



Not “what”, but “where is creativity?”: towards a relational-materialist approach to generative AI

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Abstract

The recent emergence of generative AI software as viable tools for use in the cultural and creative industries has sparked debates about the potential for “creativity” to be automated and “augmented” by algorithmic machines. Such discussions, however, begin from an ontological position, attempting to define creativity by either falling prey to universalism (i.e. “creativity is X”) or reductionism (i.e. “only humans can be truly creative” or “human creativity will be fully replaced by creative machines”). Furthermore, such an approach evades addressing the real and material impacts of AI on creative labour in these industries. This article thus offers more expansive methodological and conceptual approaches to the recent hype on generative AI. By combining (Csikszentmihalyi, *The systems model of creativity*, Springer, Dordrecht, 2014) systems view of creativity, in which we emphasise the shift from “what” to “where” is creativity, with (Lievrouw, *Media technologies*, The MIT Press, 2014) relational-materialist theory of “mediation”, we argue that the study of “creativity” in the context of generative AI must be attentive to the interactions between technologies, practices, and social arrangements. When exploring the relational space between these elements, three core concepts become pertinent: creative labour, automation, and distributed agency. Critiquing “creativity” through these conceptual lenses allows us to re-situate the use of generative AI within discourses of labour in post-industrial capitalism and brings us to a conceptualisation of creativity that privileges neither the human user nor machine algorithm but instead emphasises a relational and distributed form of agency.

Keywords Creativity · Generative AI · Creative labour · Mediation · Materiality · Relationality

1 Introduction

Through 2022 and 2023, the topic of “creative AI” has been widely discussed in popular media, industry events, online spaces, and academic contexts. With the rapid development of so-called “generative AI” software such as Midjourney, Dall-E, ChatGPT, and Stable Diffusion, old questions regarding the possibilities of machine-automated creativity have once again become an object of interest.¹ Users, developers, and scholars have rushed to either celebrate their potential benefits for the cultural and creative industries or to express their concerns regarding issues of labour, copyright, bias, environmental footprint, and deeper existential threats. Yet the question regarding computer creativity is not new. Historically, creativity has been perceived as one of

the “bulwarks of human exceptionalism” (Gunkel 2021, p. 385), that is, as the limit of those human abilities that cannot be computable. Similarly, Emmanuele Arielli (2021, p. 7) argues that creativity is often considered a “quintessentially human domain” since “its intractability and complexity have long appeared as insusceptible to algorithmic reduction”. From this perspective, creativity appears as “the pinnacle of human abilities and therefore represents a final bulwark against the seemingly unstoppable advances of AI” (Arielli 2021, p. 7).

Much of the current debate oscillates between those who insist that creativity is an exclusive human feature—what Turing (1950) had already called “the Lovelace objection”—and hence that machines can, at most, merely imitate the appearance of creativity (Moruzzi 2023, p. 250; Gaut 2010, p. 1040; see also Hertzmann 2018 and Murray 2023), and those who claim that, with enough data and processing

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¹ For an overview of “Generative AI” as a form of machine learning, see Carle (2023), Huang and Siddarth (2023), and Jovanovic and Campbell (2022).

power, machines can eventually achieve genuine creative processes capable of both generating novel combinations and assessing their value (see Newell et al. 1959; Kurzweil 2012; Malabou 2019; Arielli 2021). Between these two poles are those who argue that machines are not here to replace human creativity but rather to “augment it” (Finn 2017, p. 186; Manyika 2023; Vinchon et al. 2023; Moruzzi 2023). This augmentation can be either quantitative or qualitative. In a quantitative sense, AI technologies can affect the speed and quantity of creative work (automating certain tasks, supporting efficient workflow, facilitating the production of variations), while in a qualitative sense, it might shift the role of human creative input (channelling its focus into ideation, nuanced editing, or creative direction), reduce the entry barrier into artistic practices (*qua* “democratising” art), or open the door to completely novel types of art. Despite their stark differences, the three points of view presuppose that there is such a thing as “creativity”, a concrete faculty or operation (human or technical) that can be identified, defined, measured, imitated, and potentially automated. Put differently, in all these approaches, creativity is understood as a (mental) faculty that an individual entity (a human, a living organism, a computer) possesses or may possess. These approaches begin by asking “what is creativity”, and once defined, proceed to evaluate whether a specific individual or machine fits under this definition. Simone Natale and Leah Henrickson (2022, p. 2) call this approach the “ontological definition of creativity”, and Joanna Zylinska (2020, p. 49) contends that simply asking “what is creativity” to assess the creative value of AI-generated art is a “misguided question”.

In the 1980s, psychologist Mihaly Csikszentmihalyi (2014) posited a “systems model of creativity”. According to Csikszentmihalyi, the study of creativity should move away from psychological or ontological frameworks focused on the mental faculties of “creative individuals” towards a systemic framework focused on “the social and historical milieu in which their actions are carried out” (2014, p. 47). This entails moving away from the question “what is creativity?” towards “the simple question that should precede attempts at defining, measuring or enhancing, namely: where is creativity?” (Csikszentmihalyi 2014, p. 47). In the context of recent debates surrounding generative AI, Csikszentmihalyi’s lesson may prove useful: rather than thinking about AI creativity as the mere automation of a (profoundly human) mental faculty, we would examine the rise of these “creative machines” by paying attention to the intricate relations between technologies, practices, and social forces. Thus, the aim of this article is to offer methodological and conceptual approaches to the recent hype on creative machines without falling prey to universalism (i.e. “creativity is X”) or reductionism (i.e. “only humans can be truly creative” or “human creativity will be fully replaced by creative machines”). By combining Csikszentmihalyi’s (2014) shift from “what” to

“where” is creativity and Leah Lievrouw’s (2014) materialist and relational theory of “mediation”, we argue that the study of “creativity” in the context of generative AI must be attentive to the interactions between technologies, practices, and social arrangements. As we will see, when exploring the relational space between these three elements, three core concepts become visible: creative labour, automation, and distributed agency.

