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OF TURKU

CREATIVITY IN THE DIGITAL AGE

A Geographical Perspective to the Creative
Processes of New Media Artists and
Computer Scientists

Roosa Wingström



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ABSTRACT

In this thesis, I study the creative work of new media artists and computer scientists in the digital age. Using a geographical perspective, I consider creativity as a spatio-temporal process during which people, materials, and space interact to produce novel outcomes. This thesis focuses particularly on the role of digital technologies. Digital technologies, such as digital platforms, programs, or devices, can enhance creativity through faster processes, interactions in virtual spaces, and new ways of working. Thus, I scrutinise the socio-material and spatio-temporal contexts that emerge from the use of these technologies and their effect on the creative process.

The theoretical and conceptual framework of this thesis combines relevant literature from relational economic geography and digital geographies. I ask: what are the similarities and differences in the creative processes of new media artists and computer scientists; how are the participants' creative processes enacted through spatio-temporal relations; in what ways do the technologically mediated space-time practices affect the creative processes of the participants; and how can digital technologies, such as artificial intelligence, co-constitute the creative processes of the participants? I utilise interviews, daily diaries, and space-temporal mobility maps to answer these research questions.

The findings accentuate the role of digital technologies as co-constitutes in the participants' creative processes. Digital technologies present several opportunities for the creative process, such as flexible work arrangements as well as novel tools for creative work. The results also identify challenges brought about by digital technologies, as they can disrupt creative work by reducing the time needed for ideation or by interrupting continuous workflow that facilitates concentration. I also suggest how a geographical approach to the creative process can provide a novel insight into the creative process in the digital age. I contend that organising for creativity in the digital age requires recognising the unique space-time configurations and non-human agencies present in creative work. I also call for better recognition of the inherent value of creativity in everyday life, beyond its economic utility.

KEYWORDS: creativity, the creative process, digital technology, space-time process

TURUN YLIOPISTO

Matemaattis-luonnontieteellinen tiedekunta

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TIIVISTELMÄ

Tässä väitöskirjassa tutkin mediataiteilijoiden ja tietojenkäsittelytieteilijöiden luovia prosesseja digitaaliajalla. Tarkastelen luovuutta maantieteellisestä näkökulmasta, eli käsitän luovuuden tilallisajallisena prosessina missä uusia lopputuloksia syntyy ihmisten, materiaalien ja tilan vuorovaikutuksessa. Väitöskirjassa keskityn erityisesti digitaalisiin teknologioihin. Digitaaliset teknologiat, kuten digitaaliset alustat, ohjelmat, ja laitteet, voivat tehostaa luovaa työtä esimerkiksi nopeampien prosessien, virtuaalisten tilojen, sekä uusien työskentelytapojen avulla. Tarkastelen teknologian käytöstä syntyviä sosiomateriaalisia ja aikatilallisia konteksteja ja niiden vaikutusta yksilötason luoviin prosesseihin.

Väitöskirjani teoreettinen ja käsitteellinen viitekehys yhdistelee keskeistä talousmaantieteen ja digitaalisen maantieteen kirjallisuutta. Esitän neljä tutkimuskysymystä: mitä eroja ja samankaltaisuuksia mediataiteilijoiden ja tietojenkäsittelytieteilijöiden luovissa prosesseissa on; miten he toteuttavat luovia prosessejaan tilan ja ajan eri ulottuvuuksissa; millä tavoin teknologian kanssa syntyvät paikka- ja aikaperustaiset käytännöt vaikuttavat heidän luoviin prosesseihinsa; sekä kuinka digitaaliset teknologiat, kuten tekoäly, osallistuvat näihin luoviin prosesseihin? Vastaan tutkimuskysymyksiin monimenetelmällisesti käyttämällä aineistona haastatteluja, päiväkirjoja sekä liikkuvuutta kuvaavia aikatilakarttoja.

Väitöskirjan tuloksissa esitän, kuinka tutkittavien luova prosessi rakentuu yhdessä digitaalisten teknologioiden kanssa. Ihmisen ja teknologian vuorovaikutus tehostaa luovaa prosessia eri tavoin, kuten joustavia työskentelyjärjestelyjä sekä uusia työn tekemisen tapoja mahdollistamalla. Tunnistan myös teknologian tuomia haasteita, esimerkiksi kun ideoimiselle jää vähemmän aikaa tai keskittymistä tukeva katkeamaton työnkulku keskeytyy. Esitän, että maantieteellisillä näkökulmilla voidaan tuottaa uutta tietoa digitaaliajan luovista prosesseista. Digitaaliajan luovan työn organisoinnissa tulee huomioida uniikit tilallisajalliset kontekstit sekä muidenkuin-ihmisten toimijuus luovissa prosesseissa. Meidän tulee myös paremmin huomioida luovuuden synnynäinen arvo sen taloudellisen arvon lisäksi.

ASIASANAT: luovuus, luova prosessi, digitaalinen teknologia, tila-aika prosessi

Table of Contents

List of Original Publications	7
1 Introduction	8
1.1 Setting the scene	8
1.2 Research objectives	9
2 Creativity	16
2.1 Defining creativity	16
2.2 Creativity in arts and sciences.....	18
2.3 Spatio-temporality in the creative process	21
2.4 Relational approaches to the creative process	22
3 The creative process in the digital age	26
3.1 Engaging critically with digitalisation	26
3.2 Conceptualising technological mediation.....	28
3.3 Implications of digital technologies on the creative process....	29
3.3.1 Techno-material agencies	29
3.3.2 Mediated space-time practices.....	32
4 Materials and methods	36
4.1 Participant selection	36
4.2 Main materials and analysis	38
4.2.1 Interviews.....	38
4.2.2 Daily diaries	40
4.2.3 Content analysis.....	42
4.3 Spatio-temporal mobility maps as supplementary materials ...	45
4.4 Ethical considerations, limitations.....	48
4.5 Empirical studies	50
5 Results and discussion	53
5.1 Artistic and scientific creative processes	53
5.2 The creative process emergent through spatio-temporal relations	56
5.3 Digital technologies shaping the creative process	63
5.4 Artificial intelligence as a co-creative technology.....	65
6 Conclusions	69
Acknowledgements	74
List of References	77
Original Publications	89

List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I** Wingström, R., Hautala, J., & Lundman, R. Redefining Creativity in the Era of AI? Perspectives of Computer Scientists and New Media Artists. *Creativity Research Journal*, 2022; 36(2), 177–193.
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- II** Wingström, R. Projects and pockets: Time-geographic approach to the creative processes of computer scientists. *Geoforum*, 2024, 148.
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- III** Wingström, R., Hautala, J., & Huopalaianen, A. Studying the moments of encounter and (im)mobilities in artists' creative processes. *Culture and Organization*, 2025, 1–21.
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1 Introduction

1.1 Setting the scene

Wasa Future Festival, Finland, August 2022. I am in an exhibition hall, looking at a piece of digital artwork that has been projected on a white wall with a computer and two projectors. The artwork depicts a scene from the far future, where buildings defy gravity and the stellar objects in the sky appear to be closer to Earth than usual. I have barely had time to observe the image when it suddenly disappears. The wall has gone blank, the artwork removed by people standing next to a large touchscreen placed by the projectors and reading out loud words and phrases displayed on the screen. After a short contemplation, they select some of the words – namely, create a text prompt – and press “start.” The wall is blank no longer; instead, a new image begins to appear. The people who selected the text are brushing their fingers across the touchscreen, almost like erasing the blank canvas beneath which the new artwork slowly emerges. The piece is nothing like the one before; instead, this one depicts a green meadow with colourful flowers and something that looks like fairy dust dancing in the air. The audience has a short moment to look at this piece, and some take a photo to store a memory of it in their device or to share with others. Soon, other people arrive and select new text prompts, and the artwork changes yet again.

The above vignette illustrates a moment I experienced while observing an interactive art exhibition at a seminar. During the moment, people, digital materials, and the environment came together in the creation of a piece of art, thus illustrating the creative process. The vignette accentuates the myriad interactions that were present in the moment, and how this mutual engagement made the moment possible. The vignette thus invites us to take a closer look at how creativity emerges: what is present, what is absent, and what kind of other moments were necessary to bring the process to this point.

The creative process has long been a focus of scholarly inquiry across disciplines, from psychology to organisation and management studies, as creativity is considered a key asset for industries and organisations in knowledge-based

societies (e.g., Prince, 2014). Paying attention to the interactions, i.e., relations, inherent in creativity allows us to understand it as a process that is continuously transforming in different contexts (Fortwengel et al., 2017; Hawkins, 2013; Ibert et al., 2015). This is a common approach to creativity in economic geography where issues such as space, time, mobilities, networks, proximities, and distances have been key concepts to abstract creativity as a process (e.g., Faulconbridge, 2017; Lengyel & Eriksson, 2017; Hautala, 2018). Thus, employing a geographical approach, my aim is to better understand how the creative process is relationally formed, and subsequently, this thesis contributes to the prevalent debates surrounding creativity in economic geography and beyond (see also Hautala & Ibert, 2018).

Another fundamental element in the vignette is the presence of digital technology. The computational model that is used to create the artworks has been built and trained with large datasets on platforms developed by hundreds, if not thousands, of other programmers. Thus, it is a product of constellations of data and knowledge transferring around the world. These resources were turned into an interactive experience between the program and its user through the work of the digital artists responsible for the installation. The model outcomes produced by the model are not saved, so viewers use their own digital devices to capture and share the images before they disappear.

The example embodies the ubiquitous nature of technology in today's digitalised societies. Our everyday life is intertwined with digital technologies, from smartphones and computers to digital infrastructures, platforms, programs and applications (Kitchin, 2023; Leszczynski, 2018). Thus, most creative work is affected by digitalisation, from the design process of products to their manufacturing, and further to their marketing and consumption. Creative work is conducted under these intertwined online and offline contexts of spatial multiplicity, which then have fundamental effects on the creative process (e.g., Lundman & Nordström, 2023; Repenning, 2022; Rose, 2016). By bridging the digital geographies with geographical creativity research, my thesis offers an intriguing insight into the creative process occurring in hybrid physical-digital contexts.

1.2 Research objectives

This background brings us to the topic of the thesis, examining individual-level creative processes in the digital era. My three empirical studies centralise the work of Finland-based new media artists and computer scientists, detailing their creative processes. This work requires skills such as problem-solving, innovating, and combining existing knowledge to bring about new insight (Boden, 2004; Csikszentmihalyi & Sawyer, 2014; Runco & Kim, 2020), which result in outcomes that can be considered novel or useful – i.e., creative – by the developer's domain or

by the public. On that note, the new media artists and computer scientists are creative professionals who respectively represent two different forms of creative work: the classical creative profession of artmaking, and expert work that requires creative skills. Nevertheless, their work is inherently creative work (Stein, 1953). The creative process lies at the core of such work, referring to the temporal progression of activities during which individuals, materials, and the environment interact in the production of the outcomes (e.g., Amabile et al., 1996; Brinks et al. 2018; Hautala & Ibert, 2018; Williams, 2016). Against this background, my research has two central objectives.

My first objective is to develop an understanding of the individual-level creative process as a relational phenomenon. In my theoretical framework, I draw from relational geographic thought to centralise the spatio-temporal practices and socio-material relations inherent in the creative process (e.g., Massey, 2005; May and Thrift, 2001). In this vein, I investigate how the relational perspective to creativity can be further developed within economic geography and beyond, underlining the processual approach to creativity (Fortwengler et al., 2017).

The second major objective is to examine the embeddedness of digital technologies in creative work, and how they affect the creative process. As established by digital geographers, “digital” here refers to (i) the technologies that use binary computing, (ii) the socio-technological artefacts and configurations of daily life that result from engagement with digital mediums and (iii) the infrastructures that structure these practices (Ash et al., 2018, p. 26). Building on the relational perspective, the technologically mediated space-time practices and socio-material relations in the participants’ creative work is the central concern of this thesis (cf. Kitchin, 2023; Leszczynski, 2018).

This thesis addresses four distinct but interrelated points which deserve more consideration in the extant literature. First, my thesis contributes to the contemporary agendas of relational economic geography that entail a shift towards “socially constructed, actor-centred and process-oriented” research (Bathelt & Glückler, 2017, p. 2008). Within this paradigm, participating scholars have called for a move “from clusters to process” to research how phenomena such as creativity and knowledge creation emerge dynamically as processes (Ibert et al., 2015, Sydow, 2018). Work following the progress ontology thus traces how socio-spatial relations are formed through temporal progression, often with a focus on teams and organisations (e.g., Faulconbridge, 2017; Lengyel & Eriksson, 2017; Hautala, 2018; Grabher & Ibert, 2017). I suggest a research agenda can be developed with more nuanced considerations of individuals’ spatio-temporal practices to understand how processes are formed in the everyday. Here, I stress that assuming an individual-level approach does not denote an understanding of creativity as a unique trait of exceptional people. Instead, with a focus on two distinct groups of creative professionals, I elaborate on

context-related differences and similarities between the creative processes. Therefore, my study setting offers insight into the unique creative process of individuals who deserve better scrutiny in economic geography as well (e.g., Gong & Xin, 2019; Hautala & Ibert, 2018).

Second, the prevalent research in economic geography largely approaches creativity through its economic value, highlighted in the general research objectives that aim to enhance team, organisational, or regional creative performance (e.g., Power & Scott, 2004; Brinks et al., 2018; Harvey et al., 2012). In this vein, factors such as proximities, social practices, and management systems are used to study the creative process (Caniëls & Rietzschel, 2015; Gomes et al., 2016). This often results in instrumentalised accounts of the creative process, rendering it an organisable and linear phenomenon. Moreover, as critics have argued, such research largely fails to consider the complex and unpredictable dynamics inherent in the creative process (e.g., Bilton, 2010; Karakilic & Painter, 2022; Prince, 2014). Thus, I argue the individual-level approach alerts us to the complexities of the creative process that emerge from the myriad spatial relations in everyday life (cf. Fortwengel et al., 2017). By examining the “geographic interventions in creative practice” (Williams, 2016, p. 1560), we can better account for the corporeal, material and spatio-temporal entities present in the creative process, specifically how the process emerges in between their encounters. Indeed, economic geographers have largely dismissed the role of nonhuman materials in processes, despite them being central to everyday creative work (Duff & Sumartojo, 2017, p. 420; Hawkins, 2013; Rose, 2016). Thus, my empirical studies aim to better accentuate the role of materiality inherent in creative work by exploring the capacity of materials to constrain, complement, and substitute for activities in the creative process (Murray et al., 2021).

Third, recent work in digital geography has called for more detailed accounts of how the digital dimensions are intertwined with everyday life in a hybrid manner, instead of assuming a dichotomous perspective and separating the digital from the physical (e.g., Ash et al., 2018; Leszczynski, 2018; Li et al., 2024). The call is relevant also in the context of creativity, for digital technologies are central to how creative work is organised, negotiated and practised (Strandgaard Pedersen et al., 2020). Indeed, Williams et al., (2021, p. 132) note how creativity, innovation and technology merge in the creative economy, a term that refers to economic systems where economic value is based on novel ideas and outcomes. Thus, as Sgourev (2020, p. 38) accentuates, scholars must consider “how users make sense of a technology and apply it in constructing relations”, and “the ways in which the material features of technologies give rise to or condition the evolution of social practice.” Relational economic geographers have generally approached these issues from the perspectives of networks and teams (e.g., Grabher & Ibert, 2017; Wu & Qiao, 2024) or on a regional level (Abbasiharofteh et al., 2024). For example, in

economic geography, scholars have noted the effects of digitalisation on the diversification of industries (Boschma et al., 2017) regional transformation (De Propris & Bailey, 2021), or the development of centres and rural areas (Haefner & Sternberg, 2020). So far, there is limited empirical research that considers how the intertwined material and digital configurations influence individuals' creative processes (e.g., He et al., 2023; Repenning, 2022). Thus, this thesis contributes to these debates by accentuating the divergent ways creative work is transformed by digital technologies, and how this fundamentally affects the creative process.

Fourth, following the previous point, the emergent technologies in the digital age result in novel techno-material relations present in creative work. Artificial intelligence (AI) is an example of such a disruptive technology. AI-related issues have gained traction in creativity research over the past due to the surge of generative AI models such as ChatGPT or Midjourney (e.g., Epstein & Hertzmann, 2023). On the one hand, technology can stimulate creativity, free up time for creative tasks, and enable new creative outcomes (e.g., Anantrasirichai & Bull, 2022; Bruns & Long Lingo, 2024).

On the other hand, scholars have found how the embeddedness of technology relates to issues such as time pressure, increased stress, and decreased engagement with tasks-at-hand, thus resulting in negative effects on creative work as well (e.g., Bruns & Long Lingo, 2024; Oldham & Da Silva, 2015; Tarafdar et al., 2019; Thulin et al., 2019). This work suggests digital technology can have multiple roles in creative work, thus asserting the need to study the diverse material agencies that co-constitute the creative process (e.g., Jauhiainen, 2024). In geography, literature regarding the techno-material relations in creative work greatly stems from human geography, where the focus has mostly been on arts, cultural industries, or urban contexts (e.g., Lundman & Nordström, 2023; Rose, 2016; Pigott, 2020). Thus, geographers have called for more nuanced accounts of techno-material relations shaping space-time practices, including in the context of creativity and innovation processes (see Jauhiainen, 2024; Keating, 2024; Lundman & Nordström, 2023; Williams, 2016). The above issues motivate the three empirical studies of this thesis:

1. What are the similarities and differences in the creative processes of new media artists and computer scientists? (Articles I – III)
2. How are the participants' creative processes enacted through spatio-temporal relations? (Articles II – III)
3. In what ways do the mediated space-time practices affect the participants' creative processes? (Articles II – III)
4. How do digital technologies, such as artificial intelligence, co-constitute the participants' creative processes? (Article I)

Accordingly, the background for my research is rooted in relational economic geography, and I extend this literature with recent developments in digital geographies and human geography. To answer the research questions, my analytical approach builds on geographical frameworks, specifically time-geography and geographies of encounter. In this way, I centralise the space-time practices and mobilities of the artists and scientists to examine how the relations in the creative process are enacted over time as the participants move between different contexts (e.g., Merriman, 2012). I apply the “virtualised” form of time-geography that has recently gained traction to depict the hybrid offline-online spatio-temporalities present in everyday life (e.g., Couclelis, 2009, Ellegård, 2018, Klapka et al., 2020, Shaw, 2023; see also Hägerstrand, 1985).

Subsequently, I make the role of digital technologies explicit by drawing attention to the technology-mediated practices of the new media artists and computer scientists (e.g., Schwanen, 2007; Thulin & Vilhelmson, 2022). To deepen this approach, I closely examine the specific relations in the creative process by drawing notions from “geographies of encounter” that refer to the “coming-together of bodies”, that “make a difference” in processes (Wilson, 2017, p. 646). As the encounters reflect the connection between corporeal and material entities during situated practices, they illustrate the co-presence of relations through which the creative process becomes realised (Woodward et al., 2010).

Each empirical study included distinct research questions, the findings of which were used to formulate the answers to the research questions of this thesis. The studies are summarised in **Table 1**. The first article involves 26 new media artists and 26 computer scientists as participants, the second article focuses on nine computer scientists and the third article on four new media artists. The research represents a case study where a phenomenon is investigated in its real-life context (Yin, 2013). To this end, the methodology of the empirical studies involves multiple methods to answer the research questions. The research materials involve interviews, participant-generated daily diaries, as well as spatio-temporal mobility maps constructed following time-geographic and qualitative geographic information system (GIS) methodology. The qualitative materials were analysed with content analysis, and in Articles II and III the data were accompanied by spatio-temporal conceptualisations of the space-time practices of the participants.

Table 1. Summary of the three empirical studies.

Article	I Redefining creativity in the era of AI?	II Projects and pockets: time-geographic approach to the creative processes of computer scientists	III Studying the moments of encounter and (im)mobilities in artists' creative processes
Research questions	How do scientists and artists define creativity? Are the definitions of creativity different between scientists and artists? If yes, how? What is the role of ai in the creation process of scientists and artists?	What are creative pockets and what is their role in the creative process? How are the pockets organised and protected? How are they prevented or disrupted?	What kinds of self-described moments of encounter drive the artists' creative processes? How are these moments of encounter shaped by different mobilities?
Participants	26 new media artists 26 computer scientists	9 computer scientists	4 new media artists
Materials	Semi-structured interviews	Participant-generated research diaries Semi-structured interviews Spatio-temporal mobility maps based on GPS data	Participant-generated research diaries Semi-structured interviews Spatio-temporal mobility maps based on GPS data
Analysis methods	Content analysis	Content analysis Mobility visualisations	Content analysis Mobility visualisations
Main findings	Scientists and artists have similar descriptions of creativity; however, scientists focus on the outcome of the creative process more often than artists. The role of AI also differs between scientific and artistic creative processes. Scientists need AI to produce trustworthy outcomes, whereas artists use AI to explore and play. Co-creativity can explain the co-constituted creative process between humans and AI.	In the work of computer scientists, there are three essential spatio-temporal "creative pockets" where creative work is best advanced: pockets of flow, pockets of insight, and pockets of creative bundles. The pockets are disrupted in everyday work due to spatio-temporal fragmentation, accelerating work-pace, time-pressure, and digital congestion.	We find how the creative processes of the new media artists involve various moments of encounter. We explore the unique spatio-temporal characteristics of the encounters and present them as formative, serendipitous, and tranquil encounters. The encounters form through individual and simultaneous (im)mobilities from daily commuting to the workplace, virtual mobility over digital platforms, imaginative mobility of thoughts, and corporeal micro-mobilities of bodily movement.

The outline of the thesis is as follows. In section two, I introduce the definition of creativity and discuss the contextuality of creativity, using arts and sciences as creative domains. Then, I discuss the creative process from the relational perspective that grounds my approach to creativity. I also identify points for development for processual creativity research within the relational economic geography paradigm.

In section three, I focus on the second central framework of this thesis, i.e., technological mediation and the implications of digital technologies in creative work. Here, I draw from digital and human geographies to illustrate the effects of technological mediation and current state-of-the-art research concerning both creativity and digital geographies. I also explain the analytical approaches I use to answer the research questions and to bring the prevalent debates forward.

The fourth section details the materials and methods I used in the thesis.

In the fifth section, I answer the research questions and simultaneously draw notions from extant literature to discuss the findings in detail. The section is structured according to the research questions, meaning each subsection answers one question. The main findings accentuate how the creative process is enacted in the everyday life of the participants through myriad relations, which have a meaningful effect in the manner the process continues to unfold. Specifically, I identified spatio-temporal and socio-material contexts under which the participants felt they can best advance their work, as well as contexts that were experienced as challenging or difficult. The findings also shed light onto the everyday mundanity of creative work, where the creative process advances through daily repetitive actions.

As such, the findings highlight how the creative process alters between stability and change, and how such fluctuation is spatially situated in everyday practices. This then increases the understanding of the creative process as fluid, ambivalent, and contingent. Here, creativity cannot be attributed solely to the creative skills of an individual; instead, spatio-temporal structures and materials actively co-constitute the process. The focus on digital technologies further alerts us to how the structures produced by technology, from processing speed to distributed flexibility, affect the creative process. The focus on technologies such as AI further invites us to reconsider the agentic features such technology may possess, and how those then influence the creative process.

In the final section, I conclude the thesis through three central contributions. First, I summarise the main points from the findings and assert how they enhance our understanding of the creative process as a relational phenomenon, and how digital technologies have a central role in the formation, unfolding, and disruption of such relations. Second, I consider how this mixed-methods research contributes to theoretical and empirical research of processes in the digital age. Finally, I discuss how the findings have implications regarding creativity research and policies, offering suggestions for future endeavours in the creative process research.

2 Creativity

2.1 Defining creativity

Creativity as a phenomenon has long been of interest to scholars and has become an interdisciplinary topic across various fields such as social science, business, education, and computer science (Kampylis & Valtanen, 2010). Much of the scholarly work from classic to contemporary has debated the essence of creativity, and as a result, there is no single definition used across varying contexts (e.g., Runco & Kim, 2020). However, most definitions can be boiled down to creativity as an activity that results in novel, original and valuable outcomes (e.g., Amabile et al., 1996; Boden, 2004; Csikszentmihalyi, 2015; Guilford, 1950; Runco, 2014; Stein, 1953; see Kampylis & Valtanen, 2010 for a comprehensive summary). In this section, I dissect the different approaches to creativity.

