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The creative economy and the triple transition

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This study examines the role of culture in the Triple Transition, a task that it argues requires rethinking how we understand culture. It argues that these questions rest on a further problematic relationship of culture and development, challenging the normative idea that culture is an instrumental communication tool that facilitates development. The study argues that we need to appreciate culture in development, namely as a system of practices, values (economic, environmental, social, and cultural), and institutions that are embedded in places and times. We review the impact on, and of, the culture and creative sector in each dimension of the triple transition: digital, social, and environmental. The review of findings across the areas of the triple transition (digital, social, and environmental) suggests that culture plays an intrinsic role in development, better described as a driver of change rather than a bystander.

KEYWORDS

creative economy, culture, development, heterodox approach, triple transition

Introduction

The normative economic development agenda, characterised by its reduction to economic growth, has been increasingly questioned. The late 20th-century push towards globalisation has not solved but merely delayed a further crisis, not just of economic growth but also of social thriving (Hurrell and Woods, 1995). This is evident in recent debates about the current poly-crisis of coronavirus disease (COVID), austerity, and trade barriers, where there is further questioning of the fitness-for-purpose of extant development models that expect economic growth to drive positive social outcomes (Helleiner, 2024; Jacobs, 2024).

To address these negative outcomes, on the one hand, the UN has encouraged nation states to pay renewed attention to non-economically reductive development goals (in subsequent iterations: first millennium, then strategic, and the 2030 goals), causing policymakers to focus on a range of social dimensions of economic development (Sachs et al., 2019; Verina et al., 2021). On the other hand, organisations such as the OECD and the EU have identified the imminent challenge of the 'triple transition' (3 T) as an opportunity for social interventions that can modify both process and outcome (Anna, 2021; OECD, 2023).

In this latter formulation, economic development is challenged in two dominant dimensions. First, digitisation is changing the nature of economic change and innovation: from the way work is done to how the benefits of labour are distributed. Second, we are confronted with the environmental crisis precipitated by fossil fuel use, which has led to global warming and is increasingly impacting our ability to sustain life on the planet. The 3 T formulation highlights a third component, the social, that foregrounds the inequalities implicit in declining wealth and opportunity, increasing poverty, and declining quality of working conditions and social welfare. Discussion about the triple transition highlights both the separate and the co-dependent nature of the three transitions and the necessity of finding a new development model that achieves positive outcomes in all three dimensions (Caro-González et al., 2023; Schröder et al., 2024).

While it is very positive that conceptualisations of development have shifted from an economically reductive model to a broader social (digital and environmental) one, it is notable that there has been a general failure to consider the role of culture. Of course, a normative model of development (the 'culture and development' approach) views culture as primarily a means for communication and social cohesion that is commonly deployed instrumentally to support 'real' economic development initiatives (Gasper, 2006). This cultural gap is also evident in the 3 T model. Additionally, we note that culture is notably absent from the UN SDGs (Zheng et al., 2021).

This study aimed to examine the role that culture might play in the 3 T, a task that we argue requires rethinking how we understand culture. Furthermore, these questions highlight a problematic relationship of culture in development. A case in point is the conceptualisation and understanding of what we will term Culture and the Creative Sector (CCS).[1] We will argue that we need to appreciate culture as a system of practices, values (economic, environmental, social, and cultural), and institutions that are embedded in places and times. Only by applying this approach can we begin to understand better how and in which ways the Triple Transition will either shape or be shaped by the CCS in Europe.[2]

The triple transition

The 3 T—social, environmental, and digital- frame the key issues currently facing European economies. The way that we understand and conceptualise the development of the 3 T affects how we choose to respond in policy terms. It is not the objective to critically review this formulation here, but rather to sketch its parameters and underpinning ideas and to explore the consequences of the relation that they have to culture, or more particularly, to the CCS.