2 Creativity: two traditions

In J. P. Guilford’s 1950 address to the American Psychological Association, he defined creativity as “the abilities that are most characteristic of creative people” and that these abilities must be distinguished from intelligence (understood as purely rational thought processes) and must be able to account for that which is necessary to produce “novel ideas” (1950, pp. 444–452; see Gaut 2010, p. 1035; Kaufman and Glaveanu 2019, p. 12; Still and D’Inverno 2016, p. 147). According to Kaufman and Glaveanu (2019, p. 12), Guilford’s address led to a proliferation of scientific studies of creativity and, as such, represents a “before and after” in the concept’s “historical narrative” (see Gaut 2010, p. 1035). Despite acknowledging the influence of Guilford’s speech, Arthur Still and Mark D’Inverno (2016) prefer to trace the concept of creativity further back in Western philosophy, arguing that the contemporary understanding of the notion of creativity is the result of an overlap and confusion between two different traditions: “N-creativity” and “G-creativity”.

N-creativity, Still and D’Inverno (2016, p. 149) suggest, can be traced back to the writings of Lucretius and his use of the Latin notion *creare*, meaning “to bring about”, whereby creativity is the natural process which allows for the emergence of the new in nature. This is a materialist (but not mechanistic) understanding of creativity that applies to nature in general (and is not restricted exclusively to human agents or even to living beings). For Lucretius, all change in the world—what could be considered as the emergence of “the new”—occurs from the encounter of existing atoms or the combination of “the old”. Each of these novel combinations, however, is not the result of a purely mechanistic combinatorial game since the encounter between the existing atoms is based on the principle of unpredictability (*clinamen*).

G-creativity, on the other hand, can be traced back to Christian theology and refers to God’s creation of the universe. Creativity here means *creatio ex nihilo*, which is “creation out of nothing but ideas in God’s mind” and in this tradition, Still and D’Inverno (2016, p. 149) argue, creativity is closer to the Latin term *facere* (“to make”) than to the original meaning of *creare*. Guilford’s (1950) concept of creativity as a psychological feature of creative individuals would

fall under this category of God-like creativity. Creativity is thus thought of as a divine capacity and later expanded to humans (as a sign of us being the closest to God and as an expression of our unique autonomy and intentionality).

Furthermore, Still and D’Inverno (2016) suggest that the modern notion of the artist has been informed mainly by the tradition of G-creativity. This idea of the artist becomes particularly explicit during the Romantic period with the notion of the artist as “genius”, and continues to strongly inform current understandings of creativity as a strictly human faculty (requiring both intentionality and autonomy).² Yet, in the last few decades there has been significant “mingling and overlapping” between the two traditions of creativity and this has caused a high degree of “confusion” when addressing the issue of machine creativity (Still and D’Inverno 2016, p. 152). For this reason, to critically assess the current debates on “artificial creative systems” it is paramount to “formalise the language of both theories” and to “prise them apart” (Still and D’Inverno 2016, p. 153).

To a certain extent, it could be argued that N-creativity already paves the way for a conceptualisation of creativity that is both relational—from creativity as an individual faculty towards an awareness of the relation between the organism and the environment—and materialist—it displaces it from the idealistic account of creativity as a god-like act that creates “out of nothing” towards a materialist notion that focuses on the creative power of matter and/or living beings.³ Yet, Still and D’Inverno’s (2016, p. 153) attempt to “formalise” both theories and to use this formalisation to both “design” new artificial creative technologies and to “assess” their “success or failure” still reproduces an ontological approach to machine creativity that begins from the question of what is creativity and then uses this definition as a normative and ontological framework. Hence, and despite their significant contribution to the issue of machine creativity, we argue that to develop a more adequate (materialist and relational) approach to this phenomenon, we need to move beyond the question of “what is creativity” towards “where is creativity”.

² Oli Mould (2020, p. 7) speaks of the creative genius as a “privatisation of creativity” and argues that current debates of creativity in contemporary capitalism are mainly informed by this process of privatisation.

³ Zylinska (2020, p. 65) contends that Still and D’Inverno’s concept of N-creativity is an important contribution to the study of machine creativity not only because of its focus on the relation between the organism and the environment, but also because this concept can account for the “multiple technical apparatuses” that shape this relationship.

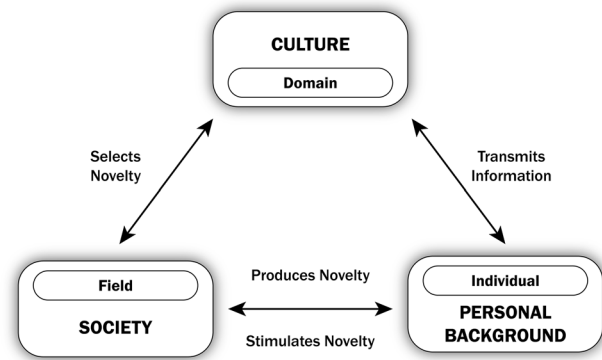


Fig. 1 Mihaly Csikszentmihalyi’s (2014) systems model of creativity

3 From what to where is creativity

Unlike Guilford, Csikszentmihalyi argues that creativity is not located in the mind of an individual or in the product of a creative act, but rather in the relational space between social institutions, cultural domains, and individuals (see Fig. 1):

[W]e cannot study creativity by isolating individuals and their works from the social and historical milieu in which their actions are carried out. This is because what we call creative is never the result of individual action alone; it is the product of three main shaping forces: a set of social institutions, or field, that selects from the variations produced by individuals those that are worth preserving; a stable cultural domain that will preserve and transmit the selected new ideas or forms to the following generations; and finally the individual, who brings about some change in the domain, a change that the field, will consider to be creative. (Csikszentmihalyi 2014, p. 47)

Csikszentmihalyi emphasises that the relationships established between these three elements are those of “circular causality” (2014, p. 51). This means that “each of the three main systems—person, field, and domain—affects the others and is affected by them in turn” (Csikszentmihalyi 2014, p. 51). As we can see, Csikszentmihalyi’s shift from what to where creativity is also involves an awareness of the multi-sided and relational aspects of creativity. It is not the faculty of an individual person nor the individual product of an isolated creative act. Rather, creativity takes place in the relational space between individuals, their cultural domain, and a specific field of knowledge, where each of these elements or systems affect the others in a relation of co-determination, either constraining or amplifying the production of valuable novelty.

