

Complexity thinking as a coordinating theoretical framework for creative industries research

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Abstract: The chapter starts by reviewing current trends in the research on creative industries across social sciences and humanities. It considers the importance of social sciences in stretching our understanding from individual creativity and labour to the knowledge of production system and supply chains in creative industries. It also reviews how humanities are contributing to a new understanding of the importance of memory, histories and digital self for a better understanding of where content and knowledge is developed for creative industries. However, the chapter also highlight the disconnect of academic knowledge and research and the limited understanding on interdisciplinary work and knowledge. It proposes that a complexity perspective can contribute towards a better understanding of current and future knowledge developed around creative industries. It considers how complexity might help integrating knowledge at different scales, which

currently remains siloed. Specifically, connecting interactions between creative practitioners in designing products and processes (micro), interactions between creative industries within local clusters or the role of cultural infrastructure within regions (meso), and the interaction between creativity, place image and its global reach and connections (macro). These allow for bridging issues and understanding across scales but also disciplinary boundaries and space from the local to the global connections. Furthermore, it considers the value of long-term research in this field and reviews the lack of longitudinal studies, proposing the importance of more large and longitudinal research funding to be developed to enable such important work to take place.

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Keywords

Creative industries; complexity theory; creative practice; interdisciplinary research; evolutionary thinking.

1. Introduction: the multidisciplinary nature of creative industries research

Research and policy attention towards the creative industries (CIs) has expanded now for over 20 years, at least since the first mapping studies in UK and Australia used the term creative industries (DCMS, 1998, Radbourne, 1997), even longer if we connect with previous work taking place in the late 1980s and early 1990s on cultural industries (Garnham, 1987, O'Brien

and Feist, 1995). From that initial mapping work, that took place mainly across geography (Pratt, 1997) and media studies (Hartley and Cunningham, 2002) as well as in public policy circles, the interest towards CIs as grown exponentially and embraced more and more subject areas.

The CIs have been embraced within broader debates concerned with the investigation of production (Blythe, 2001) and consumption systems networks (Lizardo, 2006) and practices (Warde et al., 2009) associated with a range of cultural and creative products (including both material products and intangible productions such as events, traditions and cultural values), to the broader perspective that have looked at their impact on local (and national) economies, city and national imaginaries (Molotch, 2002) as well as global networks (De Berranger and Meldrum, 2000). While definitions of the CIs and the broader creative economy vary across disciplines as well as countries (UNCTAD, 2008), the field is truly multidisciplinary as it benefits from insights and research from geography, sociology, arts & humanities and media studies researchers as well as economics, cultural theorists and policy experts (table 1). However, due to this multidisciplinary nature, knowledge and understanding of the way the CIs work is also overly fragmented covering specific foci under different disciplines.

Table 1: Mapping CIs research: keys areas of research by subject areas and key authors

Key Areas of Research	Subject areas involved	Key Authors / Publications
Creative industries (definition)	Geography, economics, cultural studies, cultural policy, Economics	(Cunningham, 2002) (Galloway and Dunlop, 2007) (Potts et al., 2008a) (Markusen et al., 2008)
Creative cities, creative planning	Geography, urban studies and planning, Economics	(Hall, 2000) (Evans, 2009) (Landry and Bianchini, 1995)
Creative clusters	Economic Geography, Economics	(Pratt, 2004) (Chapain et al., 2010)
Creative industries & Copyright	Law, Management and business studies, Media studies	(Garnham, 2005) (Towse, 2010)
Creative work and practice	Sociology, cultural policy, gender studies, Media studies	(Martin and Wilson, 2018) (Gruber, 1988) (Hesmondhalgh and Baker, 2008)
Creative industries / Creative management	Management and business studies	(Bilton and Leary, 2002) (Townley et al., 2009)

Creative industries and diversity	Media, Film and Cultural Studies	(Malik et al., 2017)
Everyday creativity and participation	Cultural policy, cultural studies	(Richards, 2007) (Wilson et al., 2017)

It seems clear that despite CIs being a common research interest across a wide range of disciplines, research tends to remain fragmented with different disciplinary fields focusing on different scales and independent objects of analysis from the individual creative idea or object to its global economic reach without linking theories and key issues across different scales of research. As a result, there are insufficient connections made between the impact of micro-dynamics (such as the practice of an artist or even the content of his/her artwork) and the role of meso-level (the operation of cultural and CIs in cities and regions) and/or macro-level dynamics (such as the growth of certain market outputs at the national and international levels). This chapter explores the current literature to map the interconnections across the different levels of understanding of the CIs (micro, meso and macro) as well as the possibility to integrate different disciplinary understandings and findings within a complexity perspective. It also places specific emphasis on the evolutionary perspective that comes with complexity thinking, providing a powerful tool to explain how ideas and CIs evolve over time and the way these changes shape local creative systems and clusters. The paper considers how this approach could help to establish a more coherent framework for defining and understanding how the CIs works, but also for exploring further the boundaries of CIs and their interconnection with communities, labour markets or social values.