The three fields of the transition have their own distinct issues, but they also have an interactive character; this is perhaps best formulated by the social element, which is often seen as a potential mediator, or pivot, through which to refocus the digital and environmental transitions (OECD, 2023). The digital transition is the manifestation of technological substitution of labour and increased process efficiencies through non-material mediation. This is part of a longer-term process of mechanisation and dematerialisation of production. Digital technologies, in particular, are enabling faster communication and exchange of information, as well as the repackaging and reordering of information and the creation of entirely new product/service categories.

The green transition has been driven by the recognition of the impact of CO_2 emissions on the atmosphere, which is causing global warming and related effects on living conditions. Related to this system change is sustainability, namely the conservation of finite resources, the impact of extraction, and the problem of waste (and its impact on humans).

The social transition signals concern about persistent inequalities in wealth and life chances (especially between social groups, with gender and ethnicity being the most prominent). These are structural and spatial inequalities associated with the distribution and access to resources, the profits from processing into products and services, and the waste streams flowing from them. They are further compounded by 'natural' changes resulting from two intertwined demographic transitions: the boom in the youth population (especially in the Global South) and the increased longevity of the elderly in the Global North. Moreover, the social transition points to the persistence and increasing precarity of working lives, differentiated by gender, generation, ethnicity, and place.

Each of these transitions is significant and complex in its own right, and is both amplified and complicated by the interactions among them (Caro-González et al., 2023). It may be argued that this essentially political representation of the problems facing Western economies is itself partial, as the problem rests on a further set of issues associated with major economic transitions over the last 50 years. In this sense, at least two dimensions can be highlighted: the changing organisation of the institutions of the economy and the reordering of the role of the state. The past century has seen the rise and fall of the state as a manager and organiser of economic and social life; the last 25 years in particular have been characterised as a retreat of the state in scale and scope of legitimacy and funding (Lipietz, 1992). In terms of economic organisations, a massive cycle of growth and concentration of power in multi- and transnational organisations, and then in the crisis of the 1970s, a reconfiguration of economies from Fordist to post-Fordist or flexibly specialised production; this itself has given rise since the 2000s to the rise of the platform economies (Doctorow and Giblin, 2022; Chalaby, 2024): it is these changes that frame the 3 T.

The study aimed to provide an initial critical review of the implications for the cultural and creative sector of the European 'triple transition'. It has been suggested that the cultural field could act as a sort of super-social regulator by articulating change in more positive directions, stressing the intrinsic value of culture as a means of communication and cohesion, and its use as an instrumental salve to the 3 Ts (Verina et al., 2021; Caro-González et al., 2023). This echoes the way that culture has been instrumentalised in debates about development, so-called 'culture and development' approaches. This study seeks to question the underlying conception of culture and its use; rather, it stresses the intrinsic and generative role of the CCS in economies (in fact, this is a neglected characteristic of modern economies: the culturalisation effect (Lash and Urry, 1993)). In so doing, it points to the value of exploring a 'culture in development' approach, or simply understanding culture not as an externality, but as an intrinsic part of the current transition.

1 We use the terminology Cultural and Creative Sector to align with current EU usage (https://culture.ec.europa.eu/cultural-and-creative-sectors/cultural-and-creative-sectors). This closely corresponds to UNESCO's notion of the Creative economy (Unesco_Institute_for_Statistics, 2009). Framework for Cultural Statistics. Paris, UNESCO. Framework for Cultural Statistics. Paris, UNESCO., as well as previously popular terms such as the Cultural Industries (Pratt, 1997). Critically, these terms include both the traditional and state-supported culture and commercial culture. Strictly speaking, the Creative Industries refer only to commercial and for-profit activities, in contrast to the state-supported and non-commercial heritage and cultural activities (which are not included in the terminology).

2 The situated character of the development process means that the commentary is specific to the particular combination of conditions in Europe.

What is culture and the creative sectors?

It is perhaps not so surprising that culture has been, and continues to be, seen as peripheral to core questions about (economic) development. Culture suffers from a representation problem with respect to both economic discourse and conceptualisation. The dominant view is to treat the prominent modality as separate from the economy, with a different value system. We review this problem in two parts: the relationship between culture and development, and the definition of the CCS.