However, Csikszentmihalyi’s “systems model” fails to properly account for the role of technology in creative

processes.⁴ Despite its relationality, this approach remains limited to a form of social constructivism that does not account for the role of technology as an important aspect in a materialist understanding of creativity; the model ignores how technology affects and is affected by the various social systems. This is not only a problem in our specific case of creative machines and generative AI, but a general shortcoming of Csikszentmihalyi's systems model of creativity deployed in any context (which becomes more obvious when dealing with the specific question of the relation between creativity and computers).

More recently, Simone Natale and Leah Henrickson (2022) have also challenged those approaches to AI creativity that tend to focus on what computers can or cannot do. They claim that these approaches are grounded on the “ontological definition of creativity” (2022, p. 2). To approach the question of creativity ontologically means, in Csikszentmihalyi's terms, to focus on what creativity is. Instead, Natale and Henrickson suggest shifting the analytical focus “to the reactions and perceptions of human users who enter into interactions with them” (2022, p. 2). As an alternative to Turing's “Lovelace objection” (1950), Natale and Henrickson coin the concept “the Lovelace effect” to “describe situations in which the behaviour of computing systems is perceived by users as original and creative” (2022, p. 2), focusing on analysing the specific social, historical, cultural, and institutional conditions under which users perceive computers as being creative. This resonates with Csikszentmihalyi's claim that the attribution of creativity is “grounded in social agreement” (2014, p. 49), and with his general shift from “what” to “where is creativity”. Furthermore, Natale and Henrickson's “Lovelace effect” can be read as an attempt to emphasise how “imaginaries” surrounding a given technology shape the design, uses, and effects of this technology,⁵ an important move in shifting the focus away from the analysis of creativity in ontological terms. Yet too much emphasis on the social and cultural context risks missing the focus on the relational and materialist points of view and becomes a form of over-simplified or reductionist social constructivism. In this sense, neither Csikszentmihalyi's systems model nor Natale and Henrickson's “Lovelace effect” alone can adequately account for the materiality of the actual

⁴ In the original paper on individuals, fields, and domains there are no references to the role that technology plays in creative practices (Csikszentmihalyi 2014). In a short text on business innovation written in 1995, the author mentions that technology is a specific “domain”, one of the many “internal forces acting on creativity” but does not develop this idea any further (Csikszentmihalyi and Sawyer 2014, p. 69).

⁵ The “Lovelace effect” can be considered part of a larger body of literature that focuses on the “socio-technical imaginaries” of algorithmic technologies. See, for example, Bucher (2017; 2018) and Beer (2017).

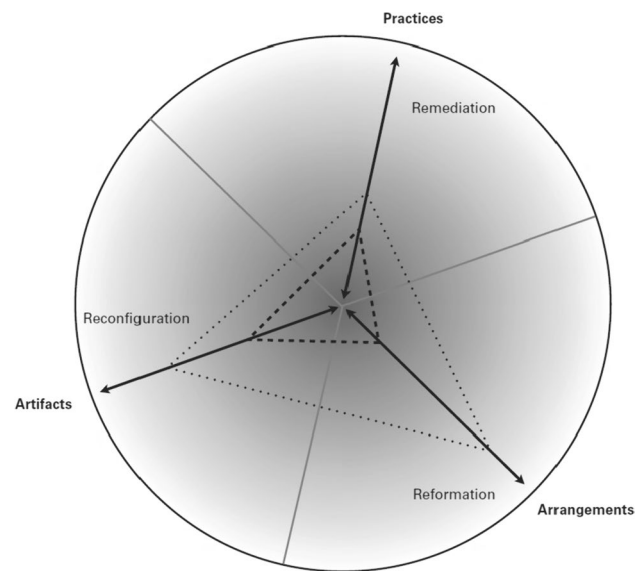


Fig. 2 Leah Lievrouw's (2014) diagram of mediation

technologies involved in the processes that are being deemed as creative in a given social, cultural, and historical context. To further advance the shift from what to where creativity is, and to reinforce its materialist dimension, we suggest employing Leah Lievrouw's (2014) “diagram of mediation”. This analytical framework can counteract the tendency, visible in both Csikszentmihalyi's and Natale and Henrickson's approaches, to overemphasise the social and cultural dimension at the cost of abandoning a more considered analysis of the materiality of the technical objects. Furthermore, Lievrouw's diagram replaces the concept of individuals with that of practices, strengthening a more materialistic approach to the role of human agents.⁶

4 Lievrouw's diagram of mediation

Lievrouw's influential “diagram of mediation” offers a conceptual and methodological contribution to analyses of media objects from a materialist and relational perspective (see Fig. 2). Aimed mainly as a critique of dominant forms of cultural (or social) constructivism in both media studies (e.g. “cultural turn”) and philosophies of technology (e.g. “social constructivism of technology”), Lievrouw writes that her theoretical approach speaks to “the shift toward conceptualizing the intrinsic social and material character of communication technology as equally definitive and

⁶ For this shift from individual agents to the materiality of practices, see, for example, Bourdieu (2008), Giddens (1986), and de Certeau (2013).

co-determining”, a trajectory that “remains something of an unfinished project in communication and media research” (2014, p. 24).

The two frameworks examined in the previous section (Csikszentmihalyi 2014; Natale and Henrickson 2022) can be categorised within the “constructivist, culturalist line” as defined by Lievrouw: frameworks that privilege the social and cultural dimension of creativity over a closer analysis of the materiality of the technical devices involved in creative practices. According to Lievrouw, these “culturalist” theories often interpret any attempt to focus on the materiality of technical devices as a form of “technological determinism” in which the “sheer material presence of technological artifacts influences and shape human action” (2014, p. 23). From this perspective, “the claim that artifacts might have power, and even agency, comparable to that of human actors is controversial to say the least” (Lievrouw 2014, p. 23). To step outside of this binary antinomy between social constructivism and technical determinism, Lievrouw claims that it is necessary to assume a perspective that is both materialist and relational, shifting from a deterministic, one-sided materialism, towards a “relational materialism” capable of accounting for the mutual shaping (co-determination) between technologies and social structures.⁷

