to offer spatial or causal accounts of the relations among individual elements of an assemblage, and instead prioritize the *temporal dimension(s)* of these relations.

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65 See Mikhail M. Bakhtin: *The dialogic imagination: Four essays by M. M. Bakhtin*. [Note 64], p. 258.

66 "Chronotopes thus are semiotic products and interactional accomplishments, and they may appear in the stream of interaction in evocative moments rather than as totalizing wholes." Kristina Wirtz (2016): The living, the dead, and the immanent. Dialogue across chronotopes. *Journal of Ethnographic Theory* 6 (1), 343–369, p. 349.

67 Stefan Feuser (2020/2021). Temporalität und die antike Stadt. *Boreas* 43/44, 149–173.

68 Gilles Deleuze/Félix Guatarri (1992). *Tausend Plateaus*. Berlin, pp. 698-701.

69 Gisela Welz (2022). Assemblage. In: Peter Hinrichs/Martina Röthl/Manfred Seifert (eds.). *Theoretische Reflexionen. Perspektiven der Europäischen Ethnologie*. Berlin, 161–176, p. 161.

70 The word "artifact" does not appear in DeLanda's relevant book: Manuel DeLanda (2006). *A new philosophy of society. Assemblage theory and social complexity*. London/New York.

71 "By 'material arrangements' I mean a set of interconnected material entities. The entities that make up arrangements can be segregated into four types: humans, artifacts, organisms, and things of nature. […] Entities of these sorts connect in various ways, most prominently through causality, which in many cases is the causality exerted on the world in human activity (e.g., setting things up).” (Theodore R. Schatzki (2010). Materiality and social life. *Nature and Culture* 5, 123-149, p. 129)

72 The causal interpretation can also be found in: Colin McFarlane (2011): Assemblage and Critical Urban Praxis: Part One. Assemblage and critical urbanism. *City* 15 (2), 204–224, p. 207.

73 Theodore R. Schatzki (2019). *Social change in a material world*. London/New York.

We conceive of an artifact assemblage as an intentional or unintentional arrangement of the elements of a class of entities that consists at least in part of material or immaterial artifacts. This characterization is deliberately broad. The broad term provides a descriptive tool for a wide range of cases. An artifact assemblage is not limited to material entities (as Schatzki would have it); immaterial artifacts, too, can form assemblages or be part of them. This observation applies, for instance, to theoretical systems that are composed of different theoretical elements; to currencies that follow and replace each other over time; and to sequences of individual elements of a song cycle such as Schubert's *Winterreise*. Although the term "artifact assemblage" brings to mind intended arrangements (such as carefully assorted arrangements of buildings, flowers, or accessories), there are also unintentional artifact assemblages, such as in the case of furnishings of a house that have been collected over many years and by different people.

Two examples may illustrate how the concept allows to assess in a differentiated manner the temporal structuring of relations between artifact assemblages and their producers and recipients. We often *do not know* whether a specific artifact assemblage is intentional or unintentional. A well-organized *bookshelf* may be an intentionally produced assemblage, but a book may have been lost or stolen. Alternatively, the owner of the book collection might think that a particular book has been added by chance, when in fact she added it deliberately a long time ago. This openness to unintentional changes is something our concept of artifact assemblages shares with our working definition of artifacts. A bookshelf containing a book collection is still an artifact, even if it has undergone unintended changes). Yet from this does not follow that *all* artifact assemblages are also artifacts. A *field of urban ruins* created by a volcanic eruption is an artifact assemblage (because it is an arrangement of things that are partly artifacts or artifact fragments). However, it is not an artifact because it does not meet the production condition (1). Our characterization of the "artifact assemblage" is thus specific enough to rule out the possibility that *everything* can be considered an artifact assemblage. All of this illustrates that the concept of artifact assemblage has implications that can result in nuanced and surprising insights even in the case of simple and seemingly straightforward examples.