The perceptions regarding creative actors have changed throughout the centuries. For much of history, the ability to create was seen as “divine inspiration” that only gods had access to (Glăveanu & Kaufman, 2019, p. 11). The ideals of the Enlightenment era began to shape creativity into a modern value as we know it, turning creativity into a human virtue. Traditionally, scholars focused on the abilities of so-called creative individuals to define creativity (e.g., Guilford, 1950). For instance, researchers have explored whether certain personality traits (Karwowski et al., 2013) or demographic factors (Silvia et al., 2009) could be predictors of creative skills and behaviour. For instance, intelligence and openness to new ideas have been connected to creative behaviour in the psycho-social accounts of creativity (Furnham & Bachtiar, 2008).

However, creativity literature has mostly moved away from creativity as a unique trait of a few individuals towards the understanding that everyone can exhibit creative behaviour. Essentially, creativity is enabled by different cognitive skills that are present during activities that are considered creative (e.g., Botella et al., 2018; Csikszentmihalyi, 2015; Runco, 2014). For instance, certain processes of thought, such as divergent and convergent thinking, allow us to explore solutions and imagine new ideas, identify and solve problems, as well as structure our thinking or come up with novel solutions (Csikszentmihalyi, 2015; Runco & Kim, 2020). The first cognitive model of creativity was introduced by Wallas (1926), and it still grounds

most stage-based approaches to creative behaviour (e.g., Botella et al., 2018). The framework entails four fundamental cognitive stages of the creative process: preparation, incubation, illumination, and verification. During the preparation phase, an individual actively works towards their goal and gathers necessary information, particularly concerning their field. The second and third stages are unconscious; incubation refers to the time needed to process the information and ideas, which then come together as illumination or insight. The process results in a novel outcome that is then tested and presented to the audience or peers in the verification phase (Botella et al., 2018).

In addition to the research on creative behaviour, creativity is also defined through the outcomes produced during creative activity. For instance, Woodman et al., (1993, p. 293) define creativity as an activity where individuals or teams work to produce a valuable, useful new product, service, idea, procedure, or process. In these approaches, novelty, usefulness, and effectiveness are generally used to evaluate the creativeness of outcomes (e.g., Boden, 2004; Puryear & Lamb, 2020). The focus on outcomes facilitates a common ground for creativity research and allows standardised procedures for examination.

In the context of economic geography, creativity is often approached from the perspective of “the creative economy”, popularised by Howkins (2002). The creative economy reflects the ideals of contemporary economies where creativity is seen as the key driver of development, translating into novel products, services, and processes, thus fostering economic growth (see also Meusburger, 2009; Pratt, 2008). As such, creative outcomes are associated with innovation, i.e., “successful implementation of creative ideas” (Amabile, 1988, p. 126). Subsequently, creativity has become “the most highly prized commodity” in creative economies (Florida, 2002, p. 5). Thus, attracting creative individuals has become a key concern for organisations and industries to enhance productivity and innovation processes.

Economic geographers have therefore focussed on the spatial dynamics of such creative production (Scott, 2014). For instance, the proximity of creative actors is seen to manifest as creative milieus (Meusburger, 2009) and clusters (Cooke & Lazzeretti, 2008). A well-known concept is Florida’s (2003) idea of the creative city, which entails an understanding of creative cities as “cauldrons” that turn creativity “into technical and artistic innovations” (Florida, 2003, p. 1). These imaginaries of creativity as keys to prosperity have influenced socio-economic policies of organisations and governments, particularly in Western societies (Prince, 2014). Such policies generally aim to stimulate individual creative capacity toward market orientation, produce networks of milieus that nurture creativity, and create urban infrastructures that attract a creative workforce (Lindner, 2018, p. 101).

Subsequently, the definitions of creativity produced in contemporary economic systems have faced critique across disciplines. While an extended review of such

criticism is beyond the scope of this thesis, we can follow Lindner's summary (2018, p. 101) of the main concerns associated with the neoliberal style of reasoning prevalent in the creative economy. Scholars argue that such approaches denote the commodification of creativity, which directs creative efforts toward market-oriented and profit-seeking activities (Bilton, 2010; Peck, 2005), promotes gentrification, middle-class consumerism, and competition between cities (Scott, 2014; Pratt, 2008). This has led to the formation of a neoliberal creative subject who must adhere to performance management and precarious conditions to succeed in the creative economy (Prince, 2014).

Therefore, in the context of this thesis, my focus remains on problematising the one-dimensional and solidified conceptualisations of creativity. For instance, Gormley (2020) argues how the prevalent idea of creativity as an economic resource centralises instrumentalised cognitive models and personal traits. Critically, the dominant views tend to ignore alternative aspects of creativity – such as “little-c creativity”, i.e., making personal discoveries in everyday life – and instead creativity is understood universally rather than contextually as multiple creativities (see also Boden, 2004).

Thus, I pay attention to how creativity is understood by individuals themselves, how creativity is emergent in everyday work, and how we can explore such a phenomenon with geographical concepts. In so doing, I resist taking the prevalent conceptualisations of creativity for granted, or as Lindner (2018, p. 99) puts it, avoid contributing “to the disempowering illusion that there is nothing left but the market principle.” Simultaneously, I stay mindful of how dominant ideals of creativity produced in the creative economy might translate to the micro-level. On that note, I offer points for the development of creativity research in economic geography and beyond to avoid a superficial understanding of creativity. I begin by introducing arts and sciences as contexts for creativity to establish a common ground that facilitates my empirical approach, before moving forward to the relational conceptualisations of creativity.

2.2 Creativity in arts and sciences

The participants of this thesis are Finland-based new media artists and computer scientists. New media art refers to artworks that are designed and created with electronic media, i.e., new media technologies, thus including art forms such as digital art, interactive art, sound art, video games or performance art (Dixon, 2015). New media art forms have been developed alongside technology, and for decades new media artists have merged state-of-the-art technologies with artmaking. The new media artists involved in this thesis were particularly specialised in novel digital

technologies such as AI in their artmaking but applied the technologies in a variety of ways, from music to performance art.

Computer science is a scientific discipline focused on computation, automation and information technology (Denning et al., 1989). The field involves both theoretical and applied disciplines, from algorithms to the design of software and hardware. The computer scientists involved in this thesis all worked at least part-time at a university, and thus represent the branch of computer science focused on developing novel methods and applications. They represent various fields of computer science, such as machine learning, data science, and natural language processing.

The two fields thus represent two distinct domains. Artistic and scientific creativity are generally recognised as distinct types of creativity (Glăveanu et al., 2013; Kaufman, 2005), and both domains have celebrated so-called creative geniuses over the past centuries (Bullot et al., 2017). Thus, past research has often treated these fields dualistically based on their differences (e.g., Snow, 1993). The distinction is also evident in economic geography, where the term “creative process” is more often applied to fields like arts and design, whereas “knowledge creation” has been reserved for scientific production (Hautala & Ibert, 2018). Nevertheless, building on the definition of Stein (1953, p. 311) who considers creative work as “novel work that is accepted as tenable or useful or satisfying by a group in some point in time”, a criterion for creative work is arguably fulfilled in both arts and sciences. The outputs, such as new pieces of art or research results, are evaluated by peers in both domains, and the outcomes are usually presented to the general audience or public as well.

Artists and scientists share similarities and differences in terms of the organisational structures and demands of work. Artists are an extremely heterogeneous group involved in a wide spectrum of jobs and workplaces, from voluntary work and unpaid labour to entrepreneurship or salaried jobs (Benhamou, 2003). Part-time and fixed-term contracts, second jobs and self-employment are also more common among artists when compared to the general workforce. Not unlike artistic careers, scientific work is increasingly highlighted by precarity, short-term contracts and grants, and heightened competitiveness (Ferreira & Quesado Delgado, 2024). However, the scientific outcomes must adhere to generally accepted principles of research and thus must meet certain criteria before they can be published (Sternberg, 2018). The volume of scientific publications is intertwined with the career progression of researchers, and further with the performance measurement of universities that correspond with the current financing systems of academia (e.g., Kallio et al., 2017). Sternberg (2018, p. 212) examines how evaluators, e.g., academic journals or funding bodies, tend to value incremental

progress, thus directing scientists toward standardised knowledge-creation processes where revolutionary scientific discoveries become rare.

Conversely, artistic creative processes are more characterised by spontaneity and freedom, particularly in terms of creative expression (Glăveanu et al., 2013). In arts, “value” or “novelty” are less significant than recognition from peers or audiences, which then translates into artistic quality (Grant, 2018). However, performance management is increasingly applied in cultural fields as well, particularly by funding bodies (Jakonen, 2020). For instance, Jakonen (2020, p. 137) studied how artistic performance is instrumentalised in the Finnish government’s cultural policies, and factors such as financial sustainability, networking, or social impact are used as evaluation criteria. The role of artistic quality has simultaneously diminished in the policies.

These similarities and differences bring us to the debate regarding domain-specific and domain-general features of creativity that is long withstanding in creativity studies and beyond (e.g., Sternberg, 2009). Certain cognitive traits, such as divergent and convergent synthetisation skills, or the stages of idea creation, have been identified as general aspects of creativity present across domains, thus accentuating the belief that all humans are capable of creative behaviour (e.g., Botella et al., 2018; Glăveanu et al., 2013; Guilford, 1950).

However, we must also recognise how creative fields also require domain-specific expertise. In other words, one cannot directly transfer musical skills to write a novel (Baer, 2015). Indeed, many scholars assert that there is not one type of ‘artistic creativity’ or ‘scientific creativity’ but rather a realm of creativities that varies from field to field (Abraham, 2022). What follows from such a perception is the notion of novelty and usefulness as highly contextual features, meaning these attributes are subjectively produced by members of distinct fields or domains. In other words, a new media art piece might have great value within new media art but receives only little attention in another field. Similarly, the so-called little-c creativity might bring much joy for an individual but has little value for others (Runco, 2014).

Thus, rather than focusing on individual skills or expertise, this thesis uses a geographical perspective on creativity and considers the spatio-temporal emergence of the creative process. By focusing on Finland-based artists and scientists, I centralise the creative processes occurring in a highly digitalised environment where technology is used in daily practices that may (not) support creative work. Therefore, I consider how the creative process emerges not only within the individual creator but also between actors and their socio-cultural context (Glăveanu et al., 2013).

Here, a geographical space-time approach proves useful as it allows the utilisation of theoretical concepts and empirical methods that can be employed in process-oriented creativity research. Indeed, considering how creativity emerges in “relation to a context, environment, organization, group, or field” has long been a

key issue in geographical research (Meusburger, 2009, p. 100; see also Power & Scott, 2004). Here, interactions between individuals and colleagues, resources and the environment are central points for research.

Similarly, my objective in this thesis is to understand how the creative process emerges and “takes place” in the work of new media artists and computer scientists. In the following section, I introduce the relational process perspective to creativity in detail and further highlight how it can be developed in economic geography and beyond.

2.3 Spatio-temporality in the creative process

To facilitate a geographical inquiry into creativity, I approach the concept as a relational process that is shaped by different spatio-temporal contexts (e.g., Lombardo & Kvålshaugen, 2014; Hautala & Ibert, 2018; Sydow, 2018; Williams, 2016). In other words, I consider the creative process that emerges through embodied interactions between people, material objects, and space. The approach is informed by the relational theory of space and time (e.g., Massey, 2005; May & Thrift, 2001). The concept of “space-time” is at the core of the relational approach, representing how the “temporal and spatial dimensions are connected inherently” (Schatzki, 2020, p. 38). Based on space-time thinking, scholars have underlined the multifaceted relations present in the creative processes of individuals, including material and digital environments, other people, and embodied experiences (Hautala & Jauhiainen, 2014; Schatzki, 2020; Williams, 2016).

In relational thinking, space results from the “thrown-togetherness” of different bodies and forces that momentarily assemble (Massey, 2005). Through such multiplicity, space influences, enables, and constrains creative activity (Beyes & Holt, 2020, Stephenson et al., 2020; see also Massey, 2009). Therefore, the creative process is always a “situated activity” (Gherardi and Perrotta, 2013, p. 231), emergent in between people, objects, and spaces (e.g., Duff & Sumartojo, 2017; Leclair, 2023; Hautala & Jauhiainen, 2019). For instance, the work of artists and scientists is in constant interaction with the socio-cultural environment: they work in unique places, from homes and offices to urban locations or natural environments, in public and private organisations to research facilities and fieldwork locations.

Thus, work in both fields is characterised by mobility, as short- and long-term movement between different locations, teams, organisations and countries is commonplace (e.g., Hautala & Jauhiainen, 2019; Hautala & Nordström, 2018). As exemplified during the COVID-19 pandemic, digital technologies have further enabled the spread of work from specific locations into multifaceted settings (Jonsson et al., 2018; Wang et al., 2020). Thus, the socio-cultural settings of artistic and scientific work take various meanings and are constantly evolving through

shared practices (Hawkins, 2013). This has been a key issue in economic geography, where studies have explored how the creative process is mobile and socially produced in interactions between people and teams (e.g., Grabher et al., 2018; Hautala & Ibert, 2018).

On that note, notions regarding the assembling and dispersing of these myriad relations also call attention to the temporality of matters, considering how the creative process emerges in “the flow of time” (Hernes, 2014, p. 2). This is essential in the study of processes, whether it is a retrospective look into how the process has evolved, following the process into the future, or analysing how the process is constituted in time (Langley & Tsoukas, 2010, p. 11). In the leading creativity theories, time is often conceptualised linearly due to the prevalent understanding of the creative process as a stage-based mechanism, which means its progress can be traced in Newtonian clock time (e.g., Amabile et al., 2002).

However, from a relational perspective, the perceived, experienced, and social time are equally relevant in processes (e.g., Kitchin, 2023; May & Thrift, 2001), not least in the context of creativity (Simpson et al., 2020). The relational concept of time is often distinguished as “temporality” (Kitchin, 2023, see also Crang, 2003). The experience of flow (Csikszentmihalyi & LeFevre, 1989) is a prominent example of a subjective temporality in the creative process because during flow, time is seen to pass faster than usual, or to slow down or pause completely, even creating a sense of “timelessness”.

2.4 Relational approaches to the creative process

Following the paradigm shift toward process research (Ibert et al., 2015) and new mobilities (Sheller, 2017), the extant research in economic geography and beyond has increasingly explored how processes of creativity are relationally formed. Geographical research finds how processes are formed along co-worker networks (Lengyel & Eriksson, 2017), through the repeated rhythms of geographical co-presence and dispersion (Hautala, 2018), or in-between the city-periphery relations (Grabher, 2018). Such literature has emphasised the temporal rhythms of socio-spatial practices and simultaneously contested the territorial perspectives of creative cities and clusters (e.g., Faulconbridge, 2017; Ibert et al., 2015; Malmberg & Power, 2006). For example, in creative economies where creative outcomes are largely measured and defined in creative centres such as cities and clusters, the movement of individuals to and from peripheries can support the generation of novel ideas which then challenge the mainstream thinking in the centres (e.g., Hautala & Jauhiainen, 2019).

Despite individuals being at the core of social processes on all scales (e.g., Gong & Xin, 2019), research on individual-level creative processes has been conducted

mostly outside of economic geography. So far, most of the research on the relationship between the creative process of individuals and the socio-material context can be found in the field of management and organisational studies (MOS). Here, scholars have explored how to enhance the creative behaviour and cognitive skills of individuals, for example by managing team relations or the organisational structures under which individuals operate (e.g., Caniëls & Rietzschel, 2015; Slavich & Svejenova, 2016). For instance, certain spatial and social configurations, such as physical spaces (Leonard-Barton & Swap, 2005), managerial practices (Biancani et al., 2014) or team dynamics (Bissola & Imperatori, 2011) can support individual creativity. Similarly, the effects of time pressure and deadlines (Amabile et al., 2002, Khedhaouria et al., 2017) or time management (Zampetakis et al., 2010) are found to support creative behaviour.

The mainstream creative process research has received critique for the lack of in-depth relational thinking of space-time (e.g., Sydow, 2018). Indeed, the common approaches often promote a linear understanding of the creative process, in which novelty is achieved if suitable organisational or urban settings are in place. These “instrumentalised” accounts of the creative process hold a risk of reducing spatio-temporal factors to objective variables and render the creative process a controllable and frictionless phenomenon (e.g., Bilton, 2010; Karakilic & Painter, 2022; Prince, 2014). Thus, critics note how such studies can only perpetuate “performed images of creativity,” limiting the research efforts to notions of outcome-oriented and market-focused ideals of creativity (Leclair 2023, p. 821).

I argue that relational thinking is required to move away from the variance-based conceptualisations of the creative process (e.g., Beyes & Holt, 2020). The specific focus on spatio-temporal aspects of creativity would increase the understanding of the forces that sustain, transform, and hinder the creative process, also beyond the context of cities or organisations and at the individual level. Indeed, the epistemological advancements must be matched with thorough methodological development that corresponds to the issues present in theoretical debates (Yeung, 2024). Therefore, in this thesis, I refrain from using instrumentalised accounts of creativity. Instead, I abstract the creative process through methodologies that combine geographical concepts with process ontology (cf. Hernes, 2014; Langley et al., 2013).

In their imperative work connecting creativity and process theory, Fortwengel et al. (2017) introduce two theoretical paths to creative processes: practice and becoming. The practice approach considers how different spatio-temporal structures, such as work routines, material or temporal limitations, or organisational practices, enhance or restrict the creative process (e.g., Caniëls & Rietzschel, 2015; Ortmann & Sydow, 2018). This perspective highlights the role of spatio-temporal structures in the creative process by exploring how they are produced through shared actions

and “embedded in social systems” (Fortwengel et al. 2017, p. 12). The becoming perspective, in turn, builds on Deleuze’s (1995) ideals of becoming, seeing the process as continuously changing and evolving (Langley & Tsoukas, 2010; Hernes, 2014). Here, the empirical aim is to understand how the fleeting moments of creativity emerge in the flow of time.

My study setting thus draws on these distinct but complementary ontologies and combines them with geographical concepts. I suggest that the spatio-temporal configurations and engagements with the world, including with non-human entities, are a central way to bring to the fore the more invisible forces present in creative action. To go about this, I call attention to temporality, mobility, and material agencies.

First, temporality and movement in processes are often “rendered invisible” in social sciences (Langley & Tsoukas, 2010, p. 2). However, the daily spatio-temporal rhythms of individuals are key issues to consider in how different relations “emerge, develop, grow, or terminate” in their daily work (Langley et al., 2013, p. 1, see also Hernes, 2014). This requires paying attention to the temporal ordering and fluidity of processes (Langley et al., 2013, p. 4). Therefore, I argue geographic methods can offer significant contributions to the creative process research by drawing from relational space-time thinking to accentuate the temporality inherent in spatial practices.

Second, geographers have connected spatio-temporal thinking to research on mobility to accentuate how human processes are (re)produced in space over time. Here, mobility must be understood more than mere movement between locations; instead, it refers to the way individuals and tangible or intangible objects move, how mobility is experienced, and the meanings given to mobility (Cresswell, 2014). As such, mobility has practised, embodied, and experienced dimensions. Mobility can thus be used to bring to the fore how human processes are sustained or constrained in different spatio-temporal contexts (e.g., Hägerstrand 1970), or to conceptualise temporality and change inherent in fluid processes (e.g., Merriman, 2012). In other words, the focus on the everyday mobilities of individuals allows us to examine how the creative process actualises in different spatio-temporal contexts over time (see Jeanes et al., 2015; Küpers, 2015; Merriman, 2023). This perspective complements the prevalent mobility-related creativity research, where mobility has been considered rather implicitly in relation to careers or change of locations in the long term (e.g., Hautala & Nordström, 2018; Loacker & Sliwa, 2016).

Third, tangible and intangible materials are another essential element in relational creative processes despite often receiving less attention in the processual analyses of creative work (Bruns & Long Lingo, 2024). Materials are known to “support, shape, react to, resist and generally lead creative action” (Glăveanu, 2016, p. 165). In post-humanist considerations of materiality, materials are often theorised

as mediators in spatial processes (see Duff & Sumartojo, 2017). Following Latour (2007, p. 5), mediators “transform, translate, distort, and modify the meaning or the elements they are supposed to carry”. In other words, quoting Duff and Sumartojo (2017, p. 421), “paint makes all the difference” in creativity. However, the exclusion “of nonhuman material, semiotic and affective forces” has been prevalent in creativity research (ibid, p. 420, see also Leclair, 2023). Thus, the relational perspectives alert us to the central role of materials in such moments and thus challenge the human-centric perspectives to creativity (e.g., Duff & Sumartojo, 2017; Leclair, 2023).

Moreover, the focus on materials also sheds light on the segments of tedious work where creativity and ideas are constantly formed and reformed in mundane but essential interactions with the social and material (e.g., Gherardi & Perrotta, 2013; Leclair, 2023). These issues have been taken up in human and cultural geography where scholars have examined materiality, particularly in terms of artistic work (e.g., Hawkins, 2013; Rose, 2016). The research on socio-material relations and non-human agencies in creativity has further increased in the digital age, due to the distinct features that digital technologies possess in terms of connectivity and processing power (Castells, 2004; Nordström & Lundman, 2023; Pigott, 2020). Indeed, studies in process research would benefit from improved consideration of corporeal and material entities to better understand how the material (re)produces processes (Hautala & Jauhiainen, 2022; Lundman & Nordström, 2023; Williams, 2016).

The laid-out issues are particularly critical in the digital age as hybridised space-time practices and related patterns of movement, as well as novel techno-material agencies, have become key concerns for scholars. With the present approach, I uncover the processual links that explain these real-world socio-spatial issues (see Yeung, 2024). Next, I explore these issues in detail and then link them with the relational perspective.

3 The creative process in the digital age

3.1 Engaging critically with digitalisation

Moving forward to the context of the digital age, I begin by engaging critically with the concepts of digitalisation and digital technology. Digital refers to the digital systems that translate “inputs and outputs into binary structures of 0s and 1s, which can be stored, transferred, or manipulated at the level of numbers, or “digits” (Lunenfeld, 1999: xv). Technology, in turn, is generally defined as the application of knowledge in the making and using of artefacts, and often also refers to such artefacts themselves (Mitcham, 2022). Technology thus bears both physical and social meanings.

In this thesis, I focus particularly on digital technologies that have become widespread along with computer technologies since the digital transformation began in the late 1970s. Following Castells (2004, p. 9), we can identify three distinctive characteristics of digital technologies: (i) the volume, complexity and speed of processing and communicating capacity; (ii) the ability to recombine the existing databases and resources on the basis of digitisation; and (iii) the distributing flexibility through interactive networking. While digitisation and digitalisation are sometimes used interchangeably, in this thesis I use digitisation to refer to the digital creation of information data, and digitalisation to account for the use and application of digital technologies by individuals, organisations and society on all scales (Frenzel et al., 2021).

Noting how most today’s disruptive technologies are digital, scholars have scrutinised the actual and potential effects of digitalisation in different sectors of society (Williams et al., 2021). The opportunities related to digital technology have been widely noted, from the automation of jobs to the digitisation of processes and technology-augmented decision-making (Holford, 2019; Kitchin, 2023). Organisations can enhance their performance in various ways, as processes from research and development to production as well as collaborative practices and knowledge creation are increasingly technologically mediated, and thus provide opportunities for economic growth (e.g., Valenduc & Vendramin, 2017; Lyytinen, 2022). Moreover, digitally augmented solutions are often promoted as a means to

increase the sustainability and resilience of societal processes. A prominent example is the idea of a “smart city”, which entails technology-led approaches to urban development to optimise and enhance city systems, and to increase productivity and innovation (Kitchin et al., 2019).

Thus, many consider digital technologies as “a vital ingredient for addressing the major issues” in urban planning, regional development, and economic performance (Kitchin et al., 2019, p. 201). Ideally, digitalisation would result in a future like the one proposed by Wang et al. (2020), where autonomy, fluid and healthy work arrangements, and heightened human capacity to work in tandem with technology are supported. In such a scenario, digital technology is developed from the perspective of equity, sustainability, and transparency.