The chapter is structured as follows. The first part provides an overview on complexity theory and how it interacts with the current research being undertaken on the CIs. It also presents distinctively how complexity informed current research at three specific scales of analysis: micro-interactions, meso-structures (like networks and clusters) and finally macro-economic analysis (at regional, national or international level). The second part of the chapter specifically focuses on research which engages with breaking these boundaries and bridging across micro and meso approaches and meso and macro approaches using some of the author's work to reflect on the rewards and challenges of adopting a complexity approach.

Conclusions are drawn about further avenues of research and the need for multi-disciplinary work to improve our understanding of the CIs.

2. Connecting creative industries research via complexity thinking

Complexity science and associated complexity thinking has emerged in the last three decades as a new research field and approach able to provide new ways to understand a variety of systems: from the physical and biological worlds to the social and managerial ones. It is hard to find a single univocal definition of the complexity thinking (Martin and Sunley, 2007) but overall it represents an approach to understanding the object of study which predicate that most phenomena or systems in the world cannot be understood without looking at their multiple interactions and interdependencies with other systems across different scales. Breaking with traditional reductionist approaches in science, complexity focuses on studying how diverse components and systems interact in space and time leading to the creation of new forms of order and organisation. Complexity theory is not a single unified theory, but constitutes a framework - and set of methodological approaches (Mitleton-Kelly et al., 2018) - for studying complex systems. Both in the natural and social sciences complexity has allowed for a more integrated understanding of phenomena and for interrogating relational dynamics rather than single objects of research. As complexity science has started maturing, its policy relevance and influence has grown (Geyer and Rihani, 2012, OECD, 2017). However, despite an increasing body of research using complexity science in social sciences and the arts and humanities (Johnson, 2010) there is still very little research focussed on how it can support a better understanding of the CIs (Comunian, 2011, Berg and Hassink, 2014, Potts et al., 2008a) The complexity approach can help overcome some of the constraints presented by disciplinary theoretical frameworks as it allows for the integration and combination of qualitative and quantitative methodologies as well as practice-based research and therefore is in a position to create a multi-disciplinary framework which will be relevant to a variety of disciplines (Mitleton-Kelly et al., 2018). Moreover, the complexity perspective is relevant in relation to the CIs at different levels: looking at interactions between creative practitioners in designing products and processes, interactions between CIs within local clusters or the role of cultural infrastructure within city and, at the macro level, the interaction between creative

products and their global markets. It is also particularly relevant to the understanding of the connections between the CIs and local and global communities from both a production and a consumption perspective (Malik et al., 2017). In fact, the production-consumption relationship is a classic complexity challenge with non-linear emergent dynamics. This could be considered the ‘horizontal’ axis of a complexity matrix that has micro mesa macro as its ‘vertical’ axis, as production-consumption can impact from idea generation to global market outputs.¹ Complexity theory offers us the possibility to explore and understand the interconnections across the different levels of understanding of the CIs (micro, meso and macro) as well as the possibility to integrate different disciplinary understandings and findings. As such, it would help to establish a more coherent framework for defining and understanding how the CIs work, but also for exploring further the boundaries of the CIs and their interconnection with communities, labour markets or social values. In order to better understand this complexity thinking it is important to consider the principles that govern this approach (summarised in table 2) and how they can connect to current research on the CIs (table 2, column 3).

These principles are also interconnected by the idea of evolution and co-evolution (Potts, 2011). In particular, within the field of CIs research a better understanding and use of evolutionary perspectives (Berg and Hassink, 2014, Hartley, 2007) can bring even stronger interdisciplinary connections which might include history (Deinema and Kloosterman, 2009) as well as memory studies (Reading and Notley, 2015).