3.3 Artifact assemblage and time

The assemblage concept is very open to the consideration of the temporal dimension(s) of artifacts. In contrast to conventional concepts such as "ethnos", "culture" or "community", the concept of assemblage is productive in that it enables the description of a social entity without making implicit assumptions about its spatio-temporal situation and structure. Characterizing a composite entity as a social community or culture implies definitions of a definable territory, homogeneity, and temporal stability. In contrast, the assemblage concept is flexible enough to describe entities that are territorially indeterminate, structurally heterogeneous, and temporally ephemeral.[74] The relative openness of the concept importantly broadens the scope of our conceptual framework for interdisciplinary research of the temporal dimension of artifact assemblages.[75] "Artifact assemblage" allows scholars to investigate social entities with "transitory temporality", without excluding the possibility that there also exist territorially defined and permanently existing assemblages.[76] In what follows, we return to the three perspectives on temporality and time we outlined in the above discussion of the

74 See Gisela Welz: *Assemblage*. [Note 69], pp. 161–176.
75 One exception: Yannis Hamilakis (2017): Sensorial Assemblages: Affect, Memory and Temporality in Assemblage Thinking. *Cambridge Archaeological Journal* 27, 169–182.
76 See Gisela Welz: *Assemblage*. [Note 69], p. 162.

meanings of transtemporality and explain how our working definition of artifacts and our concept of artifact assemblage might benefit each of these approaches.

Firstly, attending to artifact assemblages and their complex temporal dimensions allows scholars to overcome the limitations of object biography research and instead to finetune the analysis to a specific set of temporal formations and relations. In other words, interpreting the products of human cultural creativity as elements of an artifact assemblage allows us to describe the temporal relationships between artifact creators and the artifacts they create in precise terms, such as by illuminating the coexistence of linear ("biographizing") and non-linear transtemporalities. The concept also makes room for equal consideration of immaterial and material artifacts.
Institutions are a vivid example of the complex time structures that artifacts may generate. The institution of the "German Bundestag" usually lasts for a maximum of four years (GG, Article 39 (1)). With the reconstitution of the Bundestag after each federal election, a new institution is founded in which, *ex ante*, no member of the previous Bundestag has a prominent or even fixed position. That has significant consequences for democratic theory and practice becomes clear when one takes a closer look at the period during the new election. The possibility of a "parliamentary vacuum" between the Bundestag election and the constitution of the new Bundestag was conceivable in the early years of the German Federal state. Only in 1976 was a constitutional amendment passed that stipulated that the term of office of the old Bundestag does *not* end with the Bundestag election: "Its term of office ends with the convening of a new Bundestag" (”Seine Wahlperiode endet mit dem Zusammentritt eines neuen Bundestages“, GG, Article 39 (1)). Only this constitutional amendment guaranteed that there could be no periods in which "the federal government will not face a fully functioning representative body" (“der Bundesregierung keine voll arbeitsfähige Volksvertretung gegenüberstehen wird.“)[77] Application of our working definition of artifact and the concept of artifact assemblage illuminates the temporal discontinuities of the Bundestag as a democratic institution (i.e., as an immaterial artifact whose temporal structure is defined purely in constitutional terms) and helps relate them to the longer-lasting material components of the artifact assemblage "Bundestag" (e.g., people involved, buildings, locations), to account for this complex and continuously functioning institution.
Secondly, the concept of "artifact assemblage" enables scholars to illuminate previously disregarded connections between **chronoferences** and artifacts. Although it is evident that artifacts (by inviting actors to perceive or form ideas about them) may help to bring absent times to mind, it is unclear how exactly this may happen. Interpreting chronoferences as part of an assemblage of artifacts, artifact-related actions, and corresponding perceptions and ideas provides an entry point to answer to this question. This line of investigation also opens up the possibility of specifying the role of artifacts in the "simultaneity of the non-simultaneous" („Gleichzeitigkeit des Ungleichzeitigen“)[78]. The same observation applies to sites such as the aforementioned urban ruins caused by an volcanic eruption or other catastrophe. Here, too, the concept of assemblage allows to identify various temporal dimensions, such as, for instance, seasonality.[79] Drawing on assemblage theory allows us to refine Landwehr's concept by elaborating on hitherto unclarified temporal aspects of artifacts and artifact relations.
Thirdly, our concept of artifact assemblage brings further clarification to the so-called “timelessness” of artifacts. "Timeless" artifacts appear puzzling or in need of explanation only as long as they are considered as isolated individual entities: the (metaphorically