The problem, Lievrouw tells us, is that materiality itself “is a complex, multidimensional idea, and open to a variety of interpretations, emphases, and disciplinary assumptions” (2014, p. 25). This means that materiality can be understood in a plethora of ways, leading to different interpretations of what it means to be a “materialist”. Many of these interpretations carry a deterministic aspect and are often categorised as “vulgar” or “reductionist” forms of materialism. To avoid falling into these simplistic and deterministic forms of materialism, Lievrouw proposes an understanding of materiality based on a “three-part definition” in which media objects are conceived as the “articulation” between “technical artifacts, practices, and social arrangements” (2014, p. 25). This means that a materialist theory of mediation should be able to account for the “physical character” of technical objects (“the materiality of the devices themselves”), the “materiality of practices”, and the materiality of “social or institutional forms” (2014, p. 25).⁸

With this threefold definition of materiality, Lievrouw attempts not only to go beyond the dominant strand of social constructivism in media studies, but to avoid falling into any form of reductionism that explains media phenomena as a “causal effect” of any of these three aspects on their own. Excessive emphasis on any of these three elements, she claims, will translate into a “reductionist” analysis of media objects:

[S]tudies that focus on “uses” of technology, risk falling into simplistic “instrumentalism”; those that focus primarily on “technology” tend toward “technological determinism”; while an exclusive focus on ‘social context’ can lead to “social determinism”. (Lievrouw 2014, p. 44)⁹

To avoid falling into any of these three forms of reductionism, Lievrouw’s framework examines the relations of co-determination between three different material forces: technological devices (or artefacts), practices, and social arrangements. These relations are dynamic and interdependent and refer to processes of mutual shaping.¹⁰

Lievrouw’s concept of mediation is hence based on this intersection between materiality and relationality, thus offering a framework for understanding “the mutually constitutive elements of new media technology” (Lievrouw 2014, p. 45). In the diagram of mediation (Fig. 2):

[A]ll three elements and their corresponding processes articulate and influence one another. Artifacts are made, implemented, and remade according to people’s purposes and actions, as well as the social structures and institutional sanctions that enable or constrain them [...] Similarly, devices and systems that exist in a given time and place shape users’ practices and larger social expectations about what the artifacts can do, what they are for, and what people might actually do with them. [...] Social and institutional formations also respond and adapt to available systems and devices and to communication practices and norms. (Lievrouw 2014, p. 47)

⁷ As Taina Bucher (2018, p. 50) argues, a “relational ontology” must also be a “relational materialism”. This means that agency has to be understood as emerging from the relation between different material aspects of reality.

⁸ Lievrouw had already developed this threefold definition of the materiality of media in her work with Sonia Livingstone (2006). In their *Handbook of New Media*, the authors define information and communication technologies as “infrastructures with three components”: (a) “the artefacts or devices used to communicate or convey information”; (b) “the activities and practices in which people engage to communicate or share information”; and (c) “the social arrange-

Footnote 8 (continued)

ments or organizational forms that develop around those devices and practices” (Lievrouw and Livingstone 2006, p. 2).

⁹ Lievrouw borrows this threefold reductionism from Lincoln Dahlberg (2006).

¹⁰ Lievrouw and Livingstone write that “it is precisely the dynamic links and interdependencies among artefacts, practices and social arrangements that should guide our analytic focus” (2006, p. 3), and then add that their suggested framework should focus on the “mutual shaping process in which technological development and social practices are co-determining” (2006, p. 4).

In sum, the relations between artefacts, practices, and arrangements are dynamic, each “builds on and reinforces the others; a shift in one aspect can generate corresponding shifts in the other two” (Lievrouw 2014, pp. 47–48), which is not unlike Csikszentmihalyi’s discussion of dynamic relationality using the notion of “circular causality” (2014, p. 51). Both Csikszentmihalyi’s and Lievrouw’s diagrams thus attempt to overcome the “linear causality” that defines reductionist and deterministic theories. Furthermore, we believe that Lievrouw’s diagram of mediation allows for more specificity than Csikszentmihalyi’s systems model. First, Lievrouw’s diagram accounts for technology as a material force that plays an active role in the shaping of specific practices and social structures, without this translating into some form of technological determinism. This is an essential aspect of Lievrouw’s diagram when analysing the issue of creativity in the context of generative AI. Second, Lievrouw does not speak of individuals (nor of the relation between individuals and context), but rather, emphasises material practices and social arrangements, foregrounding the material dimension of both these elements. In other words, the shift from individuals and context towards material practices and social arrangements offers a more nuanced concept of materiality than the one often deployed by a purely “social constructivist” or “culturalist” approach.

Based on the diagram of mediation, Lievrouw suggests that a more circumstantial approach to media objects should “capture the multifaceted complexity of technology” and:

be enriched by analytic frameworks and theoretical concepts that attend to the material, tangible features of technological devices and artifacts, as well as their cultural significance and meaning, the values and power they represent, the institutional interests that advance them, and the attitudes and motivations of their users. (2014, p. 50)

That is, the “central question concerning technology today” requires an examination of the “configurations of artefacts, practices, and social arrangements” while asking whether these configurations differ from those of previous technologies (Lievrouw and Livingstone 2006, p. 3). In the following section, we heed Lievrouw’s call and apply her diagram of mediation to the specific problem of creativity in the context of generative AI. In doing so, we examine the configurations between creative practices, social arrangements, and technological devices that shape this specific phenomenon.

5 Where is creativity in the context of generative AI?

We contend that Lievrouw’s diagram of mediation allows for a materialist analysis of the network of relations between generative AI technologies, the creative practices that make

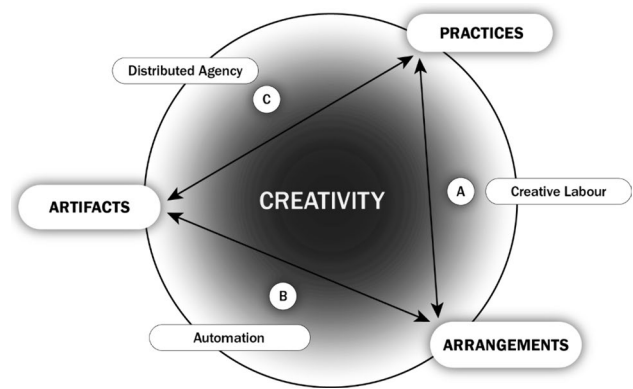


Fig. 3 Where is creativity in the context of generative AI?

use of these technologies, and the socio-economic imperatives behind their design and implementation. More specifically, the diagram of mediation allows us to examine creativity and generative AI specifically via the relations of co-determination between these three domains. This means that we do not examine practices, artefacts, and social arrangements as separate elements. Instead, we focus on the dynamic relations (i.e. the “circular causality”) between them. In doing so, we identify three core concepts that we argue are key to a more critical analysis of the issue of creativity vis-à-vis generative AI: creative labour, automation, and distributed agency (see Fig. 3). In what follows, we examine each of these concepts and their relevance for the specific issue of creative AI. Given the circular logic of these relationships, the order of presentation is purely arbitrary and entails no hierarchical relations. Furthermore, we do not claim that these are the only three concepts that can emerge from applying Lievrouw’s diagram of mediation to the issue of creative AI. These are three useful concepts that emerge from doing so, but emphasis on other concepts is also possible.