Table 2: The principles governing complex systems (column 1 and 2 are based on Pavard and Dugdale, 2000, Martin and Sunley, 2007, Cilliers, 1998). Column 3 presents examples related to the way these principles can be interpreted/applied to CIs industries research (author’s own elaboration).

Principles and features of complex systems	Explanation	Possible applications / examples in the context of CIs production and organisations ²
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¹ Thanks to Prof. Stuart Cunningham for his valuable comment on this issue.

² It is important to clarify how CIs have proved to be prototypically complex in their organisational dynamics and for some authors (Muller et al. 2009; Caves 2000) have presented network, work and organisational

Complex systems are far from equilibrium	A complex system is never fully stable as its structure, openness and connectivity implies continuous changes;	CIs as both businesses and cultural activities and organisations are always changing: they are affected by market demand, funding and policy changes and they also develop (or shrink) in response to audience's and consumers demand.
Interactions are non-linear	Feed-back loops and self-reinforcing interactions mean that small events can have large impact on the overall system	The decision of an artist to locate in a specific area of the city or to work and collaborate with another artist can have long-lasting effects on the context or a specific art sector, despite the actions being motivate by short-term decision, they can have long-lasting legacy and impact at a large scale. .
Complex systems are open	There is no fixed boundary between the system and its environment. The system is often defined by the observer/researcher for operational reasons, but this is always an approximation	The CIs are an open network of activities, producers and consumers without clear boundaries. Artists, organisers, producers change continuously and so different users or audiences. National and international changes and connections can also have an impact on the system and its interconnection with cultural activities.
Distributed connectivity	Complex systems consist of a large number of agents which interact dynamically; agents and relations take place at a variety of scales, with little possibility of centralised control over the system. This connectivity is often hybrid as it involves human and non-human elements	The CIs are an open network of knowledge and creation, audiences and consumers interact with cultural producers but also with the built environment, the cultural content and with each other. The festival organisers and artists need CIs interact with regional and national cultural agencies, funding schemes, planning and developers as well as with the audiences. The built environment and transport links might be important elements of successful development of CIs
Path-dependence and history	Complex systems can often display path-dependence: they have a history and this often contributes to their present behaviour	It is not possible to understand the development of CIs in a specific place in a vacuum, place and history are significant factors in shaping the development of CIs. Cultural planning needs to take into consideration this path-dependence.
Adaptive behavior and feed-backs	Each single agent is often unaware of the behavior of other agents and the system as a whole (as it is not possible to understand the system by summing up individuals' behavior) but responds to continuous interactions of the system and returning feed-backs	CIs workers tend to interact with others and co-operate in project work. Changes in funding or organisational structures might influence their future decision and cultural production. Similarly, audiences and consumers influence with their choices the kind of offers available.
Emergence and self-organisation	The system tends to organise itself through macro-structures (sometimes soft / ideological infrastructures, sometimes spatial / physical structures). The dynamics resulting from the micro	The artists can organise themselves in communities of practice and new partnerships or can organise themselves in face to face and virtual networks online. Similarly, from an audience perspective common passions or interests can give rise to

dynamics which were ahead of time and would have expanded to other sectors of the economy in future decades.

	adaptive interactions will give space to the 'emergence' of new structures.	interest groups, associations, friends groups or pressure groups towards a common goal.
Non-determinism and non-tractability	Complex systems are non-deterministic. This means that it is not possible to foresee the behaviour of the system from the knowledge of its components behaviour. Due to the nature of the system local and small changes can have unpredictable influence which cannot be traced back to the cause	The decision of a CIs to establish a new festival or cultural activity can have positive impact on the local community or economy. This might have a long-term impact on those audiences or consumers but it will be impossible to trace back those changes to specific events or activities taking place.

The first step to understand complex system is identifying who are the agents interacting in this system. These can be both human and non-human elements as also explored by Actor Network Theory (Whatmore, 2017) and this is particularly relevant to the cultural field as non-human elements such as a specific place or a specific idea or creative creation can have powerful influence on the overall outcomes of a piece of piece of performing art or global market dynamic (Potts et al., 2008a). It is also important to consider that while our focus here is on the understanding of CIs, many other factors (cultural and non-cultural) need to be taken into consideration in a truly complex perspective. The openness of a complex system implies that the geography or historical context, or its policy and politics, although external to CIs per se' can impact the development and emergence of that field. Furthermore, all of the principles highlighted in table 1 apply across the scale and level of analysis and considerations. For clarity, we here highlight how these scales can be interpreted and understood in relation to the CIs, however as complex systems are open also the scale of analysis are interconnected at any point in time.