77 Deutscher Bundestag – 7. Wahlperiode: Gesetzentwurf der Abgeordneten Dr. Klein (Göttingen), Dr. Lenz (Bergstraße), Gerster (Mainz) und der Fraktion der CDU/CSU. Drucksache 7/5307 vom 4. Juni 1976.
78 Achim Landwehr (2012). Von der „Gleichzeitigkeit des Ungleichzeitigen“. *Historische Zeitschrift* 295, 1–34.
79 Achim Lichtenberger/Rubina Raja (eds.) (2021). *The Archaeology of Seasonality*. Turnhout.

speaking) "timeless" masterpiece is regarded as absolutely unique, i.e., as categorically different from all other things. But as soon as we perceive the "timeless" masterpiece as an element of an artifact assemblage, it becomes apparent that its alleged "timeless" refers to the *temporal stability* of its significance as a work of art, which makes this work stand apart from other objects that belong to the same assemblage but have only ephemeral meaning. In other words, what makes the masterpiece “timeless” is the comparative impermanence of other assemblage components. The concept of artifact assemblage thus opens up many possibilities for relating the specific temporalities of individual elements to each other. Such a comprehensive consideration of the place of individual elements in artifact assemblages can be applied to numerous phenomena, ranging from buildings to amulets and coins interpreted in this or a similar way as elements of an assemblage.
All these examples demonstrate the heuristic fruitfulness of the conceptual framework we proposed for a methodical and systematic investigation of the temporal dimension of **artifacts** and **artifact assemblages**. Questions addressed in future research include: To what extent and in what sense must the investigation of artifacts take their temporality into account? What specific temporal references must a suitable conception of time establish in order to adequately describe the temporality of artifacts and artifact assemblages? Only by examining these questions in relation to one another can we gain a sound understanding of the complex relationship between **time** and **artifacts**.

4. Goals and perspectives of a research agenda on time and artifacts

Our research agenda can be summarized as follows: We define **artifacts** as the class of entities that have been created or designed by human action. In this, artifacts differ from purely natural objects. Functions can often be attributed to artifacts. While the functions relate to the intentions of the manufacturers, all production processes and all functions (attributions) of artifacts are time-bound.
We envisage a new interdisciplinary research agenda that addresses the intersections of time and artifact and revolves on the following key points:

- There are **material and immaterial artifacts**. These differ considerably from each other in terms of their temporal becoming and passing. The extensive corpus of historical and cultural studies case studies has primarily researched material artifacts to date. It can thus serve as a valuable source of material and a contrasting foil for better understanding the temporality of immaterial artifacts.
- Artifacts do not exist in isolation from one another, but are organized into classes and ensembles. Because they may consist of many artifacts and also non-artifactual entities (natural objects, people, etc.), their internal structuring can be understood through the concept of artifact assemblage. This concept is particularly suitable for describing the temporally variable relationships between the various elements of assemblages (artifacts and other entities).
- Artifacts are neither timeless nor static. All artifacts persist over time. Some persist only ephemerally, others over long periods of time. The term transtemporality, with its three meanings, allows to shed light on important temporal dimensions and relations of artifacts.
- The passage of time is not always linear; human perception of time and temporal action applies different, sometimes non-linear concepts of time.

Interdisciplinary dialogue and multiplicity of perspectives are indispensable for a comprehensive analysis of the multiple relations between time and artifacts. Yet, while some disciplines prioritize historical-empirical questions and particular case

studies, others are driven by a systematizing and synthesizing approach. What is a consensually accepted assumption in one discipline may be a challenging or even controversial thesis from another research perspective. What some disciplines consider an innovative "turn" may appear to be a problematic narrowing of the research perspective from another discipline's point of view. Because of these significant differences between disciplinary perspectives and approaches, interdisciplinary dialogue poses serious methodological and conceptual challenges. To bring the diverging perspectives on time and artifacts must be brought into productive dialogue, it is important to develop shared research trajectories and questions, without overly circumscribing individual research interests and methodologies. In this article, we have presented the first steps toward realizing such a research agenda, in the form of a shared conceptual framework.

Acknowledgement:

This paper is the result of joint discussions for a collaborative research proposal. The concept was developed primarily by the authors but we benefited greatly from discussions with colleagues from Münster. We would like to express our special thanks to Reinold Schmücker as well as to Lioba Keller-Drescher, Jan Keupp, Niko Strobach.