5.1 Between arrangements and practices: creative labour

The first aspect to consider is the relation between social arrangements and material practices. In the specific case of creativity in contemporary societies, this relationship can be understood through the notion of creative labour. If we accept that the dominant social arrangement that defines contemporary societies is capitalism, then the question of creative practices should be understood in terms of the capital–labour relation that defines this particular mode of

production.¹¹ In this sense, the concepts of creative labour and creative industries become essential analytical tools for addressing how and where creativity is taking place.¹²

Addressing the issue of creativity through the lens of creative labour and the creative industries discourse highlights its historical dimension: under which conditions has creativity become a specific trait of labour power and a specific source of economic value? This question requires differentiation between creativity as a characteristic of human labour in general and the processes through which creativity has become a specific form of labour in contemporary capitalism. As McKinlay and Smith (2009, p. 43) put it, on the one hand, all human labour “necessarily involves some degree of creativity”, while on the other, “the creative industries are distinctive in that competitive advantage and profitability are dependent not so much upon the routinisation of work but on harnessing individual and collective creativity”.¹³ In this sense, the concept of creative labour highlights the distinctive character of a specific form of (human) labour in which profit is maximised not through standardisation and routinisation, but through the exploitation of novelty and innovation (McKinlay and Smith 2009, p. 47). Put differently, creative labour refers to the process through which the forces of the market attempt to subsume specific traits of human labour under a capitalist relation that can increase profitability under concrete conditions: flexible production, unpredictability, volatility, etc. (McKinlay and Smith 2009, pp. 47–48). Hence, the lens of creative labour allows us to critically assess creativity as both a material practice (the actualisation of a general trait of labour power) and as the result of specific social forces (a historically determined form of value production).

Furthermore, acknowledging the historical character of creative labour demystifies the relationship between creativity and value that seems to dominate current discourses in the creative industries (see, e.g. Florida 2012), and presses us to focus on creativity as a politico-economic phenomenon (Lee 2022, p. 602). This requires a periodisation of the capitalist mode of production and of the relation between

labour and technology (more on this in the following subsection). As McKinlay and Smith (2009, p. 46) argue, even though all forms of human labour can be said to contain a “creative element”, it is also true that industrial capitalism (i.e. Taylorism and Fordism) aims at the standardisation and routinisation of the labour process in a way that this creative element of human labour is no longer “under the direct control of the individual producer”. In industrial production, the creative element of labour is “usually divorced, externalised or collectivised in a separate group (management and their allies) or embodied within the technology of production” (McKinlay and Smith 2009, p. 46; see also Peters and Neilson 2021, p. 6). With the shift from industrial to post-industrial capitalism, the production process begins to demand more flexibility and adaptability, hence reintroducing a creative dimension in the labour process (Peters and Neilson 2021, p. 6). This has led some authors to speak of a “knowledge economy” (Drucker 1969) and the emergence of a “creative class” (Florida 2012); a shift towards a mode of production in which creativity appears as the “key driver” behind economic growth.¹⁴ These discourses “assume unrestricted economic growth that is driven by the abundance of productive human creativity” (Lee 2022, p. 604).

The problem is that even in this new context, labour does not become fully detached from standardisation. In fact, creative labour is constantly experiencing a tension between a demand for innovation and a demand to adjust to existing institutional structures and patterns (McKinlay and Smith 2009, p. 47). Furthermore, this creative aspect of labour still has to be controlled and subsumed by capital. In industrial capitalism, this was often achieved through waged labour (formal employment) and strict work discipline. In the context of the creative industries, instead, there is a tendency to move away “from salaried or waged forms” towards a “precarised” network of competing independent contractors (McKinlay and Smith 2009, p. 56). Control is no longer enforced purely at the site of production (for instance, the assembly line) but through complex mechanisms such as self-motivation, identification, and social distinction (McKinlay and Smith 2009, p. 59).

The concept of creative labour prevents us from falling into universal and ontological analyses about creativity in general, and instead allows us to locate the issue of creative AI in the encounter between specific social arrangements (post-industrial capitalism and the creative industries) and specific forms of material practices (the buying of highly flexible human activities as labour power and the need to enforce control over it). More specifically, the concept of labour power allows us to see that the disruptive force of generative AI does not respond to its ability to automate

¹¹ According to McKinlay and Smith (2009, p. 48), when analysing creative practices “in a world dominated by commoditisation”, it is necessary to account for “the forces of monetized and mass capitalist production” in which these practices are situated. See also Lee (2022, p. 601).

¹² For a critical account of the relationship between capitalism, creative labour and the creative industries, see Mould (2020), Lee (2022), and McKinlay and Smith (2009).

¹³ Similarly, Peters and Neilson (2021, p. 5) differentiate between a “trans-historical” relation between creativity and human labour (the “intrinsically creative and innovative nature of human consciousness that implies the possibility of technological and social development”) and a “historical” analysis of the role of creativity in the different stages of the capitalist mode of production.

¹⁴ For a critique of this shift, see Mould (2020).

human creativity “in general”, but to the fact that it is able to accelerate or substitute processes that had become a specific form of labour power in post-industrial capitalism.¹⁵ This represents a movement towards the control of labour power by externalising (i.e. transferring) parts of it to a technological device.