2.1 Micro-level: ideas, practices and content creation

By micro-level here we refer to understanding creativity and creative practice which are at the core of the CIs by focussing on creative individuals (cognitive and practical skills, creative expression), creative processes and methods (how ideas are generated, theories of creativity, methods for generation of solutions), as well as creative outcomes and products (understanding artefacts and their characteristics).

Co-evolution and co-creation dynamics: We know that evolution has been widely used as an analogy for understanding creative processes, practices and outputs (whether products,

artefacts, artworks or architectural objects). However, rather than being a linear evolution, from a problem to a creative solution, many research highlight the iterative nature of creation as problems are often ill-defined or not even defined and co-evolution – where problems and solution happen often in parallel or adapting and building on each other (Dorst and Cross, 2001). The concept of co-evolution in fact brings us into the realm of complexity science as it embraces two crucial complexity concepts: *emergence and inter-connectivity*. In particular, here the focus is on understanding the creative process – how new ideas, content and solutions are generated – often through processes of co-evolution and co-creation (Füller et al., 2011). The notions of co-evolution, self-organisation and emergence can be applied to the relationship between products, processes and production systems (Varga et al., 2009). This pushes researchers towards a better understanding of creative work and creative ideas, beyond the ex nihilo work of an individual genius, which has been a predominant framework historically, towards a new ‘group genius’ (Sawyer, 2017).

Artistic practice and work as micro-networks: Within this micro-focus the numerous reflections of research on the nature of artistic practices and creative work. These range from reflection how creative ideas are generated (Badke-Schaub et al., 2010, Gruber, 1988) to the inner workings of artists minds (Jamison, 1989). It also extends to reflections on the nature of creative work, balancing different identities (Taylor and Littleton, 2016, Nixon and Crewe, 2004) and emotional dimensions (Hesmondhalgh and Baker, 2008) with self-expression often beyond paid contexts (Brook and Comunian, 2018). The role of policy in promoting, protecting and defining creative work has also been questioned (Comunian and Conor, 2017).

Convergence of content and creations: linking aspect of content creation with range of commitment towards creativity as a profession we find emerging work on the convergence of cultures and practices that surround the previously two distinct spheres of production and consumption (Deuze, 2007), this is particularly important in relation to UGC (user generated content) and social media entertainment (Cunningham, 2018). Bank and Deuze (2009) question how it is possible to capture the value generated at the meeting point of user-created content and user-led innovation. They question the implications for both creative work as profession but also as a form an expression and the importance of focusing

on the participants to see how they connect ideas and possible new practices and meanings (Banks and Deuze, 2009)

2.2 Meso-level: Complexity, Networks and Collaborations

By meso we refer to the dynamics and connections which links across individuals (creative practitioners) and companies in the CIs and beyond. In particular, we are interested in how they interconnected (collaborations, knowledge sharing, networks), the motivations behind these interconnections (economic, social, cultural) and the platforms that are created as meso-structures to support this collaboration (online platform, local clusters, a business and others). One of the main perspectives of complexity thinking which is key to research in CIs (and social science in general) is that it accounts for dynamics and changes which are non-linear and affect the system rather than simply considering the singular linear trajectories of single units (individuals/organisations) which are part of this system. Complexity theory allows us to capture some of these dynamics and understand changes and emerging patterns across the system. While having a better understanding of how agents, networks, events, organisations or performances comes together can provide us with new tools to argue for their value and how they work. However, “complexity theory implies abandoning a causal prescriptive view as while we can make and acknowledge all intervening changes, we cannot predict how the system will behave and respond as a whole” (Comunian and England, 2018a, p.178). Here it is important to consider the concept of learning as central as it connects individual element but often happens in shared and collective settings (Fenwick, 2008) and how knowledge it developed ‘in action’ (Amin and Roberts, 2008). These networks are never stable. They change and evolve to respond to the circumstances. Nevertheless, “networks (form) and interaction (process) are the cause and the ‘glue’ that give rise to and sustain phenomena, ‘generating’ meaning which is then embodied into matter” (Doak and Karadimitriou, 2007, p. 210). The literature on CIs is particularly focused on the networks dynamics that characterise the sector. These can be particularly articulated in two areas:

Creative teams and organisational networks (e.g. interactions, communication, social structures). These are often people brought together by a project structure, for example creating a film or delivering an advertising campaign. The most obvious example is the one

of an orchestra (Khodyakov, 2007). The research on organisation and creative dynamics within creative businesses or within creative teams in other businesses has received a great deal of attention from business and organisational academics (Ruef, 2002, Maguire et al., 2006). While this research is not often read or used in broader discussion about the development of the CCIs, it clearly has a strong bearing within the complexity framework (Martins and Terblanche, 2003, Paulus, 2000). We reflect on the implications of siloed knowledge in relation to CIs in the conclusions of the chapter.