The relationship of culture to development

The normative formulation of culture and development is twofold: culture and the relationship to development. The so-called 'culture and development' model entails a fixed idea of culture and its instrumentalisation (by an outsider) to facilitate economic development/growth objectives. It is a model that is interwoven with an economic orthodoxy of the narrowness and generalisability of economic development (within which culture and technology are 'externalities').

Clearly, there is extensive debate about these issues, and it is not the objective of this document to explore them here. Suffice to say that the challenger position views culture as diverse rather than unitary, and culture as a system of practices embedded in institutions and expressive of values (different from economic ones). Simply put, this establishes culture as an intrinsic value, alongside, but not reducible to, economic value. Moreover, this opens the possibility of culture being pursued for its own sake, not simply instrumentally. van Nieuwenhuijze (1986, p. 107) inverted economists' presumptions, proposing instead that 'everything must be taken as culture-specific until it is proven to be general'. Moreover, as Klamer et al. (2002) and Klamer (2017) points out, it is also important to challenge the reduction of culture to a unitary value, instead recognising the plurality of values and the consequential challenges to decision-making systems that account for this spread of values.

While such heterodox views on culture, and its relationship to development, have found purchase in the development literature and policy debates, the idea of culture and development, and a unitary reduction to a cultural value, are still found underpinning arguments about urban and regional development in Europe.

A consequence of culture being characterised as external to the economy is that, within conceptions of development, it is also seen as peripheral. This does not mean it is ignored; rather, it is viewed instrumentally, as something that would facilitate economic action, often via social mediation or communication. This is an approach which we can refer to as culture and development (Sen, 2000). It reflected how culture has been used in development projects and in urban and regional regeneration. From such a viewpoint, the intrinsic value of culture is downplayed with respect to its potential instrumental value. A contrasting approach is that of culture in development, where the intrinsic value of culture in terms of social meaning and well-being, as well as the economic value of cultural activities, is seen as central (in which development, or regeneration, is instrumental; Gasper, 2006; Pratt, 2015). Such an approach is consistent with a heterodox framing of 'the economy' that in effect internalises what has previously been 'externalised' (e.g., culture, technology, cultural and social relations; Freeman and Louçã, 2001). Such a reframing allows a pluralist notion of cultural and economic values, in which (all) values are constituted in specific places and times rather than universalised.

The CCS is an evolving concept

Traditionally, culture was characterised dually. First, high culture and symbolic representation, as represented by the fine and plastic arts, in which the craft form and individual artistic endeavour are valued above manufactured and mass production. Although culture was regarded in this view as a social good and as constituting identity and meaning, it was not seen as an essential part of (economic) life but as separate and subservient to it.

However, in the last century, empirically, the CCS has become an increasingly important part of economic life. The CCS has evolved to become a radical hybrid spanning mass distribution and mass production, as well as craft and artisan production, the for- and not-for-profit, formal and informal, and converging across (previously separate) cultural forms, and collapsing the boundaries with 'the rest of the economy'. However, in part due to this shape-shifting and in another part due to its 'newness', culture remains only partially visible through the lens of economics. Accordingly, the challenge is to reconceptualise the CCS and to define and measure it.

The CCS was largely invisible in the sense that no consistent economic data were collected that sought to identify it until the dawn of the 21st century. Traditional statistical measures reported on the number of artists and those employed in the mass media. Generally, culture has not been conceptualised as an industry, but rather as an aspect of consumption. Artists and venues, and the turnover in cultural products (film, music, books) were registered, but the picture was not stitched together. It was only at the turn of the century, when governments began to attempt to measure employment and economic output, that the CCS was taken seriously.

Initially, the field was conceived of as the arts (heritage, museums, theatre, classical music, and fine and plastic arts). These activities accorded with the culture supported by state funding, justified by a market-failure argument, and therefore had to be supported for the public good. An anomaly was the mass media part of which was state-funded (television and some film), and part of which was commercial (film, then later TV, publishing, and popular music). It was the growing power of commercial culture (which suffered from being designed as low, or mass culture) and its impact on consumption and public participation that undermined this first model of arts and culture.