As mentioned earlier, industrial capitalism dictated the externalisation of the creative aspect of human labour to the technologies of production. In the passage towards post-industrial capitalism, this control had to be loosened up, and replaced by softer mechanisms such as self-motivation and precarity to allow for the flexibility and innovation required by the new economic imperatives. If we understand generative AI as the automation of creative labour (or parts of it), we could argue then that generative AI is a way of tightening control over the creative aspect of labour power without sacrificing the required flexibility and novelty required by the creative industries, while also maintaining the tendency towards precarity in contractual relations that have defined these industries.

5.2 Between artefacts and arrangements: automation

The second aspect to consider is the relationship between social arrangements and technology. Within the context of capitalist modes of production and the shift from industrial to post-industrial capitalism, it is important to acknowledge that, as a technology, the current design and implementation of AI is mainly dominated by capitalist imperatives (Steinhoff 2021; Walton and Nayak 2021). This relationship between algorithmic technologies and capitalist social arrangements, however, should not be understood in deterministic terms, but rather as a multi-layered relation.

First, we should consider the relation between automation, value, and time. According to Marx (1982, p. 643), there are two ways in which capital can increase the production of surplus value: absolute and relative. The former refers to the prolongation of the working day, while the latter refers to the increase in productivity by introducing technology and cooperation in the production process. Marx also argues that the passage from absolute to relative surplus value represents a historical evolution of the capitalist mode of production: from the “formal subsumption” of precapitalist, artisanal production processes to the “real subsumption” of labour under capital, that is, the reshaping of production processes and its integration with machinery to improve efficiency, reduce necessary labour time, and hence

increase surplus value (Marx 1982, p. 645). In a capitalist social arrangement, thus, one main function of technology is to increase efficiency—not in the name of liberating disposable, free time for the workers (i.e. “wealth”)—but with the aim of increasing economic profit (i.e. “value”).¹⁶ This leads, according to Marx, to the core contradiction of capitalism: on the one hand, it emphasises the replacement of human labour with machines and hence reduces necessary labour time to a minimum while, on the other hand, it insists on labour time as the only measure of wealth (Marx 1973, p. 706).

In relation to AI technologies, particularly of generative AI, the issue of labour time is one of the dominant aspects motivating their design and implementation. Radical improvements in the speed and efficiency of production processes are often presented as one of the main “advantages” of this technology.¹⁷ This speed and efficiency, however, seldom result in the liberation of disposable time but are mostly designed and deployed for increasing economic profit. Moreover, the benefits brought forward by these technologies are not evenly distributed and depend on the position of an agent within a social structure and hierarchy as Judy Wajcman (2015) notes: one may experience the acceleration brought forward by generative AI as an economic or practical advantage, as a threat to their employability, or as the source of profound transformations in their labour processes.

Second, automation can also be understood as a weapon in the struggle between capital and labour (Marx 1982, pp. 553–564; Caffentzis 2013, p. 152; Steinhoff 2021, p. 17). This means that automation is not only deployed to increase (relative) surplus value, but it can also be used to remove power from the working class. This also means that automation should not be interpreted through the lens of “some suprahistorical, aprioristic ratiocination” according to which there is an ontological factor preventing machines from producing value, but rather as a political device deployed in a context of “political struggle” in which automation is used as a political weapon (Caffentzis 2013, p. 152). This second point is important to avoid any universalisation of the distinction between human labour and machines. The real issue is not that only human labour is creative and hence only

¹⁵ As Lee (2022, p. 607) puts it, the deployment of highly “sophisticated” generative algorithms in the creative industries is forcing us to “reconsider creativity in terms of human labour.”

¹⁶ Marx (1973, p. 706) distinguishes between “value” and “wealth”. In the case of the former, technology is put at the service of economic profit. In the case of the latter, technology is put at the service of the creation of free, “disposable time” outside of the production process and for the “whole society”.

¹⁷ In industrial capitalism, this speed and efficiency came at the price of a lack of flexibility. Hence, post-industrial capitalism had to appeal to the creative aspect of human labour to reintroduce flexibility and innovation in the production process. Seen from this perspective, generative AI is a form of automation that combines both the speed and efficiency of industrial production with the flexibility and creative aspect of post-industrial labour.

human labour can create value, but rather that under specific conditions, creative labour becomes a source of economic value and generative AI becomes a concrete technology that can be deployed to enforce control and to shift the power relations between those who carry out that labour and those who profit from it. The 2023 strike called by the Writers Guild of America (WGA) reflects the role that generative AI can play in the struggle between capital and creative labour: the “Luddite” attitude of the writers should not be seen as a response against technology per se, but against the use of technology as a weapon in the capital-labour struggle (see Mueller 2023).

Third, through competition, automation can be understood as an intrinsic imperative of capitalism. Marx (1991, p. 332) recognised that under capitalism, competition between producers operates as an intrinsic force towards further automation. As Steinhoff puts it:

Marx showed how capital is inherently driven, by competition and class struggle, to ceaseless technological revolution founded on the capture of skills and knowledge from workers and their emulation in machines. Capital tends towards an increasingly machinic state. Marx thus described machinery as a ‘most powerful weapon’ for capital. Today we typically refer to the process by which capital becomes more machinic as automation. (2021, p. 5)

This means that automation is not simply a “a choice made by individual managers, but results from the competition inherent in capitalism” (Steinhoff 2021, p. 16). If we locate generative AI within the more general tendency towards automation, then its design and implementation begin to appear as a structural imperative of the broader mode of production. It is important, however, not to interpret this argument as some form of technological determinism or technological inevitability. Instead, the relation between technical automation and capitalist imperatives is to be understood as one of co-determination. Borrowing the words of Henry Ford, this would mean that the tendency towards AI automation is not inevitable or unstoppable, but that challenging it “would require modifying the basic incentives built into the market economy” (cited in Steinhoff 2021, p. 16).