However, critics have also called attention to the negative impacts of digitalisation. Indeed, conceptualisations of digitalisation are often coupled with ideals of efficiency and productivity, relying on the perceived rationality and measurability that technological solutions provide (Holford, 2019; Lindell, 2024). For instance, Wang et al. (2020) propose a more pessimistic future scenario where knowledge-intensive work is dominated by digital technologies to optimise work with the aim of achieving maximum productivity. As such, the research on disruptive digital technologies has been greatly concerned with the future of work, noting how digitalisation is related to issues such as salary and working conditions, mass automation and displacement of jobs, employment security, and offshoring (e.g. Frey & Osborne, 2017; Williams et al., 2021). Automatization and technology reliance are also found to pose risks to decision-making processes, policymaking, and surveillance (Kitchin et al., 2019; Lindell, 2024).

While most of these dialectics are beyond the scope of the present thesis, it is crucial to remain aware of the underlying imaginaries that drive economic and technical development in today’s societies (e.g., Holford, 2019; Lindell, 2024). Indeed, as the effects of digitalisation are profoundly entangled with the creative economy, the debates on digital disruption are prolific in creativity research as well. In the utopian visions, people work reduced hours with maximum flexibility, utilising the possibilities offered by digital tools and platforms such as new business models and networks that subsequently provide new ways of employment (see Repenning, 2022; Valenduc and Vendramin 2017). Conversely, creative work in dystopias is affected by fragmented employment, pressures of commodification and global open markets, resulting in increased precarity or even mass unemployment (see Frey & Osborne, 2017; Williams et al., 2021).

Critically, understanding these scenarios and their effects requires better engagement on how digital technologies and human practices reflexively shape each other (Holford, 2019; Kitchin, 2023). Indeed, Williams et al., (2021, p. 134) argue that “much of the current debate positions workers as passive bystanders in the

automation or commodification of work.” As such, they call for more research, particularly from the perspective of creative professionals who are not bound by traditional organisational structures to scrutinise how such people experience changes that result from technological disruption.

While economic geographers have mostly scrutinised such issues on a macro level, only a few studies have focussed on the micro-level contexts in which creative processes occur, studying the manner people exist in digital space and engage with digital technologies (e.g., Repenning, 2022). Again, we can recognise the efforts of human and cultural geographers who have developed theoretical and empirical work on creativity-related research in the digital age, mostly focusing on the mediums of arts, design, and media (e.g., Lundman & Nordström, 2023; Rose, 2016; Pigott, 2020).

In the following sections, I couple the theory of the relational creative process with insights from digital geography. In so doing, I first present the concept of technological mediation, and then discuss its impacts on creative work in detail.

3.2 Conceptualising technological mediation

To ensure a geographical approach to the issues of digitalisation and the creative process, I use the concept of technological mediation to explore the human practices emergent in digitised societies. Technological mediation refers to the “multiple yet contingent comings-together of technology, people, and place, and space” (Leszczynski, 2018, p. 18), and is used to explain how humans experience the world with and through technologies (e.g., Ihde, 1990; Rose, 2016). The approach builds on theories on materials as mediators (see Latour, 2007, for Actor-Network theory). Digital technologies produce spatial multiplicity when digital spaces blend with the physical places that are linked to infrastructure, data centres, or users (Zook & Graham, 2018; Leszczynski, 2018). These systems are thoroughly interwoven into how society is managed, governed and planned (Kitchin 2023, p. 34), and digital technologies, practices, products and services have become commonplace in everyday life (Ash et al., 2018).

Therefore, Kitchin (2023 p. 34) theorises digital technologies as “space-time machines” that produce, disrupt and transform social practices. Extant literature has greatly explored these enabling and disabling characteristics of digital technology (see Davenport & Mazalek, 2004). Often conceptualised as “affordances”, digital technologies offer human activities such as instantaneous connections, access to data and knowledge, and the creation of new outputs (Henriksen et al., 2022; Heras-Escribano, 2019).

Critically, as digital technologies and related practices are constantly in development, we must consider technological mediation based on contemporary

practices instead of drawing implications from theories and ideals from past eras (Jonsson et al., 2018, p. 216). In this vein, it is necessary to study “how users make sense of a technology and apply it in constructing relations”, and “the ways in which the material features of technologies give rise to or condition the evolution of social practice” (Sgourev, 2020, p. 38). Instead of considering “the digital” as distinct spaces or technological applications, we must recognise the hybridisation of space and how it affects the everyday spatio-temporalities of human practices (Li et al., 2024). Thus, the virtual dimension cannot be separated from offline spaces, but the digital-material spaces must be seen as inherently hybrid (He et al., 2023).

However, digital geographers have accentuated how technology does not hold power over space, or as Richardson (2021, p. 348) notes, “the relationship between technology and space is neither uniform nor unidirectional.” Indeed, social practices play an active role in shaping the application and development of technologies, and similarly, spatio-temporal practices are continuously negotiated in daily life when people take up those technologies (Leszczynski, 2018). In other words, technological mediation and space-time practices are mutually formed (Ash et al., 2018).

In the following sections, I use relevant literature to examine the effect of techno-material agencies and mediated space-time practices on creative processes.

3.3 Implications of digital technologies on the creative process

3.3.1 Techno-material agencies

In creative work, digital technologies are increasingly used in the development, creation, sharing and distribution of novel outcomes (Repenning, 2022). Considering the distinctive characteristics of digital technologies (Castells, 2004), such as the volume and speed of processing information or flexibility of interactive networking across distance, digital technologies possess features that set them apart from traditional technologies or tools. For instance, Mazzone and Elgammal (2019, p. 8) accentuate the difference between a computational algorithm and a paintbrush, suggesting that the paintbrush cannot change, make decisions, or learn from data.

Digital technologies support the creative process also by creating affective responses and transforming human experiences (Leszczynski, 2018), i.e., expanding the “possibilities of perceiving, feeling, knowing and acting” (Carbone, 2019, p. 97–98). For instance, digital platforms have become a specific type of spatial setting that offers new possibilities for creativity. This is evident for example when artists use social media to share their work (Repenning & Oechslen, 2023), or when scientific research group organises their work and share resources over digital networks (Richardson, 2021). Digital technologies also facilitate the creative process by

stimulating creativity, freeing up time for creative tasks, or enabling the creation of new outcomes (e.g., Anantrasirichai & Bull, 2022; Bruns & Long Lingo, 2024).

On the other hand, the negative sides of increased digital technology use create issues in creative work and beyond, such as increased stress and decreased engagement with the task at hand (e.g., Bruns & Long Lingo, 2024; Oldham & Da Silva, 2015; Tarafdar et al., 2019; Thulin et al., 2019). Generally, digital screen-based devices are known to be addictive, creating effects from overuse to social pressures and disconnectedness (Tarafdar et al., 2019). Being constantly connected to work and colleagues via mobile devices is also linked with increased stress and subsequently lowered creativity (Byron et al., 2010). The constant technological mediation requires energy and focus which intervenes with time spent on creative tasks and engagement (Bruns & Long Lingo, 2024), and “information overload” might result in too many ideas to process and implement (Oldham & Da Silva, 2015).

Therefore, the digital technologies that are increasingly used in today’s creative work present an interesting point for research that can provide deeper insight into the role of digital technology in the creative process. In Article I, I engage with these issues by focusing on a digital technology that has centrally influenced creative practices over the past years: AI (Mazzone & Elgammal, 2019). AI is generally defined as a computational system exhibiting behaviour that would be considered intelligent when performed by humans, e.g., learning, reasoning, and problem-solving, and such technologies have been utilised in various ways since its early implementations in the 1950s (Kaplan & Haenlein, 2019; Russell & Norvig, 2010). Subsequently, AI solutions have become commonplace across industries and are thus an integral part of various creative and innovation processes. For example, AI models support data analyses, innovation process management, and enhance product development (e.g., Tekic & Füller, 2023).

AI has become a trending issue in creativity debates over the past decade particularly due to the developments in generative AI models (e.g., Epstein & Hertzmann, 2023, see also Article I). The generative models, such as ChatGPT or Midjourney, can be used to create visual media or written text based on human-assigned prompts. Consequently, they represent a disruptive technology that fundamentally changes creative work and critically has put forward important questions regarding agency in the creative process (Hopster, 2021). Most creativity literature attributes creative agency, i.e., a temporally embedded capacity to act with intent (Emirbayer & Mische, 1998), only to humans. However, several technologies such as AI possess the capacity to “intentionally constrain, complement, and/or substitute for” activities in human practices, and Murray et al., (2021, p. 553) therefore call such technologies “agentic technologies”.

Focusing on the role of AI in artmaking, Nordström et al., (2023) argue how prevalent research on creativity in digital geographies mostly considers human-

technology relationships through “separated” or “merged” categorisations of agency. Thus, they argue the conceptualisations in digital geographies must be further developed to better recognise the agency of technology in the creative process (*ibid*, p. 2206). The authors find how the agencies of artists and AI mutually evolve through processes of code development, training the program, and curating the outcomes produced by the code. These moments then influence the creative experiences of the artist. Similarly, Murray et al., (2021) find four “conjoined agencies” between humans and technology, namely assisting, arresting, augmenting, and automating agencies, which all impact organizational routines.

In their work regarding AI and art, Kalpokiene and Kalpokas (2023) call for the posthuman recognition of humans and AI where both agencies are embedded and relational, thus inviting us to question the dominative underpinnings of human-centric views on creativity. The notions of AI’s agency have far-reaching implications in creative industries and beyond, relating to issues such as copyright issues, technological unemployment, or misinformation (Epstein & Hertzmann, 2023; Kalpokiene & Kalpokas, 2023).

The inherent materiality of the creative process is highlighted also in Article III. In Article III, I suggest that “geographies of encounter” can be employed to depict the “coming-together” of different agencies in the creative process, both human and non-human (Wilson, 2017).¹ Traditionally, geographies of encounter have been conceptualised as “the meeting of opposites”, for instance in the context of cultural encounters explaining the power of borders and boundaries, or to depict the “thrown-togetherness” of different forces in space to illuminate social differences in the urban (Woodward et al., 2010; see also Massey, 2005). Essentially, the moment of encounter conceptualised the meaningful instances that “make a difference” in the process (Wilson, 2017, p. 646).

Geographies of encounters have also been applied in the context of digital geographies: for example, Koch and Miles (2021) argue that digital technologies have transformed how and where geographies of encounter take place in everyday life. Similarly, Adams (2017) argues how technological mediation produces a new metaphysics of encounters when “people encounter other people and things, near or far, still or mobile, perpetually redefining ‘here’ and ‘there.’”

¹ While employing creative moments of encounter in this thesis, I remain mindful of how encounters are also seen as a charged concept due to their diverse applications in critical contexts from post-colonial writing to studies on urban diversity (Wilson, 2017). Indeed, the objective here is not to establish encounters as harmonious occurrences along the creative process; instead, the moments of encounters can reveal the frictions, surprises, and ambiguities inherent in creativity.

In the context of creativity, geographers have used encounters to account for the “enchanted” or surprising meetings of different forces in everyday life (e.g., Pyyry, 2016; Nordström, 2018). Here, the moments of encounter represent active connections that encapsulate the relational context in which the creative process is established and made to hold (Gherardi & Perrotta, 2013).

Analytically, the encounter recognises “the immanent, material connection between bodies and unfolding, situated practices” (Woodward et al., 2010, p. 273). I thus use the encounters to capture the fleeting moments that come and go in processes (Hernes, 2014), as they represent “an ongoing process of making and remaking meaning” (Adams, 2017, p. 371). Critically, in the moments of encounter, agency is not attributed to a single species but instead resembles the “flexible capacities of elements” that emerge when agents interact with their environment (Kalpokiene & Kalpokas, 2023, p. 2, see also Heras-Escribano, 2019). Thus, by closely examining the encounters along the creative process, I account for the multiple relations and agencies that bring about creative action.

3.3.2 Mediated space-time practices

The effect of digitalisation on spatio-temporal work arrangements and mobility practices is well established, as the changing geographies of work and leisure have long been the focus of scientific inquiry (Salomon, 1986; Choudhury, 2022; Wang et al., 2020; Henriksen et al., 2022). These characteristics are visible across various disciplines, not least in knowledge-intensive and creative fields that are characterised by mobility and high levels of digitalisation. Indeed, the spatio-temporal conduction of creative and knowledge-intensive work is increasingly conducted in hybrid, physical-virtual contexts (Schiemer et al., 2023; Slavich and Svejenova, 2016).

Accordingly, mobility practices in the digital age appear extremely multifaceted and bear various dimensions such as virtual and communicative mobility (Hearn, 2020; Wang et al., 2020; see also Urry, 2007). Indeed, digital technologies afford mobile work arrangements such as “digital nomadism” or commuting between urban centres and peripheries (Bürgin & Mayer, 2020). Such forms of work are both a requirement and a resource for creative workers, as being “nomadic” enables a balance between solitude and social, and it also supports networking and connection to important resources and infrastructures (Hautala & Nordström, 2018; Liegl, 2014).

On that note, the widespread use of mobile internet and communication technologies (ICTs) has relaxed the space and time-related constraints of work, meaning everyday work is less confined to specific locations. Digital technologies afford increased individualisation of work arrangements, as people in highly digitalised professions can better “adapt to fluctuations in bodily capacity and well-

being” and organise their schedules accordingly (Thulin & Vilhelmson, 2022, p. 264). Work-related flexibility is found to have a positive influence on well-being, positive emotions, and creativity at work (Chen et al., 2015; Liu et al., 2011). The flexibility also facilitates the mobile practices the creative professionals engage with to enhance their work and to create new networks in everyday life (e.g., Bürgin et al., 2022; Hautala & Nordström, 2018).

Thus, digital technologies create “constellations of practice”, i.e., collectively shared space-time structures, which facilitate instantaneous connections and sharing of knowledge over distances (Faulconbridge, 2010, p. 2854, see also Orlikowski & Yates, 2002). While remote conferencing tools have long been commonplace, technological development has also opened up new platforms for collaboration and co-work (Grabher et al., 2018; Schiemer et al., 2023; Jarvenpaa & Välikangas, 2020). For example, there is increasing interest in virtually augmented realities that enable new kinds of embodied experiences and are argued to offer new possibilities for shared innovation processes (e.g., Jauhiainen, 2024). A novel aspect here is the use of immersive and interactive technologies that better facilitate co-presence, as “being together” is noted as a key ingredient in most collaborative work (see Schiemer et al., 2023; Slavich and Svejenova 2016).

However, scholars have also taken note of the negative effects caused by digital technologies that relate to well-being and disrupted space-time routines (e.g., Tarafdar et al., 2019). For instance, the spatio-temporal boundaries between work and leisure have blurred (Hubers et al., 2018; Mullan & Wajcman, 2019), and work has become increasingly dependent on enabling technologies (e.g., Brydges & Hrats, 2019; Hearn, 2020; Richardson, 2021). Moreover, the embeddedness of technology can create feelings of time pressure (Thulin et al., 2019) and affect work pace and organisation, as spatio-temporal structures of work become technologically mediated (Thulin & Vilhelmson, 2022).

Moreover, the technologically mediated collective practices are increasingly dependent on the shared schedules of individuals, thus decreasing the possibilities for serendipitous interactions that are beneficial for idea generation and support (Jarvenpaa & Välikangas, 2020). Thus, the manner the constellations of practice are organised and enacted in hybrid physical-virtual contexts as well as the implementation of technologies that enhance co-presence have become key issues in creative work where interaction, networking and collaboration are not only encouraged but required. The need to be constantly connected and available to networks has implications for self-organising and management. Rapidly evolving digital technologies and their application demand instantaneous responses from workers who must adapt to the demands of creative industries, meaning digital technologies reflexively shape the creative identities and careers of individuals (Williams et al., 2021). Against this background, it is necessary to examine the

myriad ways the creative process is enacted, produced and disrupted in mediated space-time.

In Article II, I draw from Hägerstrand's time-geography and combine its central concepts with the creative process research. Hägerstrand and his group developed time-geography to dynamically analyse the movement of corporeal agents, organisms, and materials in space and time (Hägerstrand, 1970; Hägerstrand, 1985).² Time-geography's central concept is the space-time path that depicts an individual's movements in space-time and their relation to the surrounding world (Hägerstrand, 1970). Thus, time-geography can be utilised in the temporal sequencing of "practices that assemble and bundle people, tools, and objects in space" (Thulin and Vilhelmson, 2022, p. 253).

During the past decades, scholars have "virtualised" time-geography and reworked classic time-geographic concepts to depict the hybrid offline-online contexts (e.g., Couclelis, 2009, Ellegård, 2018, Klapka et al., 2020, Shaw, 2023). In this thesis, I focus particularly on the concept of the "pocket of mediated order" which depicts the relational closeness between matters, achieved in technologically mediated proximities (Li et al., 2024). The pocket of mediated order is adapted from Hägerstrand's theorisation on the pocket of local order used to describe the ideal order of things, e.g., relationships and resources in space-time that allow individuals to perform their daily activities.

With pockets of local order, Hägerstrand aimed to develop relational thinking within time-geography, noting how not only physical but also social and mental dimensions are inherent parts of human activity (Hägerstrand, 1985). With the pockets of mediated order, the role of technology can be made more explicit in geographical analyses of social practices (e.g., Schwanen, 2007; Thulin & Vilhelmson, 2022). As such, the approach used in Article II adheres to the perspective of creativity as a practice that builds on moderate process ontology (Fortwengel et al. 2017), thus allowing me to abstract the structures and materials that sometimes enhance and sometimes constrain the creative process.

In Article III, I combine the previously introduced concept of encounters with geographical mobility literature to explore how the encounters emerge, transform, and disperse in space (e.g., Küpers, 2015; Merriman, 2012; Urry, 2007). The approach used in the article adheres to what Fortwengel et al. (2017) name a strong

² The classic time-geography faced criticism for being too physicalist, failing to account for the social structures, embodied experiences and power relations inherent in relational space-time contexts (e.g., Buttner, 1976; Rose, 1993). Whereas these debates are beyond the scope of this thesis, several scholars have since addressed the critique and justified the use of time-geography in a contemporary context. For an extensive summary of the debates, see Ellegård (2018) and Latham (2020).

process perspective. With encounters and mobilities, I illuminate how the creative process is constantly “becoming” in the flow of time as creative actors engage with temporally assembled resources (e.g., Karakilic & Painter 2022). Unlike the practice perspective to creativity where the focus remains on resources that structure daily life, the becoming perspective draws attention to the interconnected events that can be captured by empirical analyses (Fortwengel et al., 2017).

Thus, in Article III, I use mobility literature to consider how mobility produces different patterns in processes through varying speeds, rhythms, and slowness (Merriman, 2023). This way, as Cresswell (2006) argues, mobility alerts us to stillness (i.e., immobility), and subsequently how the interplay between mobility and immobility reproduces ambiguous creative processes.

Article III further highlights the dimensions of mobility brought about by digital technologies, illustrated as virtual mobility in the article. Indeed, creative workers in precarious positions often have no choice but to be mobile for them to maintain their professional positions. Such mobility is heavily supported by digital technologies, as the COVID-19 pandemic also highlighted (e.g., Brydges & Hracs, 2019; Klapka et al., 2020). Reflecting upon different mobilities, I explored how the creative process is (re)produced in and through different forms of mobility, such as geographical, virtual, imaginative, and corporeal (Jeanes et al. 2015; Merriman, 2023; Stephenson et al., 2020; Thompson, 2018). In the following section, I introduce the materials and methods in detail.

4 Materials and methods

4.1 Participant selection

In the research articles of this thesis, I empirically engage with the creative process by focusing on two groups of creative professionals: computer scientists and new media artists. As such, the research setting of this thesis conforms to a case study setting where a phenomenon is investigated in its real-life context through a case or cases of interest (Yin, 2013). The key approach is to use multiple sources of data from several points in time to gain an overview of the issue in question (Creswell & Poth, 2016). The focus on specific cases thus provides deeper insight into the research problem; in this instance, the techno-material relations and mediated aspects of the creative process. Yin (2013) notes how case studies can lack generalisability because the researchers must often focus on a few cases with a limited amount of data.

Therefore, I convey insights from past literature to conceptualise the theoretical questions and then discuss them with the empirical findings from my research to explain them. As Lund (2014, p. 231) argues, it is the movements between observations and their articulation that provide “epiphanies and analytical knowledge”, grounding “the potentiality for generalization, abstraction, and theorization of the case.”

Moreover, a clear and concrete case selection improves the validity of a case study. In this thesis, the cases were initially bounded to creative professionals, and subsequently to artists and scientists, to allow analyses of comparisons and contradictions on distinct creative processes (see section 2.2). Then, the participant selection was bound to location; in this case, Finland. With the research context in mind, the participant selection was further narrowed down to artists and scientists who use digital technologies in their work, thus directing the focus on new media artists and computer scientists (**Table 2**).

Both new media artists and computer scientists closely work with digital technologies, and technological mediation is present in their everyday life (Wang et al., 2020). Moreover, both groups are central in developing and applying novel technologies and thus offer the best access to the relevant information concerning the use of digital technology in the creative process (cf. Bogner et al., 2009).

Table 2. Sample selection criteria and justification.

Participants	General selection criteria	Reason for the criteria
New media artists	Based in Finland during the data collection	Narrows down the scope of the case by focusing on specific context (e.g., Yin, 2013). Finland is one of the most digitised countries in Europe (Marti & Puertas, 2023) thus facilitating a focus on the role of digital technologies in everyday life
	Working as a professional artist, art researcher or art educator, and work involves making art	Allows examination of an artistic creative process. The artistic creative process has been studied in detail and the findings can thus be reflected against past literature (e.g., Glèveanu et al., 2013).
	Main domain is new media art, and/or involves applying or developing novel digital technologies in artmaking (Biggs, 2009).	Bounds the case to artists whose creative processes involve various mediating technologies. Ensures the participants are experts in the use of digital technology in artmaking.
Computer scientists	Based in Finland during the data collection	Narrows down the scope of the case by focusing on specific context (e.g., Yi, 2013). Finland is one of the most digitised countries in Europe (Marti & Puertas, 2023) thus facilitating a focus on the role of digital technologies in everyday life
	Working in a Finnish university and involved with conducting research	Allows examination of a scientific creative process. Scientific creative process in academia has been studied in detail and the findings can thus be reflected against past literature (e.g., Sternberg, 2018).
	Working in a computer science research group where work involves applying or developing novel mediating tools	Bounds the case to scientists whose creative processes involve the use of various mediating technologies. Ensures the participants are experts in the use of digital technology and computational methods in scientific creative processes.

In addition to the general selection criteria, the selection of participants for the three research articles involved specific criteria that correspond to the research setting of each study. In the first and third articles, the participants were contacted directly based on their applicability to participate. In the second paper, an open call to participate was posted to a relevant email list consisting of a large group of computer scientists who fit the criteria to participate.

4.2 Main materials and analysis

The methodology for collecting the materials and analysing the data consists of multiple methods and thus represents a mixed-methods approach. The multiple methods approach has varying definitions, but the key idea is to combine different research strategies, often both qualitative and quantitative, to answer the research question (Flick, 2018). Using multiple methods in case studies is often appropriate, particularly when the research question is complex and thus benefits from various materials that explain the issue (Eisenhardt & Graebner, 2007). Therefore, using multiple methods is useful when studying the creative process which is a complex phenomenon and thus requires specific methodological considerations (Fortwengel et al., 2017).

Because the spatio-temporal perspective is at the core of my empirical investigations, the methods in my three studies involve qualitative materials from interviews and participant-generated research diaries, as well as GPS-based geospatial data (**Table 3**). Next, I first introduce the methods and then explain how they were applied in the research articles.

Table 3. The empirical studies.