The new iteration was based on the economic power of consumption (driven by a growing, independent, and richer youth culture). Early debates used the term cultural 'industries' to signal this transition; at the turn of the 20th century, the notion of the creative industries sought to acknowledge and refocus this debate. The conceptual core was of the industries based upon copyright use, transformation, and earnings. However, later versions recognised the growing legitimacy and diversity of cultural forms (termed domains).

In the current iteration, the culture and the creative sector (CCS) seeks to embrace the duality of cultural forms. In part, this is acknowledging the convergence of cultural forms in practice and is

further enabled by digitisation. In the other part, it recognises the boundary-spanning characteristics of CCS across formal and informal, for- and not-for-profit activities, and 'high' and 'low' cultural forms. This fundamental recognition of the relational dimension of culture (context of other cultural forms and with non-cultural forms) is critical. In the CCS model, the relational dimension is further extended to the production process: namely, the cycle of activities from ideation, through making, distributing, exchanging, and archiving, and back again to ideation.

Accordingly, the CCS model has two dimensions: a breadth of cultural forms (which is ever changing), and a depth related to the necessary functional process entailed in manifesting a cultural good or service. This can be characterised as the five phases of creative reproduction: ideation, making, distributing, exchanging, and archiving; these functions are articulated together in a production ecosystem. Recent research has highlighted how such production systems (or ecosystems) are embedded in places (and the social, economic, cultural, and environmental conditions) that constitute them. Such a revised conception of the CCS has led to data and measurement lagging because statistical data collection conceives of the economy as it was 50 years or more ago, not as it is now. The most grievous aspects of the CCS, such as computer games, simply did not exist then and still do not exist in official statistical taxonomies and datasets. Many aspects of the CCS remain uncounted and invisible. As measurement of the CCS has developed, the picture that has emerged is of a significant player in local and national economies, in terms of jobs and output, as well as in cultural expressions (Unesco_Institute_for_Statistics, 2009).

Alongside the statistical existence of the CCS, a further significant (structural) transition has taken place, namely, the development of the mass media. The mass production and consumption of cultural products and services, coupled with rising disposable income and an increasing share of that income dedicated to culture, are contributing to this trend. In combination, culture became a significant part of developed economies (film, publishing, and TV). Of course, with digitisation this transformation and associated growth have been supercharged. We now view content creation as a driver of the digital economy.

In addition to the structural transformations of CCS, we have the spatial. This is not simply the acknowledgement that culture is produced differently in places, but that the organisation of cultural production is not confined to those places; it can be spread across places. The work of researchers exploring the development of Global Value Chains (GVC) has been informative in seeding new insights into the CCS (Coe, 2015). It was common to assume that cultural production was unique to and particular in various places. However, inspired by GVC analyses that follow the supply chains of goods, CCS researchers have examined the ecosystems of cultural production that share, in diverse ways, the extended flows of goods and services across nations and continents.

Understanding the impact and consequences of the CCS is improved by an appreciation of its structural and organisational characteristics (Pratt, 2009; Pratt, 2012; Pratt, 2017). First, as noted above, CCS is a network production; however, not all network forms or organisations are the same. In the last century, the cultural field, like all others, has shifted from a normative large-corporation model to one comprising many small- and micro-networked organisations, in no small part as a strategy of risk minimisation. The CCS is a high-risk activity in early adopters of this organisational form. The CCS is characterised by a small number of very large organisations and a huge variety of micro-enterprises and self-employment. This creates operational risks around intermediation and employment precarity. A second characteristic of economic organisation, exemplified by the CCS, is the project-based company: a form of temporary alliance that is formed and reformed in a serial project manner. This is quite different from the rest of the economy, which has a greater representation of mid-sized companies and comprises a life course in which permanency is the norm. Finally, the economic form of the creative sector is one of 'winner takes all', with limited space for later entry to markets; first movers tend to monopolise (Frank and Cook, 1996). These characteristics are all given an extra twist by the short turnover time, the time between new products, which in the CCS is very short.