Fourth, it is important to acknowledge that in the context of AI, automation and labour cannot be distinguished so sharply. Several authors have highlighted that AI should not be considered simply as a form of automation that fully replaces human labour. Instead, AI systems entail a high demand of human labour for its design, training, and maintenance. Scholars speak of this labour in terms of “heteromation” (Ekbja and Nardi 2017), “hidden labour” (Altenried 2020), or “ghost work” (Gray and Suri 2019). This is an essential aspect of generative AI, in which the issue of the

labour necessary to generate the immense training datasets remains a highly contested issue (Vinchon et al. 2023; Huang and Siddarth 2023). This means that rather than thinking about generative AI simply as the automation of creative labour, special attention should be paid to examining how labour practices themselves have shifted as a response to the technical demands of these algorithms. As Williams et al. (2022) put it, while popular media is “distracted” by the idea of conscious and creative machines, “an army of precarised workers stands behind the supposed accomplishments of artificial intelligence systems today”. In this sense, new tasks such as data annotation, data moderation, and model testing show that in fact so-called AI automation “is fuelled by millions of underpaid workers around the world, performing repetitive tasks under precarious labour conditions” (Williams et al. 2022; see also Dzieza 2023).

Furthermore, acknowledging the intricate relation between AI and labour opens up the question regarding the valorisation process behind these new technologies. Here two different perspectives prevail. On the one hand are those (see Steinhoff 2022) who argue that data companies generate value by exploiting the labour of highly skilled computer scientists and the labour of a precarious working force (for tasks such as data annotation, data filtering, model testing, etc.). From this perspective, data itself do not generate value but function as a means of production, while labour is still understood in the traditional sense as a “salaried” or “waged” relation. On the other hand, there are those who argue that algorithmic technologies and digital capitalism profit from an appropriation and enclosure of the commons (Arvidsson 2020; Bode and Goodlad 2023). In this sense, generative AI would produce value not only by exploiting waged labour, but by capturing the “general intellect” contained in the vast training datasets.¹⁸ In either case, AI automation and labour are not easily differentiated but rather intermeshed in ways that complicate clear analyses regarding the origins of value or the location of creative practices.

5.3 Between practices and artefacts: distributed agency

The third aspect to consider in Lievrouw’s diagram of mediation is the relationship between material practices and technological devices. When examining the relationship between creative practices and technology, most accounts tend to conceive technology merely as a tool (Moruzzi 2023,

¹⁸ These two perspectives reproduce a long-standing debate regarding the concepts of value and labour in so-called cognitive capitalism. See, for example, Caffentzis (2013).

p. 246; see also Vinchon et al. 2023; Ploin et al. 2022; and Murray 2023).¹⁹ This constitutes an instrumentalist point of view according to which technologies are merely neutral tools devoid of any agency. From this perspective, agency and creativity remain located exclusively within the human user (Gaut 2010, p. 1040). As Werner Rammert puts it, from an instrumentalist perspective “human action—defined to be intentional and creative—is often sharply distinguished from animal behaviour, which is characterised as instinct-driven and only tool-using, and from machine operation that is described as a repetitive and pre-programmed activity” (2008, p. 63). As mentioned earlier, however, Lievrouw’s diagram of mediation challenges this instrumentalist point of view by examining the relation of codetermination between technologies and practices. In the specific case of generative AI, this would entail challenging the idea that creative agency resides within the (human) user, and to think of it as distributed between human and non-human agents. As we will see, this idea of distributed agency may have important implications on how we understand authorship, ownership, and labour in the specific context of generative AI.

The concept of distributed agency is not new and precedes Lievrouw’s own diagram of mediation. Actor-Network Theory (ANT), for example, has insisted on a redefinition of agency beyond human actors, emphasising the agential role of non-human elements such as technical objects (Bucher 2018, p. 51; see also Latour 2005). In this context, Rammert’s (2008) “distributed agency” shifts the analysis from what to where is agency, and Taina Bucher (2018, p. 51) argues that this shift has “far from trivial” implications for any critical analysis of artificial intelligence. This focus on the where of agency resonates both with Csikszentmihalyi’s systems model of creativity as well as with our utilisation of Lievrouw’s diagram of mediation to analyse creativity in the context of generative AI. Building on the concept of distributed agency, Moruzzi (2023) examines how this notion may allow for a redefinition of creativity, authorship, and ownership, and as such, establishes a conceptual link between creativity and agency. Unlike traditional views (see, e.g. Gaut 2010, p. 1040) that conceive of this creative agency as strictly human and grounded on notions such as intentionality and autonomy, Moruzzi argues for an idea of distributed creativity in which “artificial systems should be regarded as co-creative partners for humans, not as mere tools or as isolated agents” (2022, p. 261). Similarly, Joanna Zylinska (2020, p. 91) calls for an approach to AI-generated art capable of interrogating the entanglements between human and

non-human agency; Oliver Bown (2015) uses ANT to detach the concept of creative agency from that of human intentionality to better understand “computational creativity”; and Martin Zeilinger (2021, p. 9) contends that generative AI may be “impacting and reshaping the concepts of agency and ownership”. According to these authors, the idea of a distributed creative agency challenges traditional conceptualisations of creativity as essentially linked to human agency. This has at least two important consequences for our analysis of generative AI.

First, the idea that creativity is distributed between human and non-human agents puts into question conventional understandings of attributions of authorship, ownership, and copyright. Most legal frameworks today consider copyright law as protecting the products of human intellectual labour “founded on the creative powers of the mind”, which would not include “works generated by a machine” (Eshraghian 2020, p. 157; see also Murray 2023). In this sense, copyright remains closely linked to human creative agency and cannot account for its distributed character discussed above. This understanding of copyright translates into specific attempts to clearly identify the human agent involved in the generation of new content by AI within existing legal frameworks (Eshraghian 2020; Murray 2023), or it has been used as a concrete mechanism by artists who want to stop AI companies from using their work in the training models (Lee 2023). The technical characteristics of these machine learning algorithms (scale, unsupervised aspect of the training processes, depth and opacity of the neural networks, etc.) result in serious challenges to attempts at assessing these issues. Other scholars claim that “the absence of a clear definition of creativity in general, and specifically computer creativity makes it hard to evaluate, and therefore also determine ownership” (Avrahami and Tamir 2021, p. 2). From the perspective of distributed agency, however, what becomes clear is a stark contradiction between the distributed understanding of creativity and the social and legal frameworks that centre human agency. As Zeilinger puts it, the main problem in the context of generative AI is that

on the one hand, AI appears to gesture toward new paradigms of thinking, acting and being that promise a push beyond ideological horizons centred on the human(ist) agent; but on the other hand, AI is deeply entangled with socio-economic and political regimes that rely on precisely this subject position, often in problematic alignments with the capitalist logic of contemporary ownership models. (2021, p. 9)

Zeilinger’s argument is important because it foregrounds a tension between the network of forces that inform our analysis (social arrangements, technologies, and material practices). On the one hand, capitalist social structures reproduce a conceptual distinction between

¹⁹ Coeckelbergh and Gunkel argue that most critiques of Large Language Models “present technology as just a tool”, which suggests that these critiques cannot account for an adequate understanding of the “intrinsic relation between technologies and humans” (Coeckelbergh and Gunkel 2023, p. 3).

human labour and machines that informs the basic principles behind the design, implementation, and regulation of generative AI. On the other hand, the technical affordances of these new technologies unveil the distributed character of creative agency which tends to blur the conceptual distinction between human labour and machines. This brings us to the second conceptual consequence of the concept of distributed agency.