Article	I Redefining creativity in the era of AI?	II projects and pockets: time-geographic approach to the creative processes of computer scientists	III moments and (im)mobilities in the creative processes of artists
Participants	26 new media artists 26 computer scientists	9 computer scientists	4 new media artists
Primary material	Semi-structured interviews	Participant-generated research diaries Semi-structured interviews	Participant-generated research diaries Semi-structured interviews
Secondary material	-	Space-time paths based on GPS data	Space-time paths based on GPS data
Methods	Content analysis	Content analysis Mobility visualisations	Content analysis Mobility visualisations

4.2.1 Interviews

All three research articles of the thesis included interviews with the participants. Interview is a common method of acquiring qualitative materials, allowing the researcher to gather data directly from the participants (Bogner et al., 2009; Tracy, 2024). Here, the participant is a key informant who can provide extensive

information about the research issue. There are multiple types of interviews, from structured interviews to open interviews. All interviews of this thesis were semi-structured, meaning they hold more freedom than a structured interview and leave room for additional questions, clarification, and interaction.

The quality and rigour of interviews are highly dependent on the interviewer who coordinates the interview process. Moreover, an adequate number and length of interviews, a coherent question pattern, and transcription accuracy are essential to convey valid and reliable results (Tracy, 2024). Despite providing rich data, interviews also present challenges in terms of ex-post interpretations of past events, which can be problematic in the context of process research where temporality is a key concern (e.g., Ibert et al., 2015). Therefore, the interview data for Articles II and III that apply process ontology were accompanied by participant-generated research diaries to allow a deeper analytical approach to the individual creative processes of the participants.

All interviews in this thesis were recorded by the interviewer and then transcribed verbatim. The interview language was either Finnish or English depending on the participant's preference. The Finnish quotations used in the studies were translated by the authors and language-checked by proofreaders.

In the first article, a total of 52 interviews were conducted with the participants during the spring and summer of 2020. Here, the interviews formed the only data source for the study. Thus, the semi-structured thematic interview method was carefully employed to facilitate an in-depth discussion regarding the key research questions, i.e., the role of AI in the creative processes of the participants. The first thematic area of the interview focused on participants' perceptions of creativity and AI in general and from the perspective of their own lives. The second thematic area focused on the human–AI relationship and the participants were asked to provide examples and insights on the topic based on personal experiences and views. The questions further prompted the participants to talk about AI in relation to their own work and field, and regarding creative experiences and processes. The lengths of the interviews varied between 30 and 80 minutes, with the average interview being 50 minutes long.

The interviews conducted for the second and third articles were built around the daily diaries the participants filled the data collection period. In the second study, two interviews were conducted at the beginning and at the end of the study period of the nine computer scientists, thus totalling 18 interviews. The study period began with interviews that lasted 30 minutes on average, focusing on general questions about work, i.e., usual tasks, work environment, co-working and daily routines. The participants were also asked to define creativity and elaborate on whether they identify creativity within themselves or through their work. The research period was concluded with follow-up interviews where the participants could reflect on the

study and revisit the daily diaries they filled during the study period. The final interviews lasted 20 minutes on average.

The third study followed a similar approach to the second study. The four artists involved in the third study were selected from the participant pool of the first research article, and the materials from these interviews were used as background information in the third study as well. Therefore, additional interviews with the four artists were conducted only at the end of the study period. Here, the interviewer asked questions about the data collection phase, with a specific focus on the observations the participants recorded about their creative processes, as well as their mobility practices. The interviews lasted 40 minutes on average.

4.2.2 Daily diaries

The daily diary method was used in Articles II and III. Because the articles have different analytical approaches to processes, the diary method was adapted accordingly and therefore both studies involved a distinct diary. The daily diary method is increasingly used to study the day-to-day processes of individual creativity (Czerwonka, 2019). In creativity research, most diary studies focus on how different factors, such as well-being and stress (Petriglieri et al., 2019; Weinberger et al., 2018), or positive affect and emotion (Smith et al., 2022) fluctuate in everyday life and subsequently affect individual creativeness. However, as Czerwonka (2019, p. 61) also notes, daily diaries can offer research access to “the temporal processes investigation unfolding in everyday environments.”

Indeed, the diary method is particularly useful when researching processes, allowing the participants to document the important events as they happen. In geography, participant-generated diaries have been a common method to focus on spatio-temporal characteristics of their life (Latham, 2003). Thus, following relational geography, Latham argues for the usefulness of diary studies in geography as they provide insight into the spatio-temporal practices of individuals. In this thesis, I applied the daily diary method from creativity research and human geography, meaning the diaries were formed in a manner that paid special attention to spatio-temporal aspects of the creative process, thus corresponding to the objectives of this thesis.

Despite the advantages, diary studies also have limitations that must be considered. Bolger et al., (2003) note how diary studies require a level of participant commitment that is rarely present in other types of qualitative studies. Thus, the researcher must carefully consider the scope and structure of the diary in a manner that provides sufficient information without disrupting the participants' lives (Day & Thatcher, 2009). To limit such burdens, scholars often employ diaries that are short and easy for the participant to fill. As a result, the

diary studies are less compatible with an in-depth level of reporting of a phenomenon in question.

Bolger et al., (2003) also note that diary completion might have effects such as reactance or habituation on the participants' responses. Reactance refers to a change in participants' experience due to being a participant in a study. However, the diary method can also reduce reactance compared to other forms of studies due to the habituation process, which means developing a habitual style of responding to the diaries. However, habituation can also lead to participants ignoring what they find inapplicable and may thus omit responses even when they would be relevant. In this thesis, the participants of studies II and III were made familiar with the diaries before the study period to ensure they understood how to fill the diaries. Moreover, each participant was granted a gift card to compensate for the time and effort they put into the diaries.

In the diaries of the second article, each diary entry consisted of two pages: the first page resembles a time-geographic diary including structured questions that focused on visited places, times and work-related tasks (see Ellegård, 2018). This gave an overall view of each day. The diary setting encouraged the participants to mention elements such as co-workers, materials, or other factors such as stress or temporal limitations that affected their daily work. On the second page, the participants were asked to focus specifically on creativity to describe an event that they considered important in terms of the creative process. This way, the participants were able to distinguish creative activities in their work to recognise change in their process and elaborate on matters that had affected their work most on each day, both negative and positive. The question was open-ended but prompted the participant to describe the event and explain why or why not it felt creative. Altogether the participants recorded 99 diary entries. All participants apart from one filled in at least 10 diary entries, and on average there were 11 entries per participant.

In the daily diaries used in the third article, the entries focussed on the self-described moments of creativity. For each entry, we asked the artists to describe a pivotal moment from their day and elaborate on its influence on the creative process. There were no predetermined attributes assigned to the moments; instead, we instructed the artists to describe any moment they felt was significant. The participants then described the event in geographical context including the place they were at, what they were doing, the tools they were using, and who they were with. In the geographical thinking of "encounter"; such moments are events that "make a difference" in the creative process and the artists also described what happened after the moment in the diaries. Thus, the focus was on the encounters between the artist and sites, people, and materials. Here, the subjectively experienced context was important in the description of the moments and the

artists were asked to elaborate on their feelings. Altogether, the material includes 40 diary entries with 36 descriptions of moments of encounter, meaning the diaries included four days when the participants did not identify a significant moment of encounter.

4.2.3 Content analysis

The interviews and research diaries were analysed with a content analysis, which is a common qualitative analysis method used to identify and describe key results from data (Krippendorff, 2018, pp. 24–27). To convey trustworthy results, Elo et al. (2014) accentuate the importance of rich and appropriate data. Here, data collection, analysis, and reporting the results are all key issues the researcher must carefully plan when conducting a content analysis. Elo et al. (2014) further highlight self-reflection and good analysis skills as necessary tools for the content analysis to result in credible results. This means the researcher must be able to explain the analytical process and discuss the limitations of the study. Following these procedures, each research article of this thesis contained an explanation of the analytical process, as well as a discussion regarding the limitations of the study.

Following the general content analysis procedures (e.g., Krippendorff, 2018; Kyngäs, 2020); the approach to data analysis was largely inductive and the process is summarised in **Figure 1**. In the first phase of the process, I became familiar with the qualitative materials by reading them thoroughly. Based on this initial familiarisation I defined the units of analysis, which in the case of this thesis were transcribed passages from the interviews as well as the written parts of the research diaries. The ensuing coding phase began with open coding to summarise each passage, meaning each passage was assigned a distinct code.

The analysis was then conducted by assigning all related codes into distinct categories. The categorisation phase was repeated until all categories were clearly defined, ensuring there were no overlapping or vague categories. In the fourth phase, I identified different relationships between the categories and found common themes. Finally, the most important themes were abstracted in the results section by relevant theory and concepts.

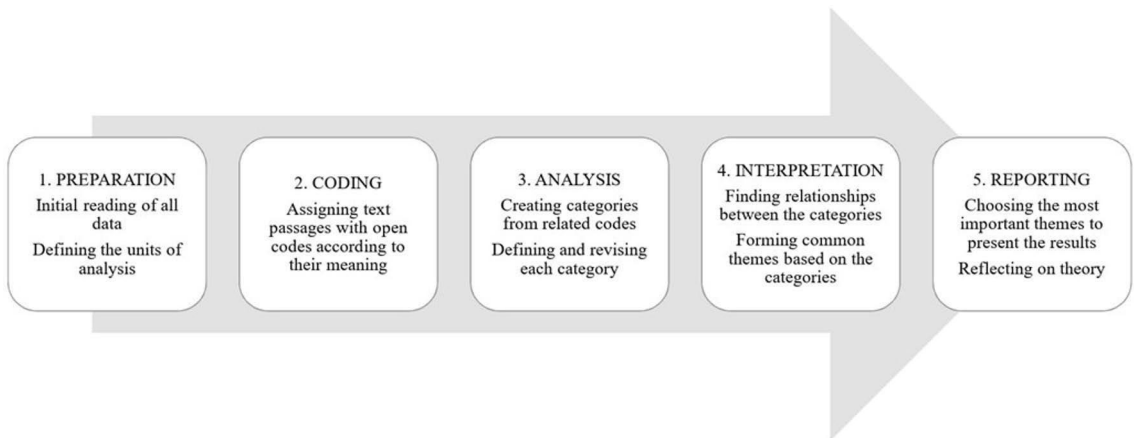


Figure 1. The process of the inductive content analysis based on Krippendorff (2018) and Kyngäs (2020).

In the first research article, 52 transcribed interviews (26 artists and 26 computer scientists) were subjected to content analysis. The first phase of analysis was inductive with a focus on descriptions of creativity. Here, the condensed nodes were assigned an open code and then organised into sub-categories based on their similarities and closeness. Then, the sub-categories were revisited to identify the main categories, i.e., definitions for creativity, and the analysis thus resulted in ten distinct categories. The categories were reflected against the theoretical background to identify which elements of creativity (actor, process, outcome, domain, and space) were present in each definition.

The second phase of analysis focused on the role of AI in the participants' creative processes. Here, the focus was on how the participants define AI, do the participants think AI can be creative, and how they consider AI to be involved in their creative processes. The coding process then followed a similar procedure of open-coding text passages into sub-categories and categories.

In the final part of the analysis, the results were compared between artists and computer scientists by grouping the final analytical categories based on the two participant groups. In the article, the results were presented through four thematical areas: the definitions of creativity, similarities and differences in the creativity definitions between new media artists and computer scientists, the perceptions regarding creativity of AI, and the different roles of AI in artistic and scientific creative processes.

In the second study, content analysis was used to describe and analyse the creative processes of the participants from a spatio-temporal perspective. Thus, nine participant-generated diaries and 18 interviews were subjected to content analysis. The first phase of the analysis focused on creating a typology of space-time routines,

work-related tasks and activities for each participant to gain an overview of their creative processes.

In the second phase, the time-geographic concepts were utilised, and the creative process was abstracted with the concept of time-geographic “project”, meaning the objectives they aim to reach and the routines they utilise to do so. Subsequently, I utilised the time-geographic concept of the pocket of local order to analyse where, when, with what, and with whom the creative activities during the project occurred. The pockets were then analysed by the participants’ experiences with creativity. The analysis resulted in three distinct spatio-temporal contexts i.e., “creative pockets” where creative work is best advanced.

Finally, the moments where the participants found creative work to be more difficult were similarly categorised, resulting in three spatio-temporal contexts that disrupt the formation of creative pockets. To guide the analysis and to effectively present the results, the analysis was accompanied by a space-time visualisation building on GPS data (see the following section).

In the third study, the four daily diaries and interviews were also subjected to content analysis. Here, “moments of encounter” were used as units of analysis, following a common empirical approach in process studies (Wilson, 2017; Hernes 2014). The material involved a total of 36 moments of encounters derived from the daily diaries. Thus, the content analysis focussed on unpacking the moments of encounter, particularly focusing on the felt experiences of creativity and the spatio-temporal context.

In the first phase of the analysis, each diary entry was assigned a code (i.e., a tag) based on the descriptive characteristics present in each moment (place, time, activity, materials, social connections, emotions, and mentions of mobility). Similar descriptive coding was done with the interview passages in which the participants talked about their creative processes and mobilities during the study period.

In the second phase of the analysis, each diary entry was defined as an analytical unit as well as relevant passages from the interviews in which the participants talked about creative moments. The units were assigned a distinct code, which was then cross-examined and clustered based on similarities and differences. The resulting subcategories were again clustered based on similarities, resulting in three main categories: creativity emergent in formative encounters, serendipitous encounters, and tranquil encounters.

The moments of encounter were then connected to the concepts of mobility. This phase involved going back and forth with the relevant mobility literature (e.g., Cresswell, 2006; Urry, 2007) to identify different forms of mobility from the diaries and interviews. The mobility maps further enhanced the analysis by providing an overview of the participants’ movement-based patterns from a processual point of view (see the following section).

4.3 Spatio-temporal mobility maps as supplementary materials

I used the qualitative GIS approach in Articles II and III to enhance the spatio-temporal approach to the creative process. Qualitative GIS refers to combining qualitative materials with geospatial data, meaning a mixed-methods approach where both GIS and qualitative materials are used (Arpagian & Aitken, 2018; Pavlovskaya, 2009). In this study, GPS data was used as secondary material in Articles II and III to create visualisations of the participants' spatio-temporal mobility. Here, the qualitative materials collected for Articles II and III were complemented by map visualisations based on GPS data collected by the participants. This method was chosen to support time-geographic thinking, i.e., to highlight how the participants' activities are geographically located (Hägerstrand 1970; Kwan et al., 2015) and to link the events from daily diaries with geographical locations and mobility patterns.

The analysis emphasises the representational power of mapping, meaning the mapped places and phenomena “become real” once visible, as Pavlovskaya (2017, p. 2) argues. Such an approach has been central to GIS-assisted time-geographical analyses which have visualised social phenomena occurring in space (e.g., Ellegård, 2018; Kwan & Ding, 2008; Latham, 2020). In the context of this thesis, the aim was to better visualise not only space but also time and mobility (cf. Kwan & Ding, 2008), as these are central categories in the everyday creative process. Accompanied by the qualitative materials from the interviews and the daily diaries, the maps offered an overview of the participant's space-time practices. Combining these visualisations with the daily diaries allowed me to reflect upon the relationship between creative experiences and spatio-temporal practices of changing locations or staying still, highlighting the inherent spatio-temporality of the creative process.

In their framework for space-time analytics of everyday life, Yuan et al. (2014) note how the foundation of a spatio-temporal mobility analysis is to establish the “stops and moves” on an individual's everyday space-time track, i.e., the patterns of movement and being still. This was also the objective when using the maps in Articles II and III. The participants were asked to carry a SenseDoc 2.0 device (from Mobysens Technologies) with GPS tracking capability during the study periods.

The device collects location data by recording GPS points with latitude and longitude. The raw GPS data were extracted from the SenseDoc devices with the SenseAnalytics software. The data were first managed as CSV files to determine start and end times of usage for each day. After the data were prepared, the GPS points were displayed on a map with XY coordinates by using ArcGIS Pro 2.7 software. The points were visualised with a 3D view as spatio-temporal mobility maps that cover the 24 hours of each day (**Figure 2**).

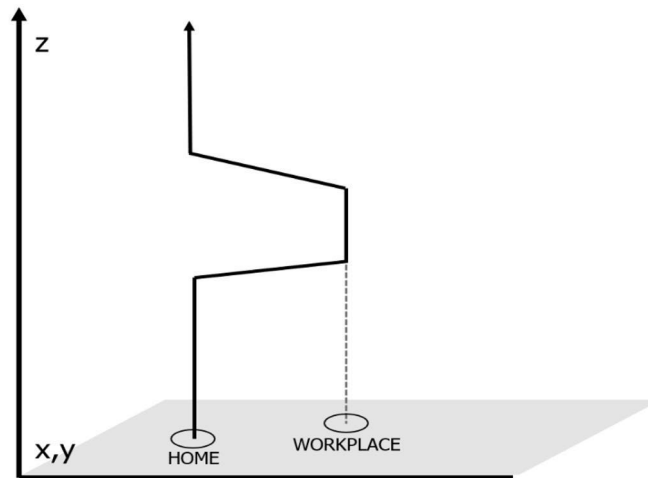


Figure 2. Conceptual space-time path where x, y represents the geographical space, and z represents time (cf. Kwan et al., 2015).

The temporal visualisation with an artificial Z -coordinate was created by assigning a height value to each XY point that corresponds to each hour of a 24-hour clock (Kwan et al., 2015). The 3D lines were visualised on a 2D base map depicting the land use map extracted from an open-access database to distinguish the different areas the participants visited each day. Here, the temporal line starts from ‘home’, meaning the place where the participant woke up and went to sleep each day. Each line covers 24 hours; midnight (00:00) at the surface level and the following midnight (24:00) at the end of the line. The higher an event is along the line, the later it occurred. The stops and moves thus become visible in the 3D maps, as the stops are displayed as long vertical lines whereas lines of movement are horizontal.

While GIS tools have been increasingly coupled with qualitative and mixed-methods research, scholars also note the limitations of qualitative GIS approaches. First, the GPS data collected by the participants is subject to a level of possible inaccuracies resulting from issues with the GPS device. Carrying and charging a GPS device requires a level of commitment, and participant engagement has implications for the quality of the resulting dataset (e.g., Pavlovskaya, 2017). In both Articles II and III, the preliminary data management revealed various gaps in the GPS data, depending on how the participant had used the SenseDoc device. Thus, days with less than 60 minutes of GPS tracking were excluded from the final analysis. On those days the data from the daily diaries were used to determine the spatio-temporal mobility patterns. Due to the gaps in the GPS data as well as the small pool of participants in Articles II and III, the GPS data did not enable a quantitative analysis. Thus, I avoided making conclusions solely based on the

mobility maps and instead highlighted the supplementary nature of the spatio-temporal maps in Articles II and III.

Second, since maps are a means of storytelling in qualitative GIS analyses, the researcher's agency in the process of visualising individuals' lived experiences impacts the "reality being represented" (Bagheri, 2014, p. 173). In other words, qualitative GIS demands recognition of the positionality of the researcher and highlights reflexivity in the research process. Third, because GIS visualisations depict objects with specific locations, they are rarely used to represent relational space. Indeed, as Pavlovskaya (2009) contends, understanding the "non-measurable properties" of place and human experience requires qualitative modes of explanation.

In other words, the felt experiences of creativity cannot be represented on a map, and thus depicting the creative pockets of moments of encounter on maps aims to visualise their occurrence with space, time, and movement. This means the maps do not aim to map objective truths regarding creative experience but rather to provide visual and process-oriented cues for interpreting the qualitative materials.

As such, GIS offers possibilities to qualitative studies even when they are dealing with relational space. For example, Pavlovskaya notes (2009, p. 39) how GIS allows the researcher to identify differences in information produced by different techniques and "treat them as research opportunities as opposed to an error or incompleteness of data." The conceptual maps complemented the primary research materials in Articles II and III. **Figure 3** depicts the specific maps that were prepared for the articles to explain the results.

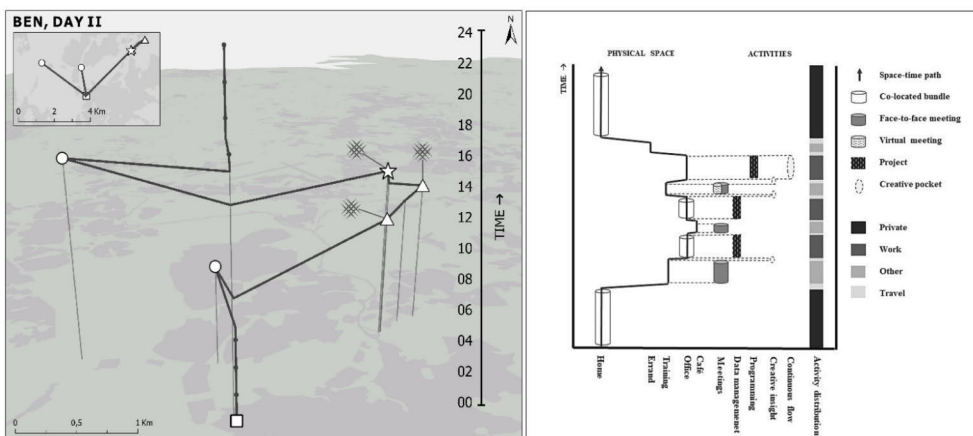


Figure 3. Examples of the map-based conceptualisations from Articles II and III.

4.4 Ethical considerations, limitations

Ethical aspects are essential in research, from planning the study to reporting the results (Darling & Wilson, 2020). Ethical questions are particularly relevant when research participants have partaken the process, and thus the ethical considerations must involve the rights of all parties involved in the research. Thus, in this thesis, I followed the research guidelines set by the Finnish National Board on Research Integrity (RI 19.4.2024). This means my studies were conducted by the principles of research ethics, i.e., accuracy, honesty, and conscientiousness in all phases of research; from collecting the data and conducting the analysis to evaluation and publishing the results.

This thesis involves research with human participants, meaning the research process requires careful consideration of research ethics to maintain scientific quality and integrity while avoiding harm (Hammett et al., 2022). This thesis followed the principles of ethical research with human participants, summarised by Darling & Wilson (2020, p. 13) as ensuring self-determination, beneficence, non-maleficence, and justice, i.e., fairness in the distribution of the costs and benefits of research. The thesis is part of a project “Co-creativity in the era of artificial intelligence” (LuotAI, 2020–2023, funded by Kone Foundation) that secured ethical clearance from the Ethics Committee for Human Sciences at the University of Turku. This means that we carefully assessed the possible benefits and disadvantages for the participants, as well as made a privacy policy plan regarding data security and storage.

All participants of this thesis participated voluntarily in the three studies, and they were informed about the purpose of the study and the intention to publish scientific articles. Before data collection, each participant received an information package about the upcoming research that included informed consent, a privacy note, a description of the research and an overview of the data procedure. All participants signed the informed consent form before participating and were made aware they can withdraw from the study at any point if they wish.

The participants had the opportunity to receive the materials involving themselves. For example, the mobility maps conducted in Articles II and III were given to the participants upon request. To ensure participant anonymity, the detailed descriptions of the participants were omitted from the research articles. All the research materials were stored in electronic form in a secured network drive provided by the University of Turku, and the backed-up materials were stored in the university’s secured cloud service. The materials were accessible only to the LuotAI project members, including myself.

In the ethical evaluation, the GPS data was determined as the most sensitive information collected from the participants. Thus, extra caution was practised when analysing and publishing the results based on location data. During the process, I also reflected upon the benefits and harms of collecting GPS data. Future research

utilising GIS methods in qualitative studies should carefully consider the necessity of GPS data. Similar results could perhaps be obtained by other means, for example by using detailed research diaries.

During the research process, I reflected upon my positionality within my research settings. Sanyal (2020, p. 25) defines “positionality” as acknowledging how each of us is positioned “within social, cultural, and economic dynamics of identity”, thus affecting the manner we interpret and produce knowledge in the world. The questions regarding positionality are extremely relevant in geography where knowledge claims have largely been made from the EuroAmerican perspective, drawing attention to geography’s colonial legacy that continues to impact the discipline (Darling & Wilson, 2020).

I accounted for such positionality by reflecting upon my subjectivity and partiality when conducting research instead of trying to produce false claims about neutrality. I acknowledged how my position impacts the research questions I find relevant, what kind of questions I ask, and how I interpret the participants’ answers, as well as how participants respond to my questions and interact with me. As a researcher interviewing other researchers, I could relate to the participants’ positions more easily as opposed to other professions, and our similar backgrounds made the researcher-participant relationship less imbalanced. On that note, despite academic researchers having similar experiences regarding precarity and short-term contracts as artists, I had to acknowledge how an artist’s position also differs from my own.