The peculiar aspects of the sub-division of rights in CCS between author rights which is a rent on the idea, plus mechanical rights, a rent based on sales was difficult to operationalise in analogue times (where physical goods were used as proxies), but with digitisation there is a potential for 'pure play'; however, there is the possibility of an infinite sub-division are reappropriation of rights. As rights are translated into rents, this creates a fast-evolving field. Notably, the negotiating rights of platforms can have a structural shaping of cultural production.

Bringing all these elements together, we can see that the CCS is an unusual hybrid of unstable elements, flexibly organised and uniquely situated. In fact, such a condition of flux can only be maintained within a supportive ecosystem in which fast-changing labour, technologies, and audiences can be found. This is why the notion of the ecosystem has become popular: it represents the elements of the production cycle, articulated by art forms (De Bernard et al., 2022). In line with the analysis of GVC (Pratt, 2023), it is also recognised that CCS systems are unevenly embedded in places, and the balance of cultural and economic value by place varies (Pratt, 2008).

The normative understanding of culture implies that such activities would have little environmental impact. However, an appreciation of the networked nature of cultural (re)production reveals complex environmental impacts, as well as nuanced social and digital ones.

The triple transition, culture, and the creative sector

In this section, we deploy a reframed conception of the relationship between the CCS and development and an institutional perspective of the CCS to review the impact and relationship of the CCS to the 3 T.

Digital

The digital transition has had a significant impact on the CCS. However, the seeds were planted in the analogue age via the development of mass production of CCS. The possibility of recording, cheap reproduction, and distribution of cultural artefacts, like the original, opened a massive market for cultural goods, driving an expansion of volume consumption and an increasing diversity of content. Technological developments have continuously expanded

mass media, especially popular music and television. The expansion of the availability of such a range of cultural expressions driven by commercial profits and social changes (notably the growth of youth cultural consumption) challenged the traditional regulatory, cultural, and market boundaries of high and low culture; moreover, they led to the expansion of the volume and the breadth (and future convergence) of cultural expressions and forms.

This analogue model of mass re-production has been further amplified by digitisation, which has reduced the costs of transmitting and storing media that do not need a physical analogue. A critical issue is the so-called long tail, which is the expansion of the archive to an infinite scale (Anderson, 2006). Previously, the limitations and costs of storage and distribution had limited the range of cultural products available; these limitations were reproduced by cultural boundaries of established high and low culture (which the market was eroding for local culture, as people were willing to pay). However, these structuring processes have not been overcome but replaced via digitisation with a new shaping of distribution underpinned by algorithms. Previously, charts, lists, or critical opinion validated the physical restrictions of choice; with digital algorithms being deployed to reproduce a version of restricted choice that maintains the 'winner takes all' economic structure of cultural markets (Frank and Cook, 1996).

This algorithmic curation of audiences is a critical aspect of the emergent economic organisational form of the current age: the platform economy. The digital possibilities of infinite choice are corralled by organisations that own or control both the intellectual properties, the means of distribution, and barriers to access consumers. The business model of monopoly is no longer rooted in physical necessity and is recreated through structural necessities of network configuration (access and availability).

Digitisation enables two forms of disintermediation in the CCS; first, of the distribution from the producer. A characteristic form of 'post-Fordist' economic organisation with smaller contractors limited to monopoly markets evolved in the 1980s. With large media organisations shedding production capacity and instead flexibly contracting it in, hence, minimising producer risks. This produces a bifurcated production system and labour market with a small core and a broad dependent periphery.

The second form of disintermediation is possible with digitisation, namely the very music, or images, that can be de- and recomposed from their smallest (digital) components, such as pixels. In music, for example, what has traditionally been understood as the division of intellectual property rights of authorship, and or mechanical/replay rights is reconfigured. Digitisation creates new possibilities for novel creation and contributions that can be made (relevant to every mix of a song). Moreover, that song can be sold not simply in parallel with physical formats (e.g., as a single, album, or remix) but also licensed to film or video game soundtracks, in an infinite range of reuse, each of which can have an income stream associated with it.