Inter-firm, project-based networks and place-based networks. The characteristics of creative work and production which often implies the coming together of very specialised workers for short period of time (Townley et al., 2009). It also means networks and collaborative dynamics across firms and individuals (freelancers) has been studied in depth in the literature (Rossiter, 2006). It is often asserted that CIs were the harbingers of post-fordism and in many ways project-based work as in the last two decade expanded beyond the CIs. However, many studies on CIs (Scott, 2002 on Hollywood; Grabher, 2001 on London's advertising industry) have highlighted the idiosyncratic nature of project dynamics in this industry and their embedded place-specific nature, which has made it harder for other industries and places to copy models and frameworks (Grabher, 2001, Scott, 2002). The importance of strong and weak ties as well as the role of brokerage is also an area of important research (Lingo and O'Mahony, 2010, Daskalaki, 2010) as well as the role of mobilities (Comunian and Jewell, 2018).

Beyond production networks, there is also in the field a booming literature on the role played by gatekeeper and cultural intermediaries (Negus, 2002, Nixon and Gay, 2002) in linking across creative producers and practitioners and markets and audiences (Foster et al., 2011). These studies highlight the distinctive nature of gatekeepers and intermediaries as they not only shape and influence production and creation (for example in the visual arts) but also consumption, taste and imaginaries (O'Connor, 2015). Finally, the role of networks and complexity clearly emerges also in the way products gets to market and enter in contact with consumers and audiences. (Potts et al., 2008a, Potts et al., 2008b). The role played by networks structures and place-based interconnections has also macro-level implications (next paragraph) in particular in relation to the development of localised clusters and cultural quarters and beyond that also global production networks and structures.

2.3 Macro: creative urban and global structures and dynamics

The complexity approach means that many of the micro and meso level interaction we have just addressed can result into macro-outputs which are visible at a much larger scale. The characteristics and nature of creative work and CIs -often based on temporary contracts and bringing together a 'motley crew' of skills (Caves, 2000)- means that the importance of networks and structures needs to be understood as a complex system of collaboration and interaction, which often give rise to super-structures (Wellman et al., 1996). The complex set of collaboration, exchanges and feedbacks reflect different stages of the development of these networks, sometimes they are temporary-networks, sometimes they are moved by cooperative behaviours and sometimes competition comes into play. Here impact and emergence can connect with broader economic development beyond the CIs (Müller et al., 2009, Bakhshi et al., 2008a)

Here the scale also be defined at different level from an area of a city being regenerated and becoming a hot bed for artists and creatives (Green, 1999b, Green, 1999a) to the whole urban context (Comunian, 2011). From a regional dimension to the evolution of national CIs production system (Berg, 2016) and global markets as well as cultural globalisation (Skinner, 2007, Hannerz, 1992, Urry, 2005) to knowledge 'commons' (Hess and Ostrom, 2007).

How does complexity research inform the understanding of these larger structures and their dynamics?

Macro-structures and global trends as complex phenomena: complexity thinking has great potential in helping to map the global changes that affect the creative economy. In particular, the mergers and acquisition patterns that develop through time can be mapped and understood via complexity thinking as co-evolving structures (Chan-Olmsted and Chang, 2003, Caldart and Ricart, 2004). Similarly, if we look at innovation and product development longitudinally through time, we see that complexity plays a role in mapping dynamic changes and actors within organisations to understand emergent patterns and motivations (Frenken, 2006, Bonifati, 2010, Potts, 2007). Furthermore, as others highlight complexity offers powerful way to explore where demand and product creation meet and how demand and consumption creates and shape markets globally (Potts, 2011, Potts et al., 2008a)

Agent-based modelling and creative dynamics: in order to understand macro-dynamics and structures developed in cities and regions, a valuable complexity approach has also been the one of using agent-based modelling (ABM) (Albino et al., 2005, Liu and Silva, 2013,

Malik et al., 2015). As Malik et al. (2015, p.2) explain “cities as a whole are greater than the sums of their constituent parts, which can only be explained by the underlying dynamism of their socioeconomic environments. One way to explore such complex systems is through ABMs, which simulate social systems from the bottom-up, thus allowing the emergence of previously unexpected macroscopic phenomenon from individual level interactions”. This approach allows for example to explore and simulate what kind of relationship exists between land-use, mobility and social factors, such tolerance on the overall economic performance of a city (Malik et al., 2015).