While this thesis has been conducted in the context of Finland, each participant has a unique background that has implications for the researcher-participant dynamics. In this thesis, the participant selection was guided by the case study criteria and thus limits the diversity of the participant demographics. For example, the majority of the participants were men due to the gender imbalance visible in computer science (Sax et al., 2017). Thus, a conscious decision was made to encourage women and other minorities to participate. Moreover, while all participants resided in Finland during the study periods, the calls for participation were made in both Finnish and English to encourage non-native Finns to participate as well. As a result, the participant pool is not limited to Finnish natives only.

In addition, as the participants were selected based on their professions, only people in these professions could participate. This can also have implications for the manner the participants engage with the research. Artists more often than computer scientists are self-employed and work in precarious positions, whereas the selection of computer scientists was limited to academia, thus excluding those working in the industry. Thus, I avoid generalisations based on the participants’ profession and instead use these notions to better reflect upon the research results.

During the study period, Finland enforced COVID-19 regulations, curtailing collective activities and affecting the lives of individuals. Due to the restrictions,

most interviews used in research Article I and all interviews used in Article III were conducted via a videoconferencing tool. Here, we followed the University of Turku guidelines regarding secure videoconference tool use. On that note, the recommended online interviewing procedures were applied to ensure that the interview setting would be adequate for the research (e.g., Lee & Hollister, 2020).

In the initial research plan, the aim was to also observe the participants' work in the everyday context to gain deeper insight into the topic of the thesis. However, due to the pandemic restrictions, the observations were left out of data collection. Whereas this limits the extent of the empirical studies somewhat, I remain confident the present mixed methods enable analyses on an adequate level to discuss with extant theory and to derive conclusions based on the findings.

Furthermore, I acknowledge the pandemic altered the participants' routines, thus affecting the spatio-temporal contexts I analysed. However, during the data collection periods in Articles II and III, the participants were able to visit different locations for work and leisure under certain conditions. For example, all participants were able to work at their offices if they needed to, however, organisations often advised them to avoid social contacts and large gatherings, as these were guidelines imposed by the Finnish government. My aim was not to examine the differences in the participants' work before and during the COVID-19 pandemic, and therefore these issues are not a focal point of this thesis. Nevertheless, the pandemic-related changes in routines and mobility were discussed in the interviews and used as a way for the participants to reflect on the role of spatial and temporal contexts in their work. Thus, the participants were also more aware of the effect of different work settings and how those influence their work. The research setting was therefore deemed suitable for the study.

During the preparation of this thesis, I utilized the AI-powered writing tools in Grammarly to enhance my writing style and check for grammar and spelling errors. After using Grammarly, I reviewed and edited the content as necessary, and I take full responsibility for the final content of the thesis.

4.5 Empirical studies

In this section, I briefly summarise the three empirical studies involved in this thesis before moving on to the results and discussion. Each empirical study included distinct research questions which were answered in the studies, and these findings were used to formulate the answers to the research questions of this thesis.

Article I

In the first study, I focus on AI as an example of a novel technology used in the creative processes of new media artists and computer scientists. The participants include 26 new media artists and 26 computer scientists. Here, to define the broad term of “artificial intelligence”, specific fields under the umbrella of AI were used as an additional criterion for the participant selection (Russell & Norvig, 2010). Therefore, the methods that the new media artists used include, for example, machine learning, machine vision, and neural networks. Similarly, computer scientists were deemed fit to participate if they were working in a university research group where AI methods, such as machine learning, data science, or natural language processing were central to their research. The key individuals fitting the study criteria were contacted based on information available online, and subsequently, additional informants were contacted based on the snowballing technique (Parker et al., 2019).

The research material consisted of 52 interviews with new media artists and computer scientists collected in the spring of 2020. The results highlighted key similarities and differences in the manner the new media artists and computer scientists define creativity, and how they view their creative process. Subsequently, the role of AI is also different in scientific and artistic creative processes. Scientists need AI to produce trustworthy outcomes and accurate information, whereas for artists AI represents a possibility for novel creation and playfulness. Here, AI can thus be considered to participate in the creative processes of participants by affording different phases of creative action. This relationship was conceptualised as “co-creativity” in the article. The results of the research accentuate the importance of understanding different creative domains, and the role AI can have in each stage of these unique processes.

Article II

The second study focused on the creative processes of computer scientists in their everyday lives. Here, research questions revolved around the mediated spatio-temporal elements of the participants’ work, and how these then affect their creative processes. The empirical data was collected by nine Finland-based computer scientists who collected data over a 14-day data collection period between late September and early December 2021. The participants were selected based on the case study criteria introduced in section 4.1. Thus, all participants work in computer science at a Finnish university. After contacting the first individuals fitting the criteria and filling the participants, the rest were contacted with a snowballing technique (Parker et al., 2019). Here, the aim was to reach people at different stages of their academic careers, and as a result, three PhD candidates, three project researchers, two senior lecturers and one professor participated. The data consists of

three elements: participant-generated daily diaries, interviews before and after the study period, and location data collected with GPS tracking devices.

In this article, the conceptual framework involved the time-geographic concepts of project and pocket of local order, revised to be used in the context of technologically mediated work (Hägerstrand, 1985; see also Li et al., 2024). The analysis resulted in three types of creative pockets where the creative projects are best advanced: pockets of flow, pockets of insight, and pockets of creative bundles. Subsequently, the analysis revealed five central ways such pockets were disrupted: fragmented work, accelerated work-pace, digital congestion, time pressure and lack of creative time. The findings were discussed with relevant literature to draw implications regarding the role of spatio-temporal context and technological mediation in creative work.

Article III

The final article centralises the creative processes of new media artists in the everyday by examining how the processes are enacted in “creative moments of encounter”, and how the participants' mobility is a central relational element through which the moments emerge. The participants involved four new media artists. They were selected from the pool of 26 new media artists introduced in the first research articles. The artists were contacted based on their relevance as mobile artists and their ongoing creative work to involve individuals in different stages of the creative process, from planning to production. The sample size is small, limiting the generalisability of the results. Thus, the article describes the individual-level accounts of moments of encounter and mobility in detail, and the findings are then discussed together with the theoretical background to draw implications regarding the role of mobility in the creative process.

As in Article II, the data in this study consists of participant-generated daily diaries, interviews, and location data collected with a GPS tracking device. The analysis was constructed by drawing from “geographies of encounter” (see Wilson, 2017). The analysis resulted in three types of moments of encounter: creativity emergent in formative encounters, serendipitous encounters, and tranquil encounters. Subsequently, the results were reflected against relevant mobility literature to illustrate how the encounters are connected to four distinct but overlapping types of mobilities: geographical (change of location), virtual (the use of virtual platforms to connect with peers of resources), imaginative (descriptions of moving thoughts, ideas, and mental images), and corporeal (descriptions of the moving body) mobilities. The findings were used to draw implications regarding the role of mobility when organising creative work.

5 Results and discussion

5.1 Artistic and scientific creative processes

RQ1. What are the similarities and differences in the creative processes of new media artists and computer scientists?

To answer the first research question, I draw from all three articles (I–III) to provide an overview of the participants’ creative processes and further explore the differences between the new media artists and computer scientists. The interviews demonstrated both similarities and differences in how the participants experience and describe creativity. The most notable difference was the case of creative outcomes; the scientists often use outcomes to describe creativity, whereas the artists rarely referred to outcomes but rather focussed on the emotions and experiences they associate with creativity.

There have been varying and multifaceted meanings linked to creativity which often differ from field to field (e.g., Runco & Kim, 2020; Puryear & Lamb 2020). Generally, most scholarly definitions of creativity consider it an activity that results in outcomes which can be deemed creative by the domain, i.e., by peers or by an audience (Kampylis & Valtanen, 2010). The characteristics of the creative actor, such as the skills and traits of humans, have long served as the epitomes of creativity (Amabile et al., 1996).

When describing creativity in empirical studies (Articles I–III), the participants often used the skills of a creative actor or the output of the creative process. Generally, both new media artists and computer scientists see humans as the main creative actors and refer to creative traits to justify this. For example, the ability to create or invent was the most mentioned skill by both new media artists and computer scientists. This was linked with other skills, such as the ability to combine past knowledge or resources. In addition, problem identification, “thinking outside the box”, and problem-solving were mentioned by several participants.

However, computer scientists were more prone to attribute such creative skills to specific tasks, and for instance mentioned programming, writing academic papers, or creating presentations as tasks that they considered to require creativity. Instead, the artists were more prone to recognise creativity inherent in themselves as a human

trait, as an always-ongoing force, or “a part of life” as one artist described (Article I, p. 94).

In past literature, the creative process often describes the production of novel, valuable, or useful outcomes, which have also become central ways to evaluate creativity (Boden, 2004). On that matter, the findings from studies detail intriguing differences between the new media artists and computer scientists. Computer scientists were more prone to use creative outcomes to define creativity. For instance, they considered valuable and novel outcomes as epitomes of creativity and conveyed examples from their domain when referring to the value or novelty of such outputs.

Conversely, the artists were more focused on the act of creation and discussed the inherent creativity in themselves or related to their identity as an artist. For example, one artist described creativity as “a playful approach [toward] everything, being curious, enthusiastic, and not afraid of failure” (Article I, p. 94). As such, computer scientists often referred to ideals of creativity in the scientific domain, e.g., outcomes deemed novel, useful, or valuable in their field, whereas artists used themselves and their own experiences as a reference more often than computer scientists.

The findings exemplify the differences in artistic and scientific creative processes: in the past literature, artistic creativity has been associated with creative expression, and the outcomes or artistic creative process are rarely defined by their perceived value or usefulness (Grant, 2018). Scientific creativity, in comparison, is linked with knowledge creation, where the outcome of such research articles is scrutinised by other scientists and a central way to measure academic merit (Sternberg, 2018). The outcomes must be justified, explained, and verified, and computer scientists must therefore consider how to produce the expected outcome early on in their creative process. The focus on outcomes in the scientific domain reflects how the performance measurements used by universities create a socio-cultural context that shapes perceptions regarding creativity, namely the value of outcomes which is determined by the domain (Kallio et al., 2017). This relates to the wider notion of how creativity is often seen as a resource for organisations, meaning the creativity of employees is a critical part of productive organisational processes (Amabile & Pratt, 2016; see also Prince, 2014).

On that note, academia appears a rather paradoxical environment for creative work due to the demands to produce specific types of outcomes. Indeed, the outcomes of scientific work cannot be “too different compared [with] the mainstream to get them published in the top journals” as one participant recalled (Article I, p. 94). In other words, computer scientists must negotiate between being creative enough to produce novel results, albeit not too creative so that the results get

published. These findings further alert us to how organisational demands for productivity might affect perceptions regarding creativity.

Past research has found that creativity at work has also intrinsic value: indeed, creative experiences at work increase work motivation and bring positive experiences (e.g., Liu et al., 2011) and this was also evident in the results (Articles II–III). Thus, moving to the individual creative processes, we can find several similarities in the manner the participants’ creativity manifests at the personal level. Past creativity research has identified different cognitive stages that are considered universal in all creative processes, tracing the process from ideation and planning to present the outcome (e.g., Glăveanu et al., 2013; Botella et al., 2018). In this thesis, the emphasis was more on the subjective experiences of creativity as opposed to, for example, pre-determined cognitive stages.

In the daily diaries (Articles II–III), the participants were asked to identify moments from each day that they found most significant or important from the perspective of the creative process. No predetermined attributes were assigned to those moments, meaning the participants could freely describe any moment they felt was meaningful for their creative work. These descriptions were used to better understand the experiences of creativity, i.e., what kind of moments contribute to the creative process. In Article II, the descriptions were central when constructing the creative pockets, whereas in Article III the moments were conceptualised as moments of encounter. Subsequently, I found how the creative processes of artists and scientists entail various moments from tedious work to moments where creativity “crystallises.”

Overall, most days reported by the participants were filled with regular work as the participants worked towards their objectives and subsequently, they highlighted moments of tedious work and described them as rather mundane or banal. Despite often being rendered invisible in creative work-related studies (see also Bruns & Long Lingo, 2024), we must recognise the importance of such mundane moments. Indeed, particularly highlighted in Article II, such moments are those where the creative process is realised, meaning the ideas and intangible concepts are incrementally formed into concrete outputs.

Several participants also noted challenging moments where they felt stuck, overwhelmed by challenges, or otherwise “un-creative” (Articles II–III). However, as one participant notes, the difficult moments are also important because they “bring out the core” of creative work (Article III).

Indeed, the more banal moments gain meaning when contradicted with the moments where the creative process crystallises. In Articles II and III, examples of such instances include solving a problem, gaining new insight into a topic, coming up with a new idea, or things falling into place. Such moments are often the focus of creativity research (Csikszentmihalyi & Sawyer, 2014), and sustaining these

moments in the work of employees is a central topic in innovation and organisational creativity studies (e.g., Amabile, 1988; Amabile & Pratt, 2016; Caniëls & Rietzschel, 2015). However, the process perspective to creativity brings to the fore also the more banal and mundane aspects of creative process that often precede the crystallizations. Indeed, the creative process is highlighted by fluctuating moments of challenges, tedious work, and progress – understanding such interplay should thus be a key concern for creative process scholars (Bruns & Long Lingo, 2024; Hautala, 2018; Karakilic & Painter, 2022).

To summarise, despite the creative processes of the participants being unique, they also involve similar characteristics. The process is often ambivalent and alters between different moments from challenges to tedious work to crystallisations. Here, the daily diaries allowed the participants to ascribe meaning to the ambiguous process. Next, I focus particularly on the spatio-temporal and socio-material aspects of the participants' creative processes to explore how the processes are spatially co-constituted.

5.2 The creative process emergent through spatio-temporal relations

RQ2. How are the participants' creative processes enacted through spatio-temporal relations?

To answer the second research question, I focus on the findings from Articles II and III. Here, I utilise the relational approach to illustrate how the creative process is co-constituted in space-time (Hautala & Ibert, 2018; Massey, 2005; Williams, 2016). The participants in studies II and III worked in multiple locations, often also beyond the conventional nine-to-five hours, resulting in examples of various space-time configurations in which creative work was conducted. Extant creativity literature has greatly researched spatial and temporal issues from organisational perspectives, i.e., focused on the enabling and disabling organisational factors like office settings, management practices or co-work structures (Caniëls & Rietzschel, 2015; Slavich & Svejenova, 2016).

In Article II, I accentuate how the participants themselves organise for the spatio-temporal practices that support their creative processes, as well as how certain contexts might disrupt their creative work. In Article III, I illuminate the more ambivalent and nonlinear aspects of creative process as “becoming” (Langley et al. 2013; see also Fortwengel et al., 2017) and explore how the creative process is distributed beyond the human actor (Duff & Sumartojo, 2017).

In the second research article, I utilised the concept of pockets of local order derived from Hägerstrand's time-geography (1970, 1985) to conceptualise the

different spatio-temporal configurations present in the participants' creative processes. The analysis revealed three types of pockets under which the participants felt their creative process was best advanced: (i) pockets of flow, (ii) pockets of insight, and (iii) pockets of creative bundles (**Table 4**).

First, the pockets of flow exemplify the conditions under which work can be advanced without disruptions. Thus, there is a need for settings that allow engagement with the task at hand, for instance when participant was programming or writing their research article. In these pockets of insight, the participant might have been physically distant from work and instead in an environment that resonated with peaceful thoughts, such as outdoor paths, or even while exercising at the gym. Lastly, the pockets of creative bundles enable social relations with peers, either face-to-face or over virtual platforms.

The approach used in Article II thus adheres to the practice perspective to creative process that builds on moderate process ontology (Fortwengel et al. 2017). Focusing on the structures that restrict or enable processes, this perspective allows scholars to examine how processes emerge from the interplay between “structures and agency.”

Table 4. Summary of the creative pockets.

	Pockets of flow	Pockets of insight	Pockets of creative bundles
Description	Enables workflow without disruptions; important when engagement is required, e.g., when the creative work is at a stage of immersion, realisation, or verification	Allows the participant to focus on ideation, thinking or planning; needed when the work requires reflection, illumination, inspiration or ideation	Enables social connections; gaining insight or ideas from others, needed in various stages of work from ideation to verification
Example activities	Working on a task at hand, e.g., programming, writing or reading	Taking notes, computing, sketching, planning	Co-working, meetings, presentations, chats
Spatial characteristics	Arrangements facilitating solitude, e.g., by physical proximity or by creating boundaries around the pocket with material	Distancing oneself from the task at hand; spaces that offer balance to the fast-paced environments	Proximity to colleagues, both face-to-face and remote; cognitive proximity i.e., task at hand is shared
Temporal characteristics	Active work time, prompted by time-pressure, feelings of timelessness during work	Abundance of time, e.g., availability of free time or 'dead time'	Shared temporal structures, designated time for meeting or enough time to spontaneously bundle

Here, the creative pockets represent the structures that enable creative experiences. The pockets thus help identify the contexts that stabilise the creative process (Ortmann & Sydow, 2018), very much like Hägerstrand intended when conceptualising the pockets of local order (Hägerstrand, 1985). By conducting an individual-level study, I shed light on how the participants organise for the creative pockets. Instead of assuming that given structures automatically produce similar results from everyone, I observed how the pockets could be organised in various ways depending on the participants' needs (Thulin et al., 2019).

The findings thus complement literature on regional and organisational creativity, which has focussed on structures that ideally sustain and enhance the creativity of individuals (e.g., Lindner, 2018; Ortmann & Sydow, 2018). However, my findings accentuate the importance of individuality and flexibility regarding the creative process. Moreover, following the relational space-time thinking, we must look into the processual change of the spatio-temporal structures themselves instead of presuming them to be “stable” (Massey, 2005).

On that note, I connect these findings with the results from the third research article, where I explored how the creative moments of encounter are realised through mobility. Here, the daily diaries and interviews were used to identify moments of encounter, and the analysis resulted in three types of encounters: formative, serendipitous, and tranquil, based on how the moment was experienced by the participants (**Table 5**).

In the article, I reflected upon the matters the artists “encountered” during each moment to highlight how the creative process is continuously unfolding in spacetime. Using moments of encounter as units of analysis adheres to the strong process perspective where the focus is on retrospective look on moments (Fortwengel et al., 2017; Hernes, 2014). Critically, encounters alert us to interactions with space and material that produce meaningful effects in the creative process (Wilson, 2017; Gherardi & Perrotta, 2013; Williams et al. 2021).

For example, the formative encounters depict the creative process emergent in repetitive actions when the artist engages with the material. Although work preceding the formative encounters can feel banal, it can also lead to moments in which creativity “crystallises”, for example when finding a solution or a new association between matters. Similarly, the serendipitous encounters show how creative imaginaries are actualised in embodied engagement between the artists and space, resulting in novel insight and ideas.

Table 5. Summary of the moments of encounter and the role of mobility in them.

	Formative encounters	Serendipitous encounters	Tranquil encounters
Creative activities	Tedious work, inventing by doing	Exploration, ideation, inspiration	Relaxation, creating room for thoughts
Spatio-temporal characteristics	Space supporting focus and connection with the material	Environment and material as a source of inspiration, surprise	Quiet and calm environments, absence of distractions, abundance of time
Role of mobility	Repetitive geographical and/or virtual mobility patterns that enable proximity to material Interplay between imaginative and corporeal mobility in the formative relationship between artist and material	Sporadic mobility enabling inspiring outcomes and distance to workspaces or materials Attentiveness to the surrounding world through corporeal movement of body and imaginative movement of thoughts	Immobility sustaining stillness and tranquillity

The tranquil encounters, in turn, depict a context where the artist could pause and reflect upon their creative process by enabling room for thoughts to roam free (**Table 5**). Using the moments of encounter as units of analysis allowed me to reimagine the creative process as situated and contingent, highlighting the nonlinear nature of the creative process (Karakilic & Painter, 2022). Here, encounters depict the thrown-togetherness of matters, and depict creativity as the emergent property in such encounters (Massey, 2005).

This, then, brings us to the role of mobility in the creative process. Article III illuminates how the moments of encounter are always preceded by mobility. Thus, I used mobility literature to show how the artists' mobility reproduces, transforms, and disrupts interactions in creative process. For example, both Articles II and III show how geographical mobility, i.e., changing location, is a fundamental everyday activity in the creative process of the participants. The geographical mobility is strongly intertwined with virtual mobility that enables connection to colleagues and materials over long distances.

Article III also depicts two other central forms of mobility: imaginative mobility, which allows the participant to “project meaning, emotion and possibility into perceptions” (Thompson, 2018), and corporeal mobility, i.e., movement of the body, which depicts how we exist in and relate to the world (Küpers, 2015). In other words, bodily movement bridges imagination with material reality in the creative process, like when the artist improvises while playing an instrument (see also Gherardi and

Perrotta 2013). Moreover, I also found how “immobility”, i.e., being still, emerged as another central relation in the participants’ creative processes. This does not refer to complete stillness in the corporeal sense, but rather the meaning participant gives to “being still” during their creative process, as opposed to e.g., being “on the move” (see Cresswell, 2006). Instead, immobility here refers to disconnecting from matters that disrupt creative work and are associated with creating room for thoughts.

In sum, mobilities alert us to the continuous forming and reforming of spatial processes (Stephenson et al., 2020). In Article II, the findings depict how the participants utilise geographical and virtual mobility practices to engage with structures that support the formation of the creative pockets. In Article III, the mobilities were used to depict how the creative process “becomes” in space-time (Fortwengel et al., 2017). Thus, the findings illuminate how the mobility itself reproduces space-time contexts of stability and change; for example, the repetitive patterns of geographical mobility that create iteration and, thereby, a level of stability, which enables formative encounters. In other words, a studio becomes a site for encounters not only because of its spatial characteristics but also because the artist repeatedly goes there to play, resulting in a process where formative encounters emerge. Indeed, like Merriman (2024) argues, the processual unfolding of matters does not necessarily denote a chaotic process without any structures. Instead, processes involve varying rhythms and speeds that produce spatio-temporal structures.

Thus, Articles II and III offer different approaches to the creative process; the practice perspective highlights the role of (human) agency while negotiating the spatio-temporal contexts that enhance – or disrupt – the creative process. The becoming perspective, in turn, highlights creativity as an emergent property in socio-material encounters. Here, creativity can be seen as distributed between human and non-human actors. Nevertheless, I suggest that the articles complement rather than contradict each other, as both approaches increase the understanding of the creative process as relational.

For instance, to reach a pocket of flow, the participants organised their work in a manner that allowed solitude: they might move to another location and thus distance themselves from factors that break the workflow, such as other people. The pockets of flow were nearly always preceded by a sense of time pressure, meaning the participants recognised the need to focus on the task at hand to meet a deadline. However, the feeling was as much a concrete deadline set for the future as it represents the “sense of urgency” that is relationally formed. The pockets of flow, named after the ensuing feeling of creative flow, are often accompanied by a sense of timelessness as participants immerse themselves in work. Similarly, formative encounters found in Article III require focus so the participants could connect with the materials needed in the task at hand. Indeed, some participants reported reaching

the feeling of flow after tediously working toward a goal during the formative encounters. Critically, participants of both studies asserted the importance of space to focus on the task at hand. These experiences were highly subjective, as for some, issues with the physical work environment such as a lack of air-conditioning or an insufficient desk affected their workflow, whereas some noted that the household chores waiting at home prevented an adequate atmosphere for work.

Similarly, the pockets of insight (Article II) represent moments where solitude and a calm environment were highlighted in favour of having time to think, ponder, or ideate. Here, 'dead-time' i.e., the absence of an upcoming task or deadline, was highlighted. Similarly, gaining insight and ideas was common in serendipitous moments of encounter (Article III). For example, one participant explained how a walk in a park resonates with the free movement of thoughts. These findings highlight the nonlinearity and ambiguity of the creative process. Simultaneously, they underline how the semiotic forces and atmospheres merit more scrutiny as the co-constitutes of the creative process (Duff & Sumartojo, 2017; Leclair, 2023).