A parallel element here is that human interaction can be monetised via our 'data shadows'; that is, the data produced as we move through, and interact with, the world (Smith, 2016). This data can be captured and used to trigger the delivery of new targeted media (such as playing a 'relevant' advert, or offering a 'personalised discount'). The emergence of people as data and the Internet of Things has created ever-new ways to cross-sell and merge data.

In further correspondence, what were previously separate 'art forms' have experienced a convergence and cross-over (we cannot separate sound from image, or text); moreover, these are being triggered by location-specific triggers. Taken together, we can see the emergence of a convergence of cultural forms and the economy: a dimension that has been referred to as the 'culturalization of the economy' (Lash and Urry, 1993). With the decreasing differentiation of products based on functionality and price, aesthetics or design (cultural signification) is increasingly used as the key differentiator or trigger for the consumer decision to buy or not buy.

The addition of generative Artificial Intelligence (AI) creates specific challenges to the cultural field. First, the fact that Large Language Models (LLMs) have to be trained on human-generated data and are subject to copyright control. Only latterly has there been pushback against LLMs, which have harvested and marketised products based upon creative actions (Chan-Olmsted, 2019). The initial innovation of the copyright regime was to identify the author and to create a means of livelihood via a continuing rent from the use of the property. The immanent breakdown of this model, facilitated by digitisation hits authors in two dimensions, erasing the validity of expression, and the possibility of earning a livelihood through rents. This creates a huge challenge to the continuity and viability of artistic labour and creativity itself (Schuhrke, 2024).

There are other ways in which AI is significant, such as streamlining the logistics of creativity; for example, in image production, where economies can be achieved in planning and shooting, thereby maximising the time spent on the creative process (Connock, 2022). Much of the production of cultural products involves reediting and the creation of special effects, literally the shaping of the product.

So, in summary, digital technologies have enabled an ongoing radical disintermediation of many of their creative components. Furthermore, they have enabled a process of recombination where goods and services are bundled and sold in different product wrappers. Working in tension with this digital and economic possibility is the reelevation of the curatorial role of cultural producers: namely, the combinatorial elements that constitute a creative product, and how audiences are encouraged to consume it. Finally, legal and employment rights have been usurped; hence, legislators are left playing 'catch up', which consequently erodes social protection and security, and cultural rights.

Social

The tensions of the social transition are visible in the CCS. This can be evidenced by the lower average income and the precarious working conditions that are commonly found in the CCS. In the last 50 years, the entire economy has experienced a shift away from stable, corporate jobs towards the relative impermanence and insecurity of small- and micro-firms, and self-employment. The levels of self-employment, 'free work', and working in micro-enterprises are far greater in the CCS than in other parts of the economy (Gill and Pratt, 2008; Pratt, 2012). While this organisational flexibility nominally enables more risk-taking and independence, it is often embedded within an organisational framework that results in the structurally weakest actors bearing the most risk.

Associated with these unstable economic conditions are inequalities within the workforce, in which women, youth, and non-white people tend to have lower pay, and are overrepresented in lower-skilled jobs (based on comparable education and training; O'Brien et al., 2017). This has a compounding effect on the representation of those most visible in the CCS, thereby (typically those on screen, or whose stories get told) compounding under-representation of the population and lack of diversity, and a narrowing of voices and experiences in the culture as a whole (Saha, 2018). While significant strides have been taken by educators and policymakers to address this poor representation, there is still a long way to go. Moreover, a lack of representation now and in the past often leads to poor recruitment in the future, creating a vicious circle. Of course, all of these factors are compounded by the threat of AI replacing job positions, and the systematic diversity bias within AI algorithms leading to further exclusion and under-representation (Parra Pennefather, 2023).