3. Bridging scales and breaking boundaries

In this chapter we argue the great challenge to push CIs research forward is breaking the boundaries by pushing research across scales. Therefore, this part of the paper looks at some examples of this kind of research, conducted by the author, as an opportunity and considers the advantages and insights brought by this approach as well as the limitation and challenges. Examples and reflections below are drawn from two projects and case studies. One focusing on the connection between micro and meso, and one trying to bridge the micro and meso level with long term macro outputs.

3.1 Complexity from creative individual practices to place and networks

One important question, which still requires further consideration in academic research, and connects micro and meso-level in the analysis of CIs is: how does place and its characteristics - as well as learning and network dynamics - influence the development of creative ideas and their content/form? We argue that the reason this kind of questions are not often addressed, it is because they bridge scales but also disciplinary interests and silos. In fact, content and form of artistic creation are usually something that is of concern to cultural studies and humanities scholar, while place / learning / networks something more of interest to social scientists including geographers and economists. This also connects with an interdisciplinary interest in the symbolic, that crosses cultural studies, communication and geography (Lash et al., 1993). To address this challenge, we illustrate the work undertaken as part of an AHRC funded collaborative research project¹ trying to understand creative ideas development in the context of a performing art festival. During this project we were able to explore how a complexity approach would facilitate a better understanding

of how artistic work was interconnected with place, audiences and other external factors (Comunian and Alexiou, 2015). In the context of the project we explored the creative production of artists involved in a street art festival in UK (Fuse, Medway). We were interested in understanding how the idea of that specific performance came about and developed. In order to do so we asked them – during a semi-structured qualitative interview – to also draw for us a cognitive map of the process and development of that idea. While cognitive mapping can be used in a range of other contexts and framework (Eden, 2004) in the project we used cognitive maps as tools to express and visualize interactions, processes and knowledge exchanges, in order to capture the development and learning by interaction (Nooteboom, 2000) which characterize creative practice. We were both interested in the content and form that the creative product (in this case a performance) as well as how it was shaped overtime both by the thinking of the artists and its interaction with others as well as context or production issues he/she was faced with. The qualitative interview allowed us to capture the process and learning over the time development of each idea, while the maps allowed us to think of the role that other people, places and audiences had in its development and shaping. Here we see the bridging also as an important element when researchers try to connect individual with collective learning and their continuous interaction (Fenwick, 2008). In this project complexity provides also a method for understanding and describing how uncertainty and feedback inform each project and ultimately influence artistic practice. The findings highlight how people, places, external factors, and audiences play key roles in terms of development and performance, contributing significantly to the success or failure of projects. The network representations and analysis in fact unveiled important aspects of the interactions between elements. It exposes connections between human and non-human elements (spaces, events, resources), which influence the ability of artists to deliver their projects but also influence the nature of these projects (often in unpredictable ways). Links with places have the more influential impact for the dynamics of production, but audience feedback, and external influences (often perceived in terms of constraints and opportunities) also provide catalysts for further actions. Especially important is the temporal element of these connections. Some of these connections play important roles at specific times in the development of a project; while others remain influential throughout. All of these reflections emerged within a complexity

framework and are not otherwise evident from simple consideration of, say, the verbal accounts of artists' experience (Comunian and Alexiou, 2015).