The creative bundles, on the other hand, depict instances where social interactions create change in the creative process (Article II). The social dimension has been well recognised in past research in geography and beyond (e.g., Brydges & Hrats, 2019). Here, the pockets were organised along shared spatio-temporal structures with others, either physically or through virtual mobility. Most bundles were pre-planned as opposed to serendipitous meetings, although those were also present in some research diaries. Social relations were well-recognised by the participants of my empirical studies, perhaps because they are easier to abstract as they often produce tangible results such as exchanging ideas and knowledge. However, co-working can also cause friction and surprises in the creative process when different ideas or ways of communication collide (Article III). Again, these encounters then inform us how the creative process fluctuates over time as creativity becomes an emergent property in the encounters, thus driving the creative process.

Finally, based on the findings, I want to bring to the fore the important role of time and temporality in the creative process, not only in the sense of progressing events but in the context of a subjective experience of time. Time is a limited resource, as also highlighted in the time-geographic framework (Hägerstrand, 1970). The different temporalities (Kitchin, 2023) are present in my findings in a relational manner as well as in the linear sense of clock time. For instance, the feeling of time pressure can manifest both as an actual deadline as well as a subjective experience.

Besides the spatial context of work, it remains critical to acknowledge the varying capacities individuals have in terms of organising the temporal allocation of work. This is essential in the digital age, as past research has shown how technology is a central mediator of temporal experiences (e.g., Thulin & Vilhelmson, 2022).

Indeed, the relational experiences of temporality deserve more attention in creativity research. For example, the feeling of “timelessness” was a central feature when the participants immersed themselves in a task at hand, reaching the feeling of flow. Similarly, having an “abundance of time” is critical when ideating. This also relates to the notion of ‘dead time’, i.e., the absence of deadlines for immediate tasks, that the participants noted to be important particularly while reflecting upon new ideas.

Besides the empirical contributions, the findings from Articles II and III advance the creative process research with theoretical insights. In many ways, the approaches used in the articles represent two distinct process ontologies – “practice” and “becoming” perspectives to creativity (Fortwengel et al. 2017). The former focuses on how the interplay between structures and agencies enhances or disrupts processes. This suggests that creativity can be supported with certain material or immaterial resources, or by organising for structures that sustain creative activities. Indeed, the creative pockets identified in Article II reveal how different creative experiences can be associated with different socio-material contexts.

On the other hand, the becoming perspective emphasises the fluidity and ambiguity of the creative process. Indeed, the findings of Article III illuminate creativity as an emergent property in the moments of encounter that cannot always be predicted. However, the findings show how different patterns of mobility produce different rhythms and speeds that play a role in the formation of the encounters. Indeed, mobility literature could be utilised more in process studies to better theorise on different temporalities in processes (e.g., Karakilic & Painter 2022; Merriman, 2023). Thus, as Fortwengel et al. (2017) note, these perspectives on the creative process are rather complementary than contradictory. Certainly, we can identify various material and immaterial forces that are present (or absent) when creative experiences emerge. However, the assemblages of such forces are always changing, meaning the processual emergence of creativity inherently entails uncertainties. Critically, both articles highlight the contextual and contingent aspects of the creative process.

With my empirical studies, I have shown how geographical concepts can be applied with both, practice and becoming perspectives to the creative process. This helps us to challenge the prevalent instrumental and variance-based approaches to the creative process, and instead reimagine the creative process as contingent and distributed beyond a human creative agent.

Building on the findings, I now move forward to discussing these issues, particularly in terms of digital technologies in the creative process and explore how the creative process is co-constituted with, and disrupted by, technology.

5.3 Digital technologies shaping the creative process

RQ3. In what ways do the mediated space-time practices affect the participants' creative processes?

The answer to the third research question focuses on the effect of technological mediation on spatio-temporal practices under which the creative process emerges. Here, I convey findings mainly based on the research results from Articles II and III.

First, I find how computer scientists' and new media artists' work entail characteristics of flexible work and how flexible work arrangements are linked with the construction of creative pockets. This means the participants' work is distributed to multiple sites due to the enabling mobile technologies and digital platforms. Thus, digital technologies add multiplicity to the manner the participants can organise the spatio-temporal and socio-material relations. Indeed, the participants use communication tools and online repositories to network, share ideas and resources, and have common working platforms that can be accessed anywhere in real-time. Here, digital technologies thus afford the flexibility of work, which has led to highly individualised work arrangements, and the participants can organise their work according to the "fluctuations in bodily capacity and well-being" (Thulin & Vilhelmson, 2022, p. 264). However, this does not mean remote work becomes a frictionless flow; instead, the spatio-temporal structures are mediated by digital technologies that create constellations of practice, which, then enable collaborative structures between the participants and their research groups and collectives (e.g., Thulin & Vilhelmson, 2022). In other words, digital technologies become co-constitutes of work pace and routines.

The role of flexible work arrangements was highlighted due to the COVID-19 pandemic. The strictest restrictions had been lifted during the study periods (Articles II and III) and the participants were able to visit their workplaces. However, many were inclined to work from home, especially if it was preferred by their organisation or peers. Moreover, meetings that were previously arranged face-to-face shifted to virtual platforms like Zoom, or in the case of one participant, outdoors. However, based on the interviews, some participants had routinely also worked from home prior to the pandemic, and most were used to the mobility inherent in scientific and artistic work. Often, the greatest difference compared to pre-COVID time was the presence of other family members, and some participants had to for instance focus on childcare during remote work. This further blurred the lines between leisure and work, and for instance, extended the work hours into the evening if household chores took up the participants' time during the daytime.

The flexible work arrangements afforded by digital technologies facilitate the creative process as the participant has more capacity to organise suitable work

settings or creative pockets. The creative pockets explain the reasons for choosing specific work times and locations: for instance, a participant explained he chooses to work at night when he has tasks that require complete focus, e.g., writing a paper because then there is “utter silence”.

This is then linked with the ideals regarding certain creative atmospheres that correspond with creative experiences. For instance, one participant’s art collective had taken up the habit of going for walks in nature, either together or separately and connecting to each other via mobile phones (Article III). Here, the mobile device that enabled the remote connection is a central material force in the encounter, as it allows assembling the social (colleagues) in a suitable space-time context (walk in nature). The example also illustrates how technological mediation shapes spatio-temporal relations (Ash et al., 2018). Indeed, due to the ubiquitous and routinised nature of technology use, such techno-material relations can easily be rendered invisible.

The findings from Articles II and III further reveal how technological mediation can also disrupt or transform the creative process. The most prominent effects are spatio-temporal fragmentation and digital congestion. Here, spatio-temporal fragmentation refers to the fragmented daily activities where work, personal care, and leisure activities intertwine and are conducted concurrently, as opposed to the more traditional division between work and leisure time. This does not necessarily denote working in multiple locations: indeed, I found examples of temporal fragmentation that occurs when the participant juggles multiple different tasks throughout the day. For instance, the participant might pause working to empty the dishwasher or to engage in childcare.

Work-related flexibility was generally positively experienced by the participants. Sometimes, engagement with other activities supported the creative process, for example by offering breaks in between work (Article II) or by prompting inspiring encounters (Article III). However, spatio-temporal fragmentation might also have negative effects in case the participant cannot continuously focus on a task for a longer period. Critically, although the different tasks can offer breaks from tedious work, the balance between the overlapping tasks can be difficult to negotiate.

Spatio-temporal fragmentation is also linked with digital congestion, which was brought up in both Articles II and III. Digital congestion has been increasingly researched, and it refers to the overload of information and content received from digital devices, leading to issues such as increased stress and decreased levels of engagement at work (e.g., Bruns & Long Lingo, 2024; Byron et al., 2010; Oldham & Da Silva, 2015). Although mobile digital technologies enable fast connections anywhere in real-time, these shared constellations of work practices and structures are always present, even if the participant is physically distant from work. Thus, to keep up with the shared structures of work and social life, people stay connected to

their peers throughout the day (see Orlikowski & Yates, 2002). This can be detrimental to creative work if it leads to the constant disruptions of space-time contexts where concentration, feeling of flow, or ‘dead time’ are required. For example, several participants mentioned how they only have “time to think” when they are “about to sleep or when they wake up sleepless” (Article III). This suggests that the space-time configurations for dead-time have diminished in everyday life

However, as noted in the earlier sections, friction and tensions are not necessarily an issue for creativity but rather an inherent part of the creative process. In many ways, balancing between these contexts brings about the creative process (Ortmann & Sydow, 2018). On that note, we must pay attention to the individual capacity to navigate these contexts. For example, Thulin and Vilhelmson (2021, p. 266) suggest that organising the rhythms of work tasks in the intertwined offline-online contexts is reliant on personal skills and learning by doing.

In terms of creative work and beyond, such notions call for a closer look at the formation of relations in the digital era. These aims may well be advanced by relational economic geographers who have already explored the dynamics and tensions in virtual team collaboration (e.g., Grabher & Ibert, 2017), knowledge exchange in virtual spaces (Wu & Qiao, 2024), or how digital spaces facilitate inter-regional relations (Abbasiharofteh et al., 2024). However, it is necessary to accentuate how these spatio-temporal rhythms are also interpersonal as they are continuously negotiated and re-negotiated with digital technologies in everyday life (e.g., Reppenning, 2022, see also Leszczynski, 2018).

5.4 Artificial intelligence as a co-creative technology

RQ4: How do digital technologies, such as artificial intelligence, co-constitute the participants’ creative processes?

My final research question deals with the techno-material relations brought about by digital technologies. In this section, I draw findings mainly from the first article where I studied how AI models can co-constitute the creative process. I abstract the role of AI in the participants’ creative processes and discuss the recognition of non-human agencies in creativity (e.g., Glăveanu & Kaufman, 2019; Kalpokiene and Kalpokas; 2023). Past literature has explored how digital technologies afford several practices by assisting, arresting, augmenting and automating procedures in work and everyday life (Murray et al., 2021). This is largely due to the volume and speed of processing capacity, as well as interactive networking, of digital technologies (Castells, 2004; see also Henriksen et al., 2022).

The argument thus stands that the capacities of digital technologies are translated into the creative process. I exemplify this with the act of programming, i.e., writing code to create a computational model or command, to illustrate an activity where the creative process unfolds in the interaction between the programmer and the program.

Nearly all participants in my empirical studies were familiar with programming, and it was a central work activity for most. Here, the participant aims for a specific outcome and is engaged in a constantly evolving, iterative process of problem-finding and problem-solving, trial and error. The instant feedback (success/failure) received from the program is translated to the experience of the programmer who must then react to this feedback.

Often, the problems with the code resonated with unpleasant feelings and stress. On the other hand, when the program was ready, the participants reported feelings of satisfaction and accomplishment, which also resonated with feelings of creativity. These notions exemplify how programming is co-constituent of the process, meaning the process takes place and gains meaning through this interactive relationship, i.e., inventing-by-doing (see Gherardi and Perrotta 2013). Critically, instead of focusing only on the affordances that enable human activities, we can appreciate frictions or challenges with technology as meaningful “encounters” for they nevertheless create change in the process (Lundman & Nordström, 2023).

In my first research article, I centralised AI as a novel technology that is disrupting creative work (see also Epstein & Hertzmann, 2023; Kalpokiene and Kalpokas; 2023). Although AI is a broad concept, it refers to a very specific type of digital technology that aims to simulate intelligence in computers, such as problem-solving or learning (Kaplan & Haenlein, 2019; Russell & Norvig, 2010). Traditionally, AI has been beneficial in mundane or time-consuming tasks, such as computation or analysing large amounts of data. However, the recent surge of generative AI has brought debates regarding creative AI to the fore, contesting the human-centred views of creativity as a human trait (Boden, 2004; Epstein & Hertzmann, 2023; Kalpokiene and Kalpokas; 2023).

Indeed, as AI models possess the capacity to adapt, change, and produce different outcomes based on these adaptations, they become intriguing subjects that co-constitute the creative process in the digital age (see Nordström et al., 2023). The participants in the first study were all using some form of AI in their work, either by applying it to produce novel outcomes or by developing new AI solutions. Indeed, different AI models have distinct features, and whereas computer scientists often used AI for computation or to analyse data, the new media artists were using AI models to create artistic outcomes where the result was not pre-determined.

Critically, the AI the participants use represents “agentic technologies (Murray et al., 2021, p. 553) as they can “intentionally constrain, complement, and/or substitute for” activities in creative work. In other words, it is the AI model and not

the artist who is processing the vast datasets, and it is the AI and not the scientist who is calculating results based on statistical models.

My aim here is not to argue that humans were not needed at all in these processes. On the contrary, humans are central to how these various models are built and trained. However, by exploring whether AI has a role, or “agency”, in the process, we can better abstract the parts of the process where the agencies become distributed between humans and nonhumans.

In Article I, I conceptualised such techno-material relationship as co-creativity, referring to the moments in the creative process where human-AI interaction is essential in the production of the outcome. Critically, the notion of co-creativity highlights a mutual relationship between humans and AI, where human creativity is not replaced, but instead co-constituted with AI. Further contextualising AI in different creative processes, I found how AI has a role in the playful exploration of surprising outcomes in arts, whereas scientists need AI to produce verified and justified outcomes. What the computer scientists would deem an error could represent the source of a novel idea for new media artists. My findings adhere to what Nordström et al. (2023) call an evolving co-agency in the creative process, i.e. the agencies of artists and AI mutually evolve throughout the creative process.

The findings also reveal how the debates regarding the agency of AI cause tension with the human-centred perceptions of creativity. Several participants were hesitant to recognise co-creativity between themselves and AI, referring to AI’s “lack of consciousness”, meaning it cannot be defined as an independently creative agent. However, AI can nevertheless “act with intention” when it has been programmed to do so (cf. Murray et al., 2021). Kalpokienė and Kalpokas (2023) argue the attempts to dismiss the agencies of non-human technologies such as AI reflect the anthropocentric thinking of Western modernity where human experiences are seen as dominating, instead of “embedded and relational.”

The discussions surrounding AI’s creativity and agency offer important insights into the creative process, which can be understood as relational and distributed. This perspective goes beyond digital technologies, highlighting non-human entities that have often been excluded from creativity research due to a prevailing human-centric view (e.g., Duff & Sumartojo, 2017; Hawkins, 2013; Williams, 2016). These considerations are crucial when exploring AI’s role in creative industries and beyond.

In our current socio-technical landscape, where AI models are developed and implemented at an unprecedented pace, these issues warrant special attention. The empirical data from Article I, collected in 2020, is insufficient to explain the influence of AI models like ChatGPT, which emerged in 2022. While some participants in the initial study anticipated the growing impact of generative AI, the rapid evolution of this technology has caught many by surprise. However, rather than

obscuring the distinction between “human” and “artificial” creativity, the use of AI in creative fields has heightened awareness among experts and the general public regarding the benefits and drawbacks of incorporating AI into creative tasks. For example, as noted by Epstein and Hertzmann (2023, p. 1110), AI art serves as a medium that reflects contemporary issues, particularly those related to “automation, corporate control, and the attention economy.”

In light of this, conducting a follow-up study with the participants from Article I could provide valuable insights regarding whether their views on AI's creativity and its influence on human creative work have changed over the past years. I believe that recent developments have further highlighted the multiple agencies involved in processes that include AI, prompting us to critically examine these processes. By understanding the co-agencies created by digital technologies, we can address pertinent issues such as copyright and misinformation (Epstein & Hertzmann, 2023). Recognizing these co-agencies compels us to appreciate the crucial roles both humans and technology play in the creative process. Understanding these dynamics can help us scrutinize the tendency within the creative economy to exploit both human and technological resources in the pursuit of profit (Kalpokiene & Kalpokas, 2023).

6 Conclusions

In this section, I conclude the thesis by outlining the contributions in three steps: First, I highlight the primary contributions, i.e. the empirical findings derived from the three empirical studies of this thesis that advance the understanding of creativity in economic geography and beyond. In doing so, I reflect on the implications of the findings on future research and organisational policies. I link my findings to existing theoretical discussions on creativity and suggest ways to advance these debates by incorporating geographical concepts. Finally, I discuss the promise of geographical methods in process research and call for multiple-methods studies in the research of processes in the digital age.

As the primary contribution, my thesis complements the empirical research on creativity in economic geography, where the focus has largely been on the creative performance of teams, organisations, or regions (e.g., Faulconbridge, 2017; Grabher, 2018; Meusburger, 2009; Lengyel & Eriksson, 2017). In such studies, creativity is often portrayed as an organisable process that can be predicated by attracting creative individuals to organisations or cities, or by managing external factors that enhance workers' creative performance (e.g., Gormley, 2020; Prince, 2014; Williams, 2016).

Instead, in this thesis, I paid attention to how creativity is understood by the participants themselves and in doing so, illustrated creativity emergent in everyday life. My empirical studies emphasised the meaning the participants find in their creative experiences and illustrated how these emerge relationally in various spatiotemporal contexts. I suggest that geographical concepts allow a better conceptualisation of the creative process as an emergent and contingent process. My approach thus contradicts the common creative process studies that tend to follow instrumentalised approaches to creativity.

In answering the first research question, *identifying the similarities and differences in the creative processes of new media artists and computer scientists*, I drew results from all studies (I–III) and found that new media artists and computer scientists use similar ways to describe creativity. Often, they use moments where creativity crystallises as examples of creativity, such as moments of insight, problem-solving, or the feeling of flow. However, computer scientists, more often than artists, focus on the outcome to describe creativity. This is due to the differences

in artistic and scientific domains, as artistic creativity is associated more with playfulness and self-expression, whereas scientists must meet the demands of the current zeitgeist i.e., academic requirements for publication. The findings demonstrate how the organisational and societal contexts of creativity shape creative work by posing different demands and drivers for the participants depending on their field (see Glăveanu et al., 2013). The empirical results of studies II and III illustrate how the creative process fluctuates between different moments in everyday life, from challenging moments to moments of tedious work, and to moments where creativity crystallises.

Findings regarding research question two, *how are the participants' creative processes enacted through spatio-temporal relations*, further revealed how the creative processes of artists and scientists emerge in everyday life. With a relational approach, I examined how these processes are always co-constituted with materials, other people, and the environment. Critically, my findings accentuate three central relations that are often overlooked in creativity and process research: temporality, materiality, and individual-level mobilities (e.g., Duff & Sumartojo, 2017; Langley et al., 2013; Williams, 2016). The findings reveal different space-time contexts that can be beneficial for creativity, for instance, if the participant can continuously focus on work or can find moments of peace in fast-paced environments. The spatial relations can also cause challenging moments in the process, which also play a role in the manner the process continues to unfold. Finally, from a relational perspective, it is necessary to understand the myriad encounters as continuous forming between meaning and materiality, and how they then create meaningful change in the creative process.

The final research questions, *in what ways do the mediated space-time practices affect the participants' creative processes*, and *how digital technologies, such as AI, co-constitute the participants' creative processes*, allowed me to examine the effects of digital transformation in creative work. The results illustrate how digital technologies co-constitute the creative processes of the participants. The findings from Articles II and III exemplify how digital technologies afford flexible work arrangements for both new media artists and computer scientists. In many ways, the flexible work supports creativity as the participants have increased capacity to organise their work in a manner that best suits their creative process. However, the findings also highlight frictions brought about by digital technologies. These technologies produce spatial multiplicity, where the participants must juggle between overlapping activities in online, offline, and hybrid contexts. The constant flow of information and connections enabled by mobile digital devices can disrupt continuous workflow and inhibit 'dead time', i.e., time when the participant has time to think or do nothing.

However, past research has greatly focussed on the affordances produced by digital technologies. For instance, the findings from the first study of this thesis reveal how AI methods afford the creative processes of the new media artists and computer scientists by providing novel ways to create unforeseen pieces of art, and by enabling ways to analyse and draw trustworthy results from large amounts of data. I conceptualised this relationship as co-creativity to illustrate the mutual relationship between humans and AI in the production of new outcomes, linked to the debates regarding non-human agencies in the creative process.

Altogether, my findings offer meaningful insight into the current debates regarding the future visions of creative work in the digital age. The factors that drive the development of AI and other digital technologies are coupled with imaginaries regarding technological and economic development. Similarly, the development of novel digital technologies is deeply entangled with the prevalent ideals of creativity in creative economies, as organizations aim for increased productivity with creativity-enhancing tools (e.g., Holford, 2019; Lindell, 2024). However, there is no need to assume a deterministic approach to technology where people are mere bystanders in the societal transformations driven by technological development. Instead, I want to use the findings of this thesis to emphasise how digital technologies and human practices reflexively shape each other (Holford, 2019; Kitchin, 2023). This means acknowledging how digital technologies “transform, translate, distort, and modify” our everyday lives, including our creative processes (Latour, 2007, p. 35). This has implications for example in organisation and management, as the digital age brings about different principles for organising the creative process compared to traditional co-located work (e.g., Thulin & Vilhelmson, 2022).

On that note, by accentuating the different agencies present in the creative process, we can address issues related to the complex effects of digitalisation in the context of creative work. In this thesis, the debates regarding AI’s agency alerted us to the non-human entities that are often left out of the human-centric views on creativity (e.g., Duff & Sumartojo, 2017; Hawkins, 2013; Williams, 2016). The debates also stretch beyond the context of creativity into issues such as copyright law, technological unemployment, or misinformation, as the notions regarding co-constituted processes are largely absent from the regulation of human-AI interactions (Kalpokiene & Kalpokas, 2023; see also Epstein & Hertzmann, 2023). Utilizing digital technologies ethically and sustainably demands a thorough examination of how individuals comprehend and implement these technologies in their everyday lives. This exploration is essential for crafting policies that promote fluid and healthy work environments, enabling people to collaborate effectively with technology in a fair and transparent way (Wang et al., 2020).

In sum, despite focusing on creativity emergent in everyday life, my empirical findings have implications on how the creative process can be approached at the

organisational and regional levels. In the context of organisational creativity, managers and organisations should be more attentive to the role of space, time and materials in the creative process, also beyond their use as external variables in the managerial approaches to creativity.

Second, based on the empirical contributions, my thesis contributes to the theoretical debates on creativity. I suggest the current theorisation on the creative process can be advanced with a more nuanced account regarding relationality and non-human agencies. Relational geography invites us to consider the inherent potentiality of space that results from the presences (and absences) of different forces and bodies – i.e., the “thrown-togetherness” of space (Beyes & Holt, 2020, Massey, 2009). As such, space enables novel and surprising imaginaries, practices and ways of organising for the creative process. Creativity can be thus seen as a realisation of such potential. Due to the multiplicity of space, the creative potential can unfold in erratic and surprising ways. Sometimes, space can hinder the becoming of creativity, forcing creative actors to find alternate routes toward their objectives. The creative process thus emerges as a “dance” between spatial contexts (cf. Ortmann & Sydow, 2018).

Arguably, such perspectives do not easily adhere to the managerial approaches to creativity that centralise the variance-based cognitive models (Gormley, 2020). This is especially evident in the becoming perspective on creativity, which seeks to illuminate the creative experiences that unfold over time, emphasizing the inherent ambiguity and unpredictability of the creative process. Conversely, the practice perspective to creativity grants a level of stability to the creative process. Thus, this theoretical perspective can be beneficial for scholars and managers who want to understand how spatial and temporal factors impact creative work. Indeed, Fortwengel et al. (2017) highlight the importance of taking such a forward-thinking approach when designing work environments that foster creative output. Ultimately, rooting either perspective in spatial thinking is essential to examine creativity contextually rather than universally. I can only agree with Leclair (2023) that spatial approaches offer a much-needed way out of the market-driven and outcome-oriented ideals of creativity.

However, the creative process research still involves puzzles (see Fortwengel et al., 2017) regarding, for example, the reproduction of spatio-temporal structures in organizational contexts (Ortmann & Sydow, 2018) or the role of non-human materials and affective spaces in creativity (Duff and Sumartojo, 2017; Leclair, 2023). The research issues must thus be matched with methods that correspond to the issues presented in theoretical debates (Yeung, 2024). With a deep understanding of spatio-temporal issues, I argue that relational geographic concepts and methods would be of use in this regard.