A second dimension of social changes is both the ageing of the population and the wave of younger people entering early adulthood. In the first sense, older populations are less connected to and even isolated by new technologies, and they are more likely to consume older cultural forms. The youth are changing consumption patterns, both as digital-first generations and through their spending power, which focuses on new forms of cultural consumption for their parents and grandparents. As digital culture has become dominantly a consumer and for-profit culture with profound exclusionary effects on the means to shape the power of representation globally (Khussainova et al., 2024). The huge growth of youth in the Global South is leading to cultural consumption patterns being increasingly dominated by those groups and locations, thereby challenging the historical cultural hegemony of the North (Kharas, 2017).

Finally, there is the movement of population to cities; the global population has recently become a majority urban, and a majority of that in the South (Smit, 2021). Historically, the majority of CCS employment and consumption has taken place in an urban context, so this influence will continue to grow. At the same time, we can note the stark urban inequalities in terms of rich and poor that shape the access to all goods and services, and spaces, but especially to the urban cultural experience (Ragnedda and Gladkova, 2020).

A key focus of the social aspect of employment is the decline in the availability of opportunities for decent work and fair and equal participation in the labour force. On the whole, the cultural sector has been a poor relation, economically, to the rest of the economy (partly due to informality and small-scale organisation). Accordingly, the challenges of the social transition are particularly acute for the CCS. They will not be ameliorated without a restructuring both within the CCS and between the CCS and the rest of the economy and society.

Environmental

The global environmental crisis linked to CO_2 emissions, fossil fuel usage, and the use and disposal of pollution-causing raw materials is obviously understood, but it has seldom been linked to the field of culture. Indeed, culture was commonly viewed as having a benign and positive effect. However, the communication possibilities are the media and social communication facilities provided by cultural events to communicate an environmental message. Simply, culture was commonly seen as being of considerable value as an instrument of, but not intrinsic to, behaviour change. Moreover, the development of mass consumption of cultural goods was considered to have minimal environmental impact (e.g., celluloid film, vinyl records, and plastic CDs and cassettes), and its effects were significantly minimised by digitisation and the dematerialisation of cultural goods and services.

However, such a view overlooks several ways in which the CCS has, and is, implicated in the global environmental crisis (Pratt, 2022). The first way is through raw materials. The extensive use of electronics when disposed of can lead to the leaching of heavy metals into the soil and to the release of plastics, which remain in the environment. The use and consumption of raw materials and the production of (toxic) waste are exacerbated by the rapid and increasingly short innovation (fashion) cycle for cultural products, further amplified by digital transformations. Examples are the short life of many products and playback media, and the rapid development and replacement of playback media. From the transistor radio to the Walkman, and iPod, to the mobile phone, the latter has an increasingly short product life cycle and is poorly recycled. Thus, the CCS relies on an infrastructure that is clearly neither sustainable nor environmentally positive (Devine, 2019). Research has identified that the disposal of electronic waste (a significant proportion of which is CCS-related) is responsible for environmental pollution and deleterious health effects (Robinson, 2009; Lepawsky and Billah, 2011). Moreover, this waste is commonly transported across the world for processing and disposal.

A second previously overlooked dimension of CCS impact is through live performance, as best illustrated by major music festivals, which have increased in their frequency and scale. Research has identified the significant carbon footprint of travel to and from such events and the generation of waste associated with single-use plastics for packaging. Research has examined theatre activities, highlighting the waste that could be reduced by recycling set design materials and costumes (Mock, 2023).

Third, a major environmental impact is associated with the massive expansion of 'cloud' storage of data, images, and streaming data flows, which has caused a huge peak in demand. The dramatic growth of data centres to accommodate this demand has enabled users to have the illusion of being dematerialised and waste-free; however, the hidden truth is that data centres consume a huge and growing amount of water and energy (which is used for cooling; Mytton, 2021). Server farms are quickly becoming a significant share of total energy usage, a trend that is growing; moreover, there is evidence of impact on local water availability. While some centres are powered by renewables, many are powered by older coal and gas-fuelled power plants (Monserrate, 2022). The precise proportion of cloud storage dedicated to CCS is difficult to measure, but obviously the geometric expansion of demand from our personal devices strongly suggests that it will continue increase apace (Afzal et al., 2024).