3.2 Complexity and evolution from individual decision to macro-outcomes

The second project – undertaken also in connection with AHRC research grant² allowed the research to look at the changes and development overtime of two glassmaking clusters in the UK, Sunderland and Stourbridge (Comunian and England, 2018b). Here the research was looking to the individuals involved in glassmaking but also the companies and support organisations that developed in the cluster. The focus of the research however was not the nature or production of the current clusters but their connection with the past and previous industrial production of glass in the two locations. The complexity approach here connected interviews with makers and policy makers with a lot of archival and historical work to look at the cluster and the knowledge and skills that defined it, through time. The importance of connecting with historical/longitudinal development is often underestimated in CIs research, despite evidence from a range of disciplines about the important of this approach: from the arts and the work on individual creative production development, to social science emphasis on the relevance of cultural and economic geography, to humanities and the role of cultural history. These important inputs are often undervalued in CIs research, showing again a siloed approach to knowledge and understanding in this field. The project responded to other research, like Berg and Hassink (2014), highlighting the limited amount of research that tries to present a long-term perspective on creative clusters development and their link with historic evolutionary perspectives. It also engaged with Holling's (Holling, 2001) 'cycle of adaptive change' as a tool to understand dynamics and changes in ecosystems, focusing on the changing processes of destruction and re-organisation alongside growth and conservation from the industries past to the post-industrial and potentially digital future. The project specifically explored the re-organisation phase, particularly how knowledge and skills which were part of the local industrial production systems might be re-organised in new forms of creative, studio-based production within craft. Here the complexity approach allowed to specifically consider the importance of longitudinal research (Comunian and England, 2018b, Gibson, 2016). It also allowed to consider the role of individuals and organisations not only in a contemporary cluster but in its evolution overtime and exposed how long-term creative outcomes can be the result of

industrial restructuring, therefore how the creative economy is much more interconnected with industry and history of production than the contemporary discourse recognises (Varga et al., 2009)

4. Conclusions and future research

This chapter has tried to consider the value that complexity thinking and complexity theory can bring to the current research on CIs. Its main premise is that we cannot successfully research and understand the CIs without looking at their multiple interactions and interdependencies with systems across different scales and across different disciplinary foci. Complexity theory allows us to capture some of these dynamics and understand changes and emerging patterns across the system. The concept of system is needed to broaden our understanding of CIs, including making better sense of the across scale. Furthermore, the impact of larger phenomena of convergence and globalisation requires that researchers adopt a systemic view. It is interesting to note that while having a better understanding of how agents, networks, events and performances come together can provide us with new tools to argue for their impact or improve their work, complexity theory implies abandoning a causal prescriptive view of a system: while we can record and acknowledge all intervening changes, we cannot predict how the system will behave and respond as a whole. We need refrain from looking at complexity as a new panacea as it “has demonstrated the existence of an underlying order, it has also called attention to a variety of ways in which the complexity of that order can collapse into pervasive disorder” (Rosenau, 1999, p.59) and this has clear implication also for how complexity approaches might be disliked by policy makers or others looking for clear development strategies emerging from academic research. Furthermore, others have highlighted complexity theory does not account for power relations (Comunian, 2017) and therefore should be integrated with political economy as well as a political ecology of creativity (Bennett, 2009). In other word, we need to avoid from reducing complexity science to a metaphor and detach too much our research from the materiality and nature of CIs work and practices As Fenwick (2012, p.159) argues “complexity research that is grounded more carefully in the actual dynamics of radical contingency, irreversibility, nested systems and strong emergence could offer important insights about the circulations of power and the intersections of conflicting system interests”.

We also agree with Martin and Sunley (2007) in highlighting that while complexity theory can offer a wider framework for CIs research, more work needs to be done to translate the value of this approach in applied methods and approaches that integrate interdisciplinary thinking to operationalise complexity theory for CIs. Beyond simply taking methods and approaches like multi-agent models and dynamical systems models to use them in CIs research, it is important to think to what complexity means for how we understand and study CIs.

However, in order for more research to be developed following a complexity framework, changes need to happen also across other research structures and practices. First of all, academic research seems to still be in silos, with many barriers to truly multidisciplinary work (Stirling, 2014). Complexity work however requires different disciplines and perspectives to bridge scales but also methodological barriers (Mitleton-Kelly et al., 2018). The silos are also often preserved by outdated funding systems and publication structures (Rafols et al., 2012) which do not reward multidisciplinary work. However, there are encouraging signs in UK and other countries that seem to value new perspectives across subjects and academic and non-academic partners (Bakhshi et al., 2008b, Comunian and Gilmore, 2015, Niedderer and Roworth-Stokes, 2007). Secondly, beyond interdisciplinary work, complexity research requires a funding structure that allows not only for larger projects to take place but also for longitudinal work (beyond 3-5 years frameworks) to build long-term perspectives on change and development or for data collection to be repeated at different points in time to account for history and patterns to emerge (Comunian and England, 2018b, Gibson, 2016).

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