Indeed, Article II shows how geographical concepts such as time-geographic conceptualisations can be used to study the structures and agencies involved in the creative process, thus offering empirical insight into the perspective of creativity as a practice (Fortwengel et al., 2017). Conversely, Article III drew from geographies of encounter and mobility literature to shed light on the often ambiguous “becoming” of the creative process. Thus, I was able to depict creativity as an emergent property in a spatio-temporal and material encounter; these concepts can be useful in the distributed approaches to creativity to illuminate how creativity is distributed between the actors and those of the world.

This brings us to the third and final contribution which is methodological. I used multiple methods to collect and analyse the data, as I combined interviews, participant-generated diaries, and spatio-temporal mobility maps. The interviews and diaries were central in the analysis of how the creative processes of the participants are relationally co-constituted with space and materials. These findings were complemented with mobility maps that I used as heuristic devices to better understand creativity as a spatio-temporal process (see Latham, 2020; Pavlovskaya, 2009). The spatio-temporal mobility visualisations illuminate where, when, and how the creative processes came about, depicting the mobility patterns of the participants (see Yuan et al., 2014). I complemented the maps with concepts of pockets of local order and moments of encounter that represent a relational approach to space-time. Focusing on techno-material relations, temporality, and mobility, I showed how the practised and embodied dimensions of the creative process can be empirically explored with geographical concepts.

Finally, I wish to emphasise creativity as an intrinsic value, not just an economic resource. The participants in this thesis each had unique experiences with creativity, yet they all found joy and a sense of accomplishment during their creative processes—moments when new ideas flourished, problems were solved, or when the pieces of a puzzle came together. Arguably, the creative process can manifest in multifaceted ways. However, how we engage with creativity profoundly accentuates the inherent curiosity we have towards the world, resonating with our quest to better understand ourselves and the technologies we use. Thus, recognising the role of creativity in innovation and development should not be done by abandoning the intrinsic value and meaning creativity has in our everyday lives.

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Working on this book has been a creative process. It beautifully encapsulates everything I've been exploring about creativity over the years; I have learned that my creative journey is a blend of tedious work and fleeting moments of challenges and triumph. This process has unfolded within various spatial and temporal contexts, influenced by the strange upheaval of the global pandemic. While I could list all the materials and environments that have fuelled my creativity (though it might reveal my energy drink habit, among other things), what's truly paramount are the precious relationships that made this thesis possible—the people who have been integral to my creative process.

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List of References

- Abbasiharofteh, M., Kinne, J., & Krüger, M. (2024). Leveraging the digital layer: the strength of weak and strong ties in bridging geographic and cognitive distances. *Journal of Economic Geography*, 24(2), 241–262. <<https://doi.org/10.1093/jeg/lbad037>>
- Abraham, A. (2022). Creativity or creativities? Why context matters. *Design Studies*, 78, 101060. <<https://doi.org/10.1016/j.destud.2021.101060>>
- Adams, P. C. (2017). Geographies of media and communication I: Metaphysics of encounter. *Progress in Human Geography*, 41(3), 365–374. <<https://doi.org/10.1177/0309132516628254>>
- Amabile, T. M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10(1), 123–167.
- Amabile, T. M., & Pratt, M. G. (2016). The dynamic componential model of creativity and innovation in organizations: Making progress, making meaning. *Research in organizational behavior*, 36, 157–183. <<https://doi.org/10.1016/j.riob.2016.10.001>>
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154–1184. <<https://doi.org/10.5465/256995>>
- Amabile, T. M., Hadley, C. N., & Kramer, S. J. (2002). Creativity under the gun. *Harvard business review*, 80, 52–63.
- Anantrasirichai, N., & Bull, D. (2022). Artificial intelligence in the creative industries: A review. *Artificial Intelligence Review*, 55, 89–656. <<https://doi.org/10.1007/s10462-021-10039-7>>
- Arpagian, J., & Aitken, S. (2018). Qualitative GIS. *Oxford Bibliographies Online: Geography*. <<https://doi.org/10.1093/OBO/9780199874002-0192>>
- Ash, J., Kitchin, R., & Leszczynski, A. (2018). Digital turn, digital geographies? *Progress in Human Geography*, 42(1), 25–43. <<https://doi.org/10.1177/0309132516664800>>
- Baer, J. (2015). The importance of domain-specific expertise in creativity. *Roepers Review*, 37(3), 165–178. <<https://doi.org/10.1080/02783193.2015.1047480>>
- Bagheri, N. (2014). What qualitative GIS maps tell and don't tell: Insights from mapping women in Tehran's public spaces. *Journal of Cultural Geography*, 31(2), 166–178. <<https://doi.org/10.1080/08873631.2014.906848>>
- Bathelt, H. and Glückler, J. (2017) Relational research design in economic geography. In Clark, G.L., Feldman, M.P., & M. Gertler (Eds.), *The New Handbook of Economic Geography* (pp. 179–195). Oxford University Press.
- Benhamou, F. (2003). Artists' labour market. In Towse, R. (Ed.), *A handbook of cultural economics* (3rd ed., pp. 53–58). Edward Elgar.
- Beyes, T., & Holt, R. (2020). The Topographical Imagination: Space and organization theory. *Organization Theory*, 1(2). <<https://doi.org/10.1177/2631787720913880>>
- Biancani, S., McFarland, D. A., & Dahlander, L. (2014). The semiformal organization. *Organization Science*, 25(5), 1306–1324. <<https://doi.org/10.1287/orsc.2013.0882>>
- Bilton, C. (2010). Manageable creativity. *International Journal of Cultural Policy*, 16(3), 255–269. <<https://doi.org/10.1080/10286630903128518>>

- Bissola, R., & Imperatori, B. (2011). Organizing individual and collective creativity: Flying in the face of creativity clichés. *Creativity and Innovation management*, 20(2), 77–89. <<https://doi.org/10.1111/j.1467-8691.2011.00597.x>>
- Boden, M. A. (2004). *The creative mind: Myths and mechanisms (2nd ed.)*. Routledge.
- Bogner, A., Littig, B., & Menz, W. (2009). Introduction: Expert interviews—An introduction to a new methodological debate. In A. Bogner, B. Littig, & W. Menz (Eds.), *Interviewing experts* (pp. 1–16). Palgrave Macmillan. <https://doi.org/10.1057/9780230244276_1>
- Bolger, N., Davis, A., & Rafacli, E. (2003). Diary methods: Capturing life as it is lived. *Annual review of psychology*, 54(1), 579–616. <<https://doi.org/10.1146/annurev.psych.54.101601.145030>>
- Boschma, R., Coenen, L., Frenken, K., & Truffer, B. (2017). Towards a theory of regional diversification: combining insights from Evolutionary Economic Geography and Transition Studies. *Regional Studies*, 51(1), 31–45.
- Botella, M., Zenasni, F., & Lubart, T. (2018). What Are the Stages of the Creative Process? What Visual Art Students Are Saying. *Frontiers in Psychology*, 9, 2266. <<https://doi.org/10.3389/fpsyg.2018.02266>>
- Brinks, V., Ibert, O., Müller, F. C., & Schmidt, S. (2018). From ignorance to innovation: serendipitous and purposeful mobility in the creative processes. *Environment and Planning A: Economy and Space*, 50(8), 1742–1763. <<https://doi.org/10.1177/0308518X1875832>>
- Bruns, H. C., & Long Lingo, E. (2024). Tedious Work: Developing Novel Outcomes with Digitization in the Arts and Sciences. *Administrative Science Quarterly*, 69(1), 39–79. <<https://doi.org/10.1177/0001839223120819>>
- Brydges, T., & Hracs, B. J. (2019). The locational choices and interregional mobilities of creative entrepreneurs within Canada’s fashion system. *Regional Studies*, 53(4), 517–527. <<https://doi.org/10.1080/00343404.2018.1478410>>
- Bullock, N. J., Seeley, W. P., & Davies, S. (2017). Art and science: A philosophical sketch of their historical complexity and codependence. *The Journal of Aesthetics and Art Criticism*, 75(4), 453–463. <<https://doi.org/10.1111/jaac.12398>>
- Bürgin, R., & Mayer, H. (2020). Digital periphery? A community case study of digitalization efforts in Swiss mountain regions. In R. Bürgin, & H. Mayer (Eds.), *Smart village technology* (pp. 67–98). Springer. <https://doi.org/10.1007/978-3-030-37794-6_4>
- Bürgin, R., Mayer, H., Kashev, A., & Haug, S. (2022). Far away and yet so close: urban–rural linkages in the context of multilocal work arrangements. *Regional Studies, Regional Science*, 9(1), 110–131. <<https://doi.org/10.1080/21681376.2022.2042370>>
- Buttimer, A. (1976). Grasping the dynamism of lifeworld. *Annals of the association of American geographers*, 66(2), 277–292. <<https://doi.org/10.1111/j.1467-8306.1976.tb01090.x>>
- Byron, K., Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: a meta-analysis examining competing theoretical models. *Journal of Applied Psychology*, 95(1), 201. <<https://doi.org/10.1037/a0017868>>
- Caniëls, M., & Rietzschel, E. F. (2015). Organizing creativity: Creativity and innovation under constraints. *Creativity and innovation management*, 24(2), 184–196. <<https://doi.org/10.1111/caim.12123>>
- Carbone, M. (2019). *Philosophy-screens: from cinema to the digital revolution*. Suny Press.
- Castells, M. (2004). *The Network Society: A Cross-Cultural Perspective*. Northampton.
- Chen, M. H., Chang, Y. Y., & Chang, Y. C. (2015). Exploring individual-work context fit in affecting employee creativity in technology-based companies. *Technological Forecasting and Social Change*, 98, 1–12. <<https://doi.org/10.1016/j.techfore.2015.05.002>>
- Choudhury, P. (2022). Geographic mobility, immobility, and geographic flexibility: A review and agenda for research on the changing geography of work. *Academy of Management Annals*, 16(1), 258–296. <<https://doi.org/10.5465/annals.2020.0242>>
- Cooke, P. N., & Lazzarretti, L. (Eds.). (2008). *Creative cities, cultural clusters and local economic development*. Edward Elgar Publishing.

- Couclelis, H. (2009). Rethinking time geography in the information age. *Environment and planning A*, 41(7), 1556–1575. <<https://doi.org/10.1068/a4151>>
- Crang, M. (2003). Rhythms of the city: temporalised space and motion. In May, J., & N. Thrift (Eds.), *TimeSpace: Geographies of Temporality* (pp. 199–219). Routledge.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Cresswell, T. (2006). *On the Move: Mobility in the Modern Western World*. Routledge.
- Cresswell, T. (2014). Mobilities III: moving on. *Progress in Human Geography*, 38(5), 712–721. <<https://doi.org/10.1177/03091325145303>>
- Csikszentmihalyi, M., & Sawyer, K. (2014). Creative insight: The social dimension of a solitary moment. In M. Csikszentmihalyi (Ed.), *The systems model of creativity* (pp. 73–98). Springer. <https://doi.org/10.1007/978-94-017-9085-7_7>
- Csikszentmihalyi, M. (2015). *The systems model of creativity: The collected works of Mihaly Csikszentmihalyi*. Springer.
- Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of personality and social psychology*, 56(5), 815.
- Czerwonka, M. (2019). Those days when people are creative: Diary methods in creativity research. In I. Lebudu, & V. P. Glăveanu (Eds.), *The Palgrave handbook of social creativity research* (pp. 59–73). Palgrave Macmillan. <https://doi.org/10.1007/978-3-319-95498-1_5>
- Darling, J., & Wilson, H. (2020). Geography and Ethics. *Research Ethics for Human Geography: A Handbook for Students*, 6–21.
- Davenport, G., & Mazalek, A. (2004). Dynamics of creativity and technological innovation. *Digital Creativity*, 15(1), 21–31. <<https://doi.org/10.1076/digc.15.1.21.28148>>
- Day, M., & Thatcher, J. (2009). “I’m really embarrassed that you’re going to read this...”: Reflections on using diaries in qualitative research. *Qualitative research in psychology*, 6(4), 249–259. <<https://doi.org/10.1080/14780880802070583>>
- De Propriis, L., & Bailey, D. (2021). Pathways of regional transformation and Industry 4.0. *Regional Studies*, 55(10–11), 1617–1629. <<https://doi.org/10.1080/00343404.2021.1960962>>
- Deleuze, G. (1995) Postscript on Control Societies, Negotiations, 1972–1990, trans. M. Jaoughin. Columbia University Press
- Denning, P. J., Comer, D. E., Gries, D., Mulder, M. C., Tucker, A., Turner, A. J., & Young, P. R. (1989). Computing as a discipline. *Computer*, 22(2), 63–70.
- Dixon, S. (2015). *Digital performance: a history of new media in theater, dance, performance art, and installation*. MIT press.
- Duff, C., & Sumartojo, S. (2017). Assemblages of creativity: Material practices in the creative economy. *Organization*, 24(3), 418–432. <<https://doi.org/10.1177/135050841668776>>
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of management journal*, 50(1), 25–32. <<https://doi.org/10.5465/amj.2007.24160888>>
- Ellegård, K. (2018). *Thinking time geography: Concepts, methods and applications* (p. 172). Taylor & Francis.
- Ellegård, K., & Vilhelmson, B. (2004). Home as a pocket of local order: Everyday activities and the friction of distance. *Geografiska Annaler: Series B, Human Geography*, 86(4), 281–296. <<https://doi.org/10.1111/j.0435-3684.2004.00168.x>>
- Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE open*, 4(1), 2158244014522633. <<https://doi.org/10.1177/2158244014522633>>
- Emirbayer, M., & Mische, A. (1998). What is agency? *American journal of sociology*, 103(4), 962–1023.
- Epstein, Z., & Hertzmann, A. (2023). Art and the science of generative AI. *Science*, 380, 1110–1111. <<https://doi.org/10.1126/science.adh4451>>

- Faulconbridge, J. R. (2010). Global architects: learning and innovation through communities and constellations of practice. *Environment and Planning A*, 42(12), 2842-2858. <<https://doi.org/10.1068/a4311>>
- Faulconbridge, J. R. (2017). Relational geographies of knowledge and innovation. In Bathelt, H., Cohendet, P., Henn, S., & L. Simon L. (Eds.), *The Elgar Companion to Innovation and Knowledge Creation* (pp. 671–684). Edward Elgar Publishing. <<https://doi.org/10.4337/9781782548522.00054>>
- Ferreira, A., & Quesado Delgado, J. (2024). The precarity paradox: the precarity-driven inefficiencies of research at a public university. *Science and Public Policy*, 51(2), 297-308. <<https://doi.org/10.1093/scipol/scad075>>
- Flick, U. (2018). *Triangulation in data collection*. In Flick, U. (Ed.), *The SAGE Handbook of Qualitative Data Collection* (pp. 527–544). SAGE Publications.
- Florida, R. (2002) *The rise of the creative class*. Basic Books.
- Florida, R. (2003). Cities and the creative class. *City & Community*, 2(1), 3-19. <<https://doi.org/10.1111/1540-6040.00034>>
- Fortwengel, J., Schüßler, E., & Sydow, J. (2017). Studying organizational creativity as process: Fluidity or duality? *Creativity and Innovation Management*, 26(1), 5-16. <<https://doi.org/10.1111/caim.12187>>
- Frenzel, A., Muench, J.C., Bruckner, M.T., Veit, D.J. (2021). Digitization or digitalization? Toward an understanding of definitions, use and application in IS research. *Proceedings of the 27th Annual Americas Conference on Information Systems (AMCIS 2021)*, Online, 9–13 August 2021.
- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological forecasting and social change*, 114, 254-280. <<https://doi.org/10.1016/j.techfore.2016.08.019>>
- Furnham, A., & Bachtar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and individual differences*, 45(7), 613-617. <<https://doi.org/10.1016/j.paid.2008.06.023>>
- Gherardi, S., & Perrotta, M. (2013). Doing by inventing the way of doing: Formativeness as the linkage of meaning and matter. In Carlile, P. R., Nicolini, D., Langley, A., & H. Tsoukas (Eds.), *How matter matters: Objects, artifacts, and materiality in organization studies* (pp. 227–259). Oxford University Press. <<https://hdl.handle.net/11572/34794>>
- Glăveanu, V. P., & Kaufman, J. C. (2019). A historical perspective. In Kaufman, J., & R. Sternberg (Eds.), *Cambridge, UK: The Cambridge Handbook of Creativity* (2nd ed., pp. 3–19). Cambridge University Press. <<https://doi.org/10.1017/9781316979839>>
- Glăveanu, V., Lubart, T., Bonnardel, N., Botella, M., De Biais, P. M., Desainte-Catherine, M., ... & Zenasni, F. (2013). Creativity as action: Findings from five creative domains. *Frontiers in psychology*, 4, 40417. <<https://doi.org/10.3389/fpsyg.2013.00176>>
- Glăveanu, V.P. (2016). Things. In: Glăveanu, V.P., Tanggaard, L., Wegener, C. (Eds), *Creativity — A New Vocabulary. Palgrave Studies in Creativity and Culture*. Palgrave Macmillan. <https://doi.org/10.1007/978-3-031-41907-2_23>
- Gomes, J., Rodrigues, F., Veloso, A., 2016. Creativity at work: The role of context. *Human Resource Management, Innovation and Performance*, 282–297. <https://doi.org/10.1057/9781137465191_18>
- Gong, H., & Xin, X. (2019). Buzz and tranquility, what matters for creativity? A case study of the online games industry in Shanghai. *Geoforum*, 106, 105-114. <<https://doi.org/10.1016/j.geoforum.2019.08.002>>
- Gormley, K. (2020). Neoliberalism and the discursive construction of ‘creativity’. *Critical Studies in Education*, 61(3), 313-328. <<https://doi.org/10.1080/17508487.2018.1459762>>
- Grabher, G. (2018). Marginality as strategy: Leveraging peripherality for creativity. *Environment and Planning A: Economy and Space*, 50(8), 1785-1794. <<https://doi.org/10.1177/0308518X18784021>>

- Grabher, G., & Ibert, O. (2017). Knowledge Collaboration in Hybrid Virtual Communities. In Bathelt, H., Cohendet, P., & S. Henn (Eds.), *The Elgar Companion to Innovation and Knowledge Creation* (pp. 537–555). Edward Elgar Publishing. <<https://doi.org/10.4337/9781782548522.00044>>
- Grabher, G., Melchior, A., Schiemer, B., Schübler, E., & Sydow, J. (2018). From being there to being aware: Confronting geographical and sociological imaginations of copresence. *Environment and Planning A: Economy and Space*, 50(1), 245-255. <<https://doi.org/10.1177/0308518X1774350>>
- Grant, J. (2018). Creativity as an artistic merit. In Gaut, B., & M. Kieran (Eds.), *Creativity and philosophy* (pp. 333–349). Routledge.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5(9), 444–454. <<https://doi.org/10.1037/h0063487>>
- Haefner, L., & Sternberg, R. (2020). Spatial implications of digitization: State of the field and research agenda. *Geography Compass*, 14(12), e12544. <<https://doi.org/10.1111/gec3.12544>>
- Hägerstrand, T. (1970). What about People in Regional Science. *Regional Science Association Papers* 24 (1), 6–21. <<https://doi.org/10.1007/BF01936872>>
- Hägerstrand, T. (1985). Time-geography: focus on the corporeality of man, society, and environment. *The science and praxis of complexity*, 3, 193-216.
- Hammett, D., Jackson, L., & Bramley, R. (2022). Beyond ‘do no harm’? On the need for a dynamic approach to research ethics. *Area*, 54(4), 582-590. <<https://doi.org/10.1111/area.12795>>
- Harvey, D. C., Hawkins, H., & Thomas, N. J. (2012). Thinking creative clusters beyond the city: People, places and networks. *Geoforum*, 43(3), 529-539. <<https://doi.org/10.1016/j.geoforum.2011.11.010>>
- Hautala, J. (2018). Now together, next apart: Knowledge creation processes through repeated geographical dispersion. *Geografiska Annaler: Series B, Human Geography*, 100(3), 220-243. <<https://doi.org/10.1080/04353684.2017.1375383>>
- Hautala, J., & Ibert, O. (2018). Creativity in arts and sciences: Collective processes from a spatial perspective. *Environment and Planning A: Economy and Space*, 50(8), 1688-1696. <<https://doi.org/10.1177/0308518X18786967>>
- Hautala, J., & Jauhiainen, J. S. (2014). Spatio-temporal processes of knowledge creation. *Research Policy*, 43(4), 655-668. <<https://doi.org/10.1016/j.respol.2014.01.002>>
- Hautala, J., & Jauhiainen, J. S. (2019). Creativity-related mobilities of peripheral artists and scientists. *GeoJournal*, 84(2), 381-394. <<https://doi.org/10.1007/s10708-018-9866-3>>
- Hautala, J., & Nordström, P. (2019). Creative city, mobility, and creativity: Finnish artists in Berlin. *Mobilities*, 14(6), 859-874. <<https://doi.org/10.1080/17450101.2019.1616445>>
- Hawkins, H. (2013). *For creative geographies: Geography, visual arts and the making of worlds*. Routledge. <<https://doi.org/10.4324/9780203769283>>
- He, J., Peng, J., & Zeng, G. (2023). The spatiality of the creative digital economy: Local amenities to the spatial agglomeration of creative e-freelancers in China. *Journal of the Knowledge Economy*, 14(4), 4608-4629. <<https://doi.org/10.1007/s13132-022-01088-6>>
- Hearn, G. (2020). The future of creative work: Creativity and digital disruption. In G. Hearn (Ed.), *The future of creative work* (pp. 1–14). Edward Elgar Publishing. <<https://doi.org/10.4337/9781839101106.00007>>
- Henriksen, D., Creely, E., & Mehta, R. (2022). Rethinking the politics of creativity: Posthumanism, indigeneity, and creativity beyond the western anthropocene. *Qualitative Inquiry*, 28(5), 465-475. <<https://doi.org/10.1177/10778004211065813>>
- Heras-Escribano, M. (2019). *The philosophy of affordances*. Palgrave Macmillan. <<https://doi.org/10.1007/978-3-319-98830-6>>
- Hernes, T. (2014). *A process theory of organization*. Oup Oxford. <<https://doi.org/10.1093/acprof:oso/9780199695072.001.0001>>
- Holford, W. D. (2019). The future of human creative knowledge work within the digital economy. *Futures*, 105, 143-154. <<https://doi.org/10.1016/j.futures.2018.10.002>>