Focusing on the use of electronic media and digital communications is clearly an important aspect of how the CCS reveals a surprisingly large carbon footprint; however, it is not the only one. Surprisingly, one of the biggest generators of pollution is perhaps the clothing fashion industry (commonly physically displaced or conceptually hidden from analyses). First, the reduction of prices and turnover to create 'fast fashion' has led to clothing being used for a shorter period and people consuming more clothing items (but using them less; Niinimäki et al., 2020). Second, these clothes have long chains of production and of (potential) recycling. Like electronic

waste, much of the clothing we discard, which does not go directly to landfill, is exported and processed in the Global South (Robinson, 2009). There is an ongoing challenge to ensure that a significant proportion of such waste is recycled and not simply dumped. Estimates of the carbon footprint of the fashion industry are staggering; recent reports suggest it exceeds that of the oil and aviation industries (Leal Filho et al., 2024).

Recalibrating the position of culture in the triple transition

This study aimed to review the role and impact of culture, specifically, the CCS, on the 3 T. The normative position is that the CCS could have an assistive impact on the transition individually and collectively, primarily, in terms of social cohesion and communication. Little attention is given in normative conceptualisations to any more fundamental contributions of the CCS.

In recent years, we have witnessed significant growth in CCS in terms of contributions to economic output and employment, as well as to regeneration and social transformation. Our understanding of the potential and actual contributions of the CCS is hindered by two interrelated issues: our conception of the CCS and our conception of the role of culture (or specifically the CCS) in development. We also pointed to the situated nature of CCS production, in and across spaces. The lens of the 3 T concept is Europe; however, the social, economic, and environmental flows extend beyond its borders and pose challenges and consequences for communities across the Global South, which are otherwise 'hidden' from analyses.

The study reviewed the current broad conceptualisation of the 3 T and argued that it was overly economically reductive; the transformational technologies, social and environmental processes were viewed as externalities, not primarily economic. Many efforts have been made to incorporate externalities into normative economic calculations by using proxies and shadow pricing. However, it is only with heterodox economics, particularly institutional economics, that a critical element of organisation is fully considered in shaping markets, and their relationship to the state and civil society. A consequence of such a reconceptualisation is to figure culture, and its governance, as multi-valent in character (neither reductive to a singular economic nor cultural value). We compared the normative cultural and development model with one of culture in development. We used such a culture in the development model and the ecosystem concept of the CCS to provide new insights into the relationship of the CCS to the 3 T.

Finally, we pointed out that culture is external to even the consideration developed in the 3 Ts, a doubly external relation. We reviewed how the CCS has been reconceptualised in recent years, from a focus on individual artists and artworks to an appreciation of a cultural production system. Critically, such a system embraces the convergence of cultural forms and the cycle of production, which, significantly, is spatially distributed, but with differential nodes of value added.

The highlights of our review were as follows: In the digital field, we pointed to the culturalisation of the economy, the rapid economic growth based on (cultural/creative) content, (creative) innovation, and creative labour. The environmental dimensions pointed to the 'hidden' costs of the growth in cloud storage and streaming of (cultural) data, and the deleterious impact on energy and water systems; moreover, the increased use of raw materials, and (toxic) waste generated by the increasingly 'fast' fashion cycles in the CCS. Finally, the social elements related to increasingly precarious employment opportunities, decreasing social security for cultural work, erosion of protection for creators' work, and a narrowing of diversity in employment and authorial social position.

In conclusion, this study illustrated various ways in which the CCS fundamentally affects the 3 T, not simply modifying an effect but as an agent of transformation. However, culture is currently relatively invisible as a force in social and economic transformation, and critically, the lack of robust governance support makes it vulnerable: potentially a case of killing the goose that laid the golden egg.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

AP: Writing – original draft, Writing – review & editing.

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