In his analysis of labour and value under capitalism, Marx (1982) insists on the conceptual separation between human (living) labour and machines (see Braverman 1974; Markelj and Celis Bueno 2023). The analyses of the concepts of creative labour and automation presented above speak to this conceptual distinction and highlight a constant struggle between labour and automation at the heart of the capitalist mode of production. Furthermore, Marx (1973) identified the core contradiction of capitalism as that between a structural drive towards automation while maintaining human labour as the sole source of value. In this sense, generative AI might be understood as an attempt to replace creative labour while keeping human labour as the foundation of value (in simple terms, this means that creative workers still need to sell their labour to ensure an income). In Lee's critique of generative AI (2022, p. 607), for example, the author claims that while these technologies dissociate "creativity from human agency", they also offer "an opportunity to reconsider creativity in terms of human labour". From the perspective of distributed agency, however, the conceptual distinction between labour and technology becomes less attainable (Markelj and Celis Bueno 2023). It is here that the utility of Lievrouw's concept of mediation becomes clear.

The concept of creative labour allows for an understanding of creativity as a relation of codetermination between material practices and social arrangements. This is offered as a corrective to the mystification of human creativity as a universal (and infinite) source of value. Furthermore, the concept of automation suggests the intrinsic contradiction of capitalist social arrangements that use technology to replace human labour while maintaining this labour as the sole measure of value. This is presented as the source of a series of structural struggles shaping generative AI: between time-saving and profit-making, between workers and technology, and between producers themselves (competition). By introducing a relation of codetermination between practices and technologies, however, Lievrouw's diagram of mediation allows us to challenge these binary oppositions and to offer a threefold perspective that rehabilitates the relevance of technological devices in the shaping of social phenomena.

It should be emphasised that this rehabilitation is far from entailing any form of technological determinism. Rather, it is intended as a corrective to dominant discourses that either fall into naïve forms of instrumentalism or to reductionist

forms of social constructivism. In both cases, technologies are seen as either mere tools or as the mere reflection of a social structure. Through the notion of distributed agency, Lievrouw's diagram of mediation shows how generative AI can both reinforce capitalist imperatives and simultaneously question some of the core conceptual presuppositions that ground this mode of production.

6 Conclusion

As we write this essay in early 2024, the proliferation of generative AI tools continues to gather steam, not least within the context of the cultural and creative industries (e.g. film, television, music, design, and advertising) and in spite of fierce debates about perceived threats to authorship and labour rights that somewhat speak back to the "boosterist" discourses permeating the marketing of these technologies. The 2023 strikes in Hollywood organised by the WGA and the Screen Actors Guild (SAG) is a prime example of how the (proposed) application of generative AI to the creative industries is presenting different challenges to various stakeholders. So far, more attentive analyses of the WGA and the SAG strikes have been largely drowned out by commentaries in the public domain that focus on abstract, ontological definitions of creativity and whether generative AI can augment/replace this decidedly restrictive faculty of creativity that is either "human" or "machinic". At the same time, resistance to these discourses have taken the form of either a Luddite rejection of AI technologies or a humanist defence of human exceptionalism.

Instead, what we advocate for in this article, via Lievrouw's relational-materialist diagram of mediation, is a conceptualisation of creativity that privileges neither human users nor machine learning algorithms but instead emphasises a relational and distributed form of agency. Through this lens, we are setting out a discursive terrain wherein a more nuanced vocabulary can allow different stakeholders in the creative fields to debate the critical specificities of how the use of AI technologies is impacting creative labour. From this base, then, and in a spirit of critical optimism, we hope that these debates can lead to more equitable outcomes achieved through various forms of industry practice, regulation, legislation, and sector-specific agreements. This can be exemplified by approaching the 2023 strikes referred to above through our proposed framework. First, studios and investors regard generative AI as a means to reduce production costs, which translates into a specific conceptualisation of automation. This emerges from an intersection between social arrangements (capitalist pressure for increased profits) and technological development (automation as the reduction of "necessary labour time"). Second, the demands from the WGA and SAG cast light on the tension between social

arrangements and labour practices. The notion of creative labour highlights the struggle between a specific form of wage-labour and the constant pressure to replace this labour by means of automation (to reduce costs and increase profit, but also to shift the power relation between labour and capital). Finally, the notion of distributed agency complicates the more traditional understanding of the struggle between capital and labour by unveiling the intricate relationality between human practices and technological artefacts. If all “creative” practices are always the result of an interwoven relation between “human” labour and technical artefacts, the stark identification of agency, intentionality, authorship, and ownership becomes problematic. This clashes with both the pressure from labour groups to protect their ownership over the creative products and a capitalist social arrangement that maintains human labour as the only source of value.

Through this perspective, we can then critically interrogate not how generative AI technologies are “augmenting creativity”, but how AI technologies impact practices and social structures through processes of amplification and/or resistance. In relation to the former, we are witnessing an increased automation of creative labour, an intensification of exploitative labour relations through the acceleration of creative work, and a reinforcement of conventional notions of authorship and agency that obfuscate the complex and often messy ways that labour practices, (creative and monetary) value, and technology are entangled with one another. In relation to the latter, more research may shed light on differentiated uses of generative AI tools that do not privilege efficiency, as well as on the question of whether these technologies can enact new forms of creativity that are *not* subsumed to capital.

Data availability Our manuscript has no associated data.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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