- Hopster, J. (2021). What are socially disruptive technologies?. *Technology in Society*, 67, 101750. <<https://doi.org/10.1016/j.techsoc.2021.101750>>
- Howkins, J. (2002). *The creative economy: How people make money from ideas*. Penguin UK.
- Hubers, C., Dijst, M., & Schwanen, T. (2018). The fragmented worker? ICTs, coping strategies and gender differences in the temporal and spatial fragmentation of paid labour. *Time & Society*, 27(1), 92-130. <<https://doi.org/10.1177/0961463X156098>>
- Ibert, O., Hautala, J., & Jauhiainen, J. S. (2015). From cluster to process. *Geoforum* 65: 323–327.
- Ihde, D. (1990). *Technology and the lifeworld*. Indiana University Press.
- Jakonen, O. (2020). Results-based steering as a tool for centralized art policy management and instrumentalization? Analysis of the Finnish Arts Council's reformation. *Nordisk kulturpolitisk tidsskrift*, 23(2), 125-142. <<https://doi.org/10.18261/issn.2000-8325/2020-02-04>>
- Jarvenpaa, S. L., & Välikangas, L. (2020). Advanced technology and end-time in organizations: a doomsday for collaborative creativity? *Academy of Management Perspectives*, 34(4), 566-584. <<https://doi.org/10.5465/amp.2019.0040>>
- Jauhiainen, J. S. (2024). The Metaverse: Innovations and generative AI. *International Journal of Innovation Studies*, 8(3), 262-272. <<https://doi.org/10.1016/j.ijis.2024.04.004>>
- Jeanes, E., Loacker, B., Sliwa, M., & Weiskopf, R. (2015). Mobilities in contemporary worlds of work and organizing. *Ephemera*, 15(4), 705.
- Jonsson, K., Mathiassen, L., & Holmström, J. (2018). Representation and mediation in digitalized work: evidence from maintenance of mining machinery. *Journal of Information Technology*, 33(3), 216-232. <<https://doi.org/10.1057/s41265-017-0050-x>>
- Kallio, K. M., Kallio, T. J., & Grossi, G. (2017). Performance measurement in universities: Ambiguities in the use of quality versus quantity in performance indicators. *Public Money & Management*, 37(4), 293-300. <<https://doi.org/10.1080/09540962.2017.1295735>>
- Kalpokiene, J., & Kalpokas, I. (2023). Creative encounters of a posthuman kind—anthropocentric law, artificial intelligence, and art. *Technology in Society*, 72, 102197. <<https://doi.org/10.1016/j.techsoc.2023.102197>>
- Kampylis, P. G., & Valtanen, J. (2010). Redefining creativity—analyzing definitions, collocations, and consequences. *The Journal of Creative Behavior*, 44(3), 191-214. <<https://doi.org/10.1002/j.2162-6057.2010.tb01333.x>>
- Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15–25. <<https://doi.org/10.1016/j.bushor.2018.08.004>>
- Karakilic, E., & Painter, M. (2022). The (un) surprising nature of creativity: A Deleuzian perspective on the temporality of the creative process. *Ephemera: Theory and Politics in Organization*, 22(2).
- Karwowski, M., Lebuda, I., Wisniewska, E., & Gralowski, J. (2013). Big five personality traits as the predictors of creative self-efficacy and creative personal identity: Does gender matter? *The Journal of creative behaviours*, 47(3), 215-232. <<https://doi.org/10.1002/jocb.32>>
- Kaufman, J. C. (2005). *Creativity across domains: Faces of the muse*. Lawrence Erlbaum Associates.
- Keating, T. P. (2024). Techno-genesis: Reconceptualising geography's technology from ontology to ontogenesis. *Progress in Human Geography*, 48(1), 49-65. <<https://doi.org/10.1177/03091325231209020>>
- Khedhaouria, A., Montani, F., & Thurik, R. (2017). Time pressure and team member creativity within R&D projects: The role of learning orientation and knowledge sourcing. *International Journal of Project Management*, 35(6), 942-954. <<https://doi.org/10.1016/j.ijproman.2017.04.002>>
- Kitchin, R. (2023). *Digital timescapes: Technology, temporality and society*. John Wiley & Sons.
- Kitchin, R., Coletta, C., Evans, L., Heaphy, L., & Mac Donncha, D. (2019). Smart cities, algorithmic technocracy and new urban technocrats. In M. Raco, & F. Savini (Eds.), *Planning and knowledge* (pp. 199–212). Bristol University Press. <<https://doi.org/10.51952/9781447345251.ch015>>
- Klapka, P., Ellegård, K., & Frantál, B. (2020). What about Time-Geography in the post-Covid-19 era? *Moravian Geographical Reports*, 28(4), 238-247. <<https://doi.org/10.2478/mgr-2020-0017>>

- Koch, R., & Miles, S. (2021). Inviting the stranger in: Intimacy, digital technology and new geographies of encounter. *Progress in Human Geography*, 45(6), 1379-1401. <<https://doi.org/10.1177/0309132520961881>>
- Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage publications.
- Küpers, W. (2015). Emplaced and embodied mobility in organizations. *ephemera: theory & politics in organization*, 15(4).
- Kwan, M. P., & Ding, G. (2008). Geo-narrative: Extending geographic information systems for narrative analysis in qualitative and mixed-method research. *The Professional Geographer*, 60(4), 443-465. <<https://doi.org/10.1080/00330120802211752>>
- Kwan, M. P., Richardson, D., Wang, D., & Zhou, C. (2015). *Space-time integration in geography and GIScience*. Springer. <<https://doi.org/10.1007/978-94-017-9205-9>>
- Kyngäs, H. (2020). Inductive content analysis. In H. Kyngäs, K. Mikkonen, & M. Kääriäinen (Eds.), *The application of content analysis in nursing science research* (pp. 13–21). Springer. <https://doi.org/10.1007/978-3-030-30199-6_2>
- Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of management journal*, 56(1), 1-13. <<https://doi.org/10.5465/amj.2013.4001>>
- Langley, A., & Tsoukas, H. (2010). Introducing perspectives on process organization studies. *Process, sensemaking, and organizing*, 1(9), 1-27.
- Latham, A. (2003). Research, performance, and doing human geography: some reflections on the diary-photograph, diary-interview method. *Environment and planning A*, 35(11), 1993-2017. <<https://doi.org/10.1068/a3587>>
- Latham, A. (2020). Diagramming the social: exploring the legacy of Torsten Hägerstrand's diagrammatic landscapes. *Landscape Research*, 45(6), 699-711. <<https://doi.org/10.1080/01426397.2020.1749579>>
- Latour, B. (2007). *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.
- Leclair, M. (2023). The atmospherics of creativity: Affective and spatial materiality in a designer's studio. *Organization studies*, 44(5), 807-829. <<https://doi.org/10.1177/01708406221080141>>
- Lee, J., & Hollister, J. M. (2020). Internet-mediated research in the age of social distancing: Methodological reflections and recommendations from two online research projects. *Journal of Korean Library and Information Science Society*, 51(2), 319-353.
- Lengyel, B., & Eriksson, R. H. (2017). Co-worker networks, labour mobility and productivity growth in regions. *Journal of Economic Geography*, 17(3), 635-660. <<http://dx.doi.org/10.16981/kliiss.51.2.202006.319>>
- Leonard-Barton, D., & Swap, W. C. (2005). *Deep smarts: How to cultivate and transfer enduring business wisdom*. Harvard Business Press.
- Leszczynski, A. (2018). Spatialities. In Ash, J., Kitchin, R., & A. Leszczynski (Eds.), *Digital Geographies* (pp. 13–23). Sage.
- Li, C., Thulin, E., & Chai, Y. (2024). Understanding the Hybridization of Everyday Activities from a Time-Geographic Perspective. *Annals of the American Association of Geographers*, 114(1), 185-199. <<https://doi.org/10.1080/24694452.2023.2245023>>
- Liegl, M. (2014). Nomadicity and the care of place—on the aesthetic and affective organization of space in freelance creative work. *Computer Supported Cooperative Work (CSCW)*, 23, 163-183. <<https://doi.org/10.1007/s10606-014-9198-x>>
- Lindell, R. (2024). The dialectics of digitalisation: A critique of the modernistic imperative for the development of digital technology. *Futures*, 162, 103428. <<https://doi.org/10.1016/j.futures.2024.103428>>
- Lindner, P. (2018). Creativity policy: Conserving neoliberalism's other in a market assemblage? *Economic Geography*, 94(2), 97-117. <<https://doi.org/10.1080/00130095.2017.1403850>>

- Liu, D., Chen, X. P., & Yao, X. (2011). From autonomy to creativity: a multilevel investigation of the mediating role of harmonious passion. *Journal of applied psychology*, 96(2), 294. <<https://doi.org/10.1037/a0021294>>
- Loacker, B., & Śliwa, M. (2016). Moving to stay in the same place? Academics and theatrical artists as exemplars of the 'mobile middle'. *Organization*, 23(5), 657-679. <<https://doi.org/10.1177/1350508415598247>>
- Lombardo, S., & Kvålshaugen, R. (2014). Constraint-shattering practices and creative action in organizations. *Organization Studies*, 35(4), 587-611. <<https://doi.org/10.1177/0170840613517597>>
- Lund, C. (2014). Of what is this a case? Analytical movements in qualitative social science research. *Human organization*, 73(3), 224-234. <<https://doi.org/10.17730/humo.73.3.e35q482014x03314>>
- Lundman, R., & Nordström, P. (2023). Creative geographies in the age of AI: co-creative spatiality and the emerging techno-material relations between artists and artificial intelligence. *Transactions of the Institute of British Geographers*, 48(3), 650-664. <<https://doi.org/10.1111/tran.12608>>
- Lunenfeld, P. (1999). Screen grabs: The digital dialectic and new media. In P. Lunenfeld (Ed.), *The Digital Dialectic: New Essays on New Media*. Cambridge (pp. xiv–xxi). MIT Press.
- Lyytinen, K. (2022). Innovation logics in the digital era: a systemic review of the emerging digital innovation regime. *Innovation*, 24(1), 13-34. <<https://doi.org/10.1080/14479338.2021.1938579>>
- Malmberg, A., & Power, D. (2006). True clusters, a severe case of conceptual headache. In Asheim, B., Cooke, P., & R. Martin (Eds.), *Clusters and regional development, critical reflections and explorations* (pp. 50–68). Routledge.
- Marti, L., & Puertas, R. (2023). Analysis of European competitiveness based on its innovative capacity and digitalization level. *Technology in Society*, 72, 102206. <<https://doi.org/10.1016/j.techsoc.2023.102206>>
- Massey, D. (2005). *For space*. Sage.
- May, J., & Thrift, N. (2001). *Timespace: Geographies of Temporality*. Routledge.
- Mazzone, M., & Elgammal, A. (2019). Art, creativity, and the potential of artificial intelligence. *Arts* 8(1), 26. <<https://doi.org/10.3390/arts8010026>>
- Merriman, P. (2012). *Mobility, space and culture*. Routledge. <<https://doi.org/10.4324/9780203842102>>
- Merriman, P. (2023). Mobility/fixity: Rethinking binaries in mobility studies. *Mobility Humanities*, 2(1), 6-21. <<https://doi.org/10.23090/MH.2023.01.2.1.006>>
- Meusburger, P. (2009). *Milieus of Creativity: An Interdisciplinary Approach to Spatiality of Creativity*. Springer.
- Mitcham, C. (2022). *Thinking through technology: The path between engineering and philosophy*. University of Chicago Press.
- Mullan, K., & Wajcman, J. (2019). Have mobile devices changed working patterns in the 21st century? A time-diary analysis of work extension in the UK. *Work, employment and society*, 33(1), 3-20. <<https://doi.org/10.1177/0950017017730529>>
- Murray, A., Rhymer, J. E. N., & Sirmon, D. G. (2021). Humans and technology: Forms of conjoined agency in organizations. *Academy of Management Review*, 46(3), 552-571. <<https://doi.org/10.5465/amr.2019.0186>>
- Nordström, P. (2018). Creative landscapes: Events at sites of encounter. *Doctoral diss., University of Turku*.
- Nordström, P., Lundman, R., & Hautala, J. (2023). Evolving coagency between artists and AI in the spatial cothe creative process of artmaking. *Annals of the American Association of Geographers*, 113(9), 2203-2218. <<https://doi.org/10.1080/24694452.2023.2210647>>
- Oldham, G. R., & Da Silva, N. (2015). The impact of digital technology on the generation and implementation of creative ideas in the workplace. *Computers in human behavior*, 42, 5-11. <<https://doi.org/10.1016/j.chb.2013.10.041>>
- Orlikowski, W. J., & Yates, J. (2002). It's about time: Temporal structuring in organizations. *Organization science*, 13(6), 684-700. <<https://doi.org/10.1287/orsc.13.6.684.501>>

- Ortmann, G., & Sydow, J. (2018). Dancing in chains: Creative practices in/of organizations. *Organization Studies*, 39(7), 899-921. <<https://doi.org/10.1177/0170840617717096>>
- Parker, C., Scott, S., & Geddes, A. (2019). *Snowball sampling*. SAGE research methods foundations.
- Pavlovskaya, M. (2009). Non-quantitative GIS. *Qualitative GIS: A mixed methods approach*, 13-37.
- Pavlovskaya, M. (2017). *Qualitative GIS*. The International Encyclopedia of Geography: People, the Earth, Environment, and Technology. <<https://doi.org/10.1002/9781118786352.wbieg1156>>
- Peck, J. (2005). Struggling with the creative class. *International Journal of Urban and Regional Research* 29 (4): 740–70. <<https://doi.org/10.1111/j.1468-2427.2005.00620.x>>
- Petriglieri, G., Ashford, S. J., & Wrzesniewski, A. (2019). Agony and ecstasy in the gig economy: Cultivating holding environments for precarious and personalized work identities. *Administrative Science Quarterly*, 64(1), 124-170. <<https://doi.org/10.1177/0001839218759646>>
- Pigott, A. (2020) Articulating artfulness: Exploring the ecological potential of creative conversation. *Transactions of the Institute of British Geographers*, 45, 877–890. Available from: <<https://doi.org/10.1111/tran.12398>>
- Power, D., & Scott, A. J. (2004). A prelude to cultural industries and the production of culture: The rise of the cultural economy. In *Cultural industries and the production of culture* (pp. 15-28). Routledge.
- Pratt, A. C. (2008). Creative cities: the cultural industries and the creative class. *Geografiska annaler: series B, human geography*, 90(2), 107-117. <<https://doi.org/10.1111/j.1468-0467.2008.00281.x>>
- Prince, R. (2014) Consultants and the Global Assemblage of Culture and Creativity. *Transactions of the Institute of British Geographers*, 39(1), 90–101. <<https://doi.org/10.1111/tran.12012>>
- Puryear, J. S., & Lamb, K. N. (2020). Defining creativity: How far have we come since Plucker, Beghetto, and Dow? *Creativity Research Journal*, 32(3), 206–214. <<https://doi.org/10.1080/10400419.2020.1821552>>
- Pyry, N. (2016). Learning with the city via enchantment: Photo-walks as creative encounters. *Discourse: Studies in the Cultural Politics of Education*, 37(1), 102-115. <<https://doi.org/10.1080/01596306.2014.929841>>
- Repenning, A. (2022). Workspaces of mediation: How digital platforms shape practices, spaces and places of creative work. *Tijdschrift voor economische en sociale geografie*, 113(2), 211-224. <<https://doi.org/10.1111/tesg.12508>>
- Repenning, A., & Oechslen, A. (2023). Creative digipreneurs: Artistic entrepreneurial practices in platform-mediated space. *Digital Geography and Society*, 4, 100058. <<https://doi.org/10.1016/j.diggeo.2023.100058>>
- Research Integrity (RI). (19.4.2024). Finnish National Board on Research Integrity TENK. <<https://tenk.fi/en/research-integrity-ri>>
- Richardson, L. (2021). Coordinating office space: Digital technologies and the platformization of work. *Environment and Planning D: Society and Space*, 39(2), 347-365. <<https://doi.org/10.1177/0263775820959677>>
- Rose, G. (1993). *Feminism & geography: The limits of geographical knowledge*. University of Minnesota Press, Minnesota.
- Rose, G. (2016). Rethinking the geographies of cultural ‘objects’ through digital technologies: Interface, network and friction. *Progress in Human Geography*, 40(3), 334-351. <<https://doi.org/10.1177/0309132515580493>>
- Runco, M. A. (2014). “Big C, little c” creativity as a false dichotomy: Reality is not categorical. *Creativity Research Journal*, 26(1), 131-132. <<https://doi.org/10.1080/10400419.2014.873676>>
- Runco, M. A., & Kim, D. (2020). Four Ps of creativity and recent updates. In *Encyclopedia of creativity, invention, innovation and entrepreneurship* (pp. 996-1001). Cham: Springer International Publishing.
- Russell, S., & Norvig, P. (2010). *Artificial intelligence: A modern approach* (3rd ed.). Harlow, UK: Pearson.

- Salomon, I. (1986). Telecommunications and travel relationships: a review. *Transportation research part A: general*, 20(3), 223-238. <[https://doi.org/10.1016/0191-2607\(86\)90096-8](https://doi.org/10.1016/0191-2607(86)90096-8)>
- Sanyal, R. (2020). Positionality. In: Darling, J., & Wilson, H. (Eds.), *Research Ethics for Human Geography: A Handbook for Students* (pp. 25–32). Sage Publications.
- Sax, L. J., Lehman, K. J., Jacobs, J. A., Kanny, M. A., Lim, G., Monje-Paulson, L., & Zimmerman, H. B. (2017). Anatomy of an enduring gender gap: The evolution of women's participation in computer science. *The Journal of higher education*, 88(2), 258-293. <<https://doi.org/10.1080/00221546.2016.1257306>>
- Schatzki, T. (2020). Timespace and the organization of social life. In *Time, consumption and everyday life* (pp. 35-48). Routledge.
- Schiemer, B., Schüßler, E., & Theel, T. (2023). Regulating nimbus and focus: Organizing copresence for creative collaboration. *Organization Studies*, 44(4), 545-568. <<https://doi.org/10.1177/0170840622109420>>
- Schwanen, T., (2007). Matter(s) of interest: Artefacts, spacing and timing. *Geografiska Annaler: Series B, Human Geography*, 89(1), 9–22. <<https://doi.org/10.1111/j.1468-0467.2007.00236.x>>
- Scott, A. J. (2014). Beyond the creative city: cognitive-cultural capitalism and the new urbanism. *Regional Studies*, 48(4), 565-578. <<https://doi.org/10.1080/00343404.2014.891010>>
- Sgourev, S. V. (2020). The alchemy of painting: How the technology of oil paint Transmuted art. In Strandgaard Pedersen, J., Slavich, B., Khaire, M. (Eds.), *Technology and Creativity. Palgrave Macmillan* (pp. 37–62). <https://doi.org/10.1007/978-3-030-17566-5_3>
- Shaw, S. L. (2023). Time geography in a hybrid physical-virtual world. *Journal of Geographical Systems*, 25(3), 339-356. <<https://doi.org/10.1007/s10109-023-00407-y>>
- Sheller, M. (2017). From spatial turn to mobilities turn. *Current sociology*, 65(4), 623-639. <<https://doi.org/10.1177/0011392117697463>>
- Silvia, P. J., Nusbaum, E. C., Berg, C., Martin, C., & O'Connor, A. (2009). Openness to experience, plasticity, and creativity: Exploring lower-order, high-order, and interactive effects. *Journal of Research in Personality*, 43(6), 1087-1090. <<https://doi.org/10.1016/j.jrp.2009.04.015>>
- Simpson, B., Tracey, R., & Weston, A. (2021). The timefulness of creativity in an accelerating world. In Reinecke, J., Suddaby, R., Langley, A., & Tsoukas, H. (Eds.), *Time, temporality, and history in process organization studies* (pp. 69–88). Oxford University Press.
- Slavich, B., & Svejnova, S. (2016). Managing creativity: A critical examination, synthesis, and new frontiers. *European Management Review*, 13(4), 237-250. <<https://doi.org/10.1111/emre.12078>>
- Smith, K., Pickering, A., & Bhattacharya, J. (2022). The creative life: A daily diary study of creativity, affect, and well-being in creative individuals. *Creativity Research Journal*, 34(4), 460-479. <<https://doi.org/10.1080/10400419.2022.2122371>>
- Snow, C. P. (1993). *The two cultures (revised edition ed.)*. Cambridge University Press.
- Stein, M. I. (1953). Creativity and culture. *Journal of Psychology*, 36, 311–322. <<https://doi.org/10.1080/00223980.1953.9712897>>
- Stephenson, K. A., Kuismin, A., Putnam, L. L., & Sivunen, A. (2020). Process studies of organizational space. *Academy of Management Annals*, 14, 797–827. <<https://doi.org/10.5465/annals.2018.0146>>
- Sternberg, R. J. (2009). Domain-generality versus domain-specificity of creativity. In P. Meusburger, J. Funke, & E. Wunder (Eds.), *Milieus of creativity* (pp. 25–38). Springer.
- Sternberg, R. J. (2018). Evaluating merit among scientists. *Journal of Applied Research in Memory and Cognition*, 7(2), 209-216. <<https://doi.org/10.1016/j.jarmac.2018.03.003>>
- Strandgaard Pedersen, J., Slavich, B., & Khaire, M. (2020). *Technology and creativity: Production, mediation and evaluation in the digital age*. Springer International Publishing.>
- Sydow, J. (2018). From dualisms to dualities: On researching the creative processes in the arts and sciences. *Environment and Planning A: Economy and Space*, 50(8), 1795-1801. <<https://doi.org/10.1177/0308518X1878248>>

- Tarafdar, M., Cooper, C. L., & Stich, J. F. (2019). The technostress trifecta-techno eustress, techno distress and design: Theoretical directions and an agenda for research. *Information Systems Journal*, 29(1), 6-42. <<https://doi.org/10.1111/isj.12169>>
- Tekic, Z., & Füller, J. (2023). Managing innovation in the era of AI. *Technology in Society*, 73, 102254. <<https://doi.org/10.1016/j.techsoc.2023.102254>>
- Thompson, N. A. (2018). Imagination and creativity in organizations. *Organization Studies*, 39(2-3), 229-250. <<https://doi.org/10.1177/0170840617736939>>
- Thulin, E., & Vilhelmson, B. (2022). Pacesetters in contemporary telework: How smartphones and mediated presence reshape the time-space rhythms of daily work. *New Technology, Work and Employment*, 37(2), 250-269. <<https://doi.org/10.1111/ntwe.12224>>
- Thulin, E., Vilhelmson, B., & Johansson, M. (2019). New telework, time pressure, and time use control in everyday life. *Sustainability*, 11(11), 3067. <<https://doi.org/10.3390/su11113067>>
- Tracy, S. J. (2024). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact*. John Wiley & Sons.
- Urry, J. (2007). *Mobilities*. Polity.
- Valenduc, G., & Vendramin, P. (2017). Digitalisation, between disruption and evolution. *Transfer: European Review of Labour and Research*, 23(2), 121-134. <<https://doi.org/10.1177/1024258917701379>>
- Wallas, G. (1926). *The art of thought*. Jonathan Cape.
- Wang, B., Schlagwein, D., Cecez-Kecmanovic, D., & Cahalane, M. C. (2020). Beyond the factory paradigm: Digital nomadism and the digital future (s) of knowledge work post-COVID-19. *Journal of the Association for Information Systems*, 21(6), 10.
- Weinberger, E., Wach, D., Stephan, U., & Wegge, J. (2018). Having a creative day: Understanding entrepreneurs' daily idea generation through a recovery lens. *Journal of Business Venturing*, 33(1), 1-19. <<https://doi.org/10.1016/j.jbusvent.2017.09.001>>
- Williams, N. (2016). The creative processes: From interventions in art to intervallic experiments through Bergson. *Environment and Planning A*, 48(8), 1549-1564. <<https://doi.org/10.1177/0308518X16642769>>
- Williams, P., McDonald, P., & Mayes, R. (2021). The impact of disruptive innovation on creative workers: the case of photographers. *Creative Industries Journal*, 14(2), 130-151. <<https://doi.org/10.1080/17510694.2020.1858707>>
- Wilson, H. F. (2017). On geography and encounter: Bodies, borders, and difference. *Progress in Human Geography*, 41(4), 451-471. <<https://doi.org/10.1177/0309132516645958>>
- Woodman, R. W., Sawyer, J. E., & Griffin, R. W. (1993). Toward a theory of organizational creativity. *Academy of management review*, 18(2), 293-321. <<https://doi.org/10.5465/amr.1993.3997517>>
- Woodward, K., Jones III, J. P., & Marston, S. A. (2010). Of eagles and flies: Orientations toward the site. *Area*, 42(3), 271-280. <<https://doi.org/10.1111/j.1475-4762.2009.00922.x>>
- Wu, D., & Qiao, Y. (2024). Interwoven spaces: How interactions in physical space facilitate knowledge exchange and market transactions in virtual space. *Geoforum*, 151, 104010. <<https://doi.org/10.1016/j.geoforum.2024.104010>>
- Yeung, H. W. C. (2024). Method in relational-explanatory geography. *Progress in Human Geography*, 03091325241248847. <<https://doi.org/10.1177/03091325241248847>>
- Yin, R. K. (2013). Validity and generalization in future case study evaluations. *Evaluation*, 19(3), 321-332. <<https://doi.org/10.1177/1356389013497081>>
- Yuan, M., Nara, A., & Bothwell, J. (2014). Space-time representation and analytics. *Annals of GIS*, 20(1), 1-9. <<https://doi.org/10.1080/19475683.2013.862301>>
- Zampetakis, L. A., Bouranta, N., & Moustakis, V. S. (2010). On the relationship between individual creativity and time management. *Thinking skills and creativity*, 5(1), 23-32. <<https://doi.org/10.1016/j.tsc.2009.12.001>>
- Zook, M., & Graham, M. (2018). Hacking code/space: Confounding the code of global capitalism. *Transactions of the Institute of British Geographers*, 43(3), 390-404. <<https://doi.org/10.1111/tran.12228>>



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