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The Creative and Cultural Industries towards Sustainability and Recovery

Edited by
Marlen Komorowski and Justin Lewis

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Contents

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Editorial

The Creative and Cultural Industries: Towards Sustainability and Recovery

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We are delighted to introduce this Special Issue of *Sustainability*, entitled "The Creative and Cultural Industries: Towards Sustainability and Recovery". During the last several decades, the creative and cultural industries (CCIs) have increasingly been recognized for their role in local, regional, national and supranational economies; as drivers of economic growth, development and regeneration; and for their social and cultural impacts on well-being, place making, inclusion, sustainability, diversity and culture. On the other hand, the COVID-19 crisis has exposed the fragility and precarity of an industry dominated by micro-businesses, freelance and informal work practices and few tangible assets, calling into question the sustainability of economic models based on a high level of precarity in employment practices. This has led to some efforts (undertaken by governments and public bodies) to protect this industry from the pandemic's impact. At the same time, lockdowns have also highlighted the importance of creative activity in maintaining individual well-being and community resilience and the innovative potential of this industry.

In this context, this Special Issue addresses the broader research field of CCIs and its various subsectors, as well as its role in developing pathways towards sustainability, resilience and recovery. The articles featured in this Special Issue offer unique insights, methodologies and empirical evidence that contribute to our understanding of the creative and cultural industries' multifaceted nature. Some notable contributions from this Special Issue include the following:

In "Out of Print: What the Pandemic-Era Newspaper Crisis in Australia Teaches Us about the Role of Rural and Regional Newspapers in Creating Sustainable Communities (Contribution 1)", Olav Muurlink and Elizabeht Voneiff Marx explain that the news industry has been hit particularly hard by the move to online spaces, with dramatic cuts in revenues from sales and advertising. This article investigates Australia as a case study of the collapsing business models for print journalism.

"Cultural Mapping Tools and Co-Design Process: A Content Analysis to Layering Perspectives on the Creative Production of Space (Contribution 2)", by Vanessa Ágata de Abreu Santos and Jan van der Borg, brings together different approaches to investigate a possible structure for multi-perspective layering toward participatory practices in the creative production of space.

"Creative Economy and Sustainable Development: Shaping Flexible Cultural Governance Model for Creativity (Contribution 3)", by Wen-Jie Yan and Shu-Tang Liu, explores the impact of policy on the creative industries, arguing that the humanistic rationality of cultural governance has a significant improvement effect and stable role in promoting the governance of cultural policies.

"The Quintuple Bottom Line: A Framework for Place-Based Sustainable Enterprise in the Craft Industry (Contribution 4)", by Inge Panneels, draws upon an analysis of the craft industry to propose the extension of the sustainable business framework of the 'Quadruple Bottom Line' to the Quintuple Bottom Line (purpose, profit, people, planet and place).

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In "Live Music in the Time of Corona: On the Resilience and Impact of a Philharmonic Orchestra on the Urban Economy (Contribution 5)", Johannes Glückler und Robert Panitz show that COVID-19 posed an existential threat to the music performance sector. This article explores the case of the Mannheim Philharmonic Orchestra in Germany to analyse the regional economic impact and financial resilience of the Orchestra in the face of COVID-19.

These articles, among others, offer diverse perspectives on the CCIs, providing valuable insights for researchers, policymakers and practitioners alike. They contribute to our knowledge base and inspire us to adopt innovative approaches that promote sustainability within these industries.

We express our appreciation to the authors who contributed their expertise and intellectual rigor to this Special Issue. We also express our gratitude to the dedicated reviewers for their insightful feedback and guidance, which were instrumental in ensuring the quality and impact of this Special Issue.

Conflicts of Interest: The authors declare no conflict of interest.

List of Contributions

1. Muurlink, O.; Marx, E.V. Out of Print: What the Pandemic-Era Newspaper Crisis in Australia Teaches Us about the Role of Rural and Regional Newspapers in Creating Sustainable Communities.
2. de Abreu Santos, V.Á.; van der Borg, J. Cultural Mapping Tools and Co-Design Process: A Content Analysis to Layering Perspectives on the Creative Production of Space.
3. Yan, W.-J.; Liu, S.-T. Creative Economy and Sustainable Development: Shaping Flexible Cultural Governance Model for Creativity.
4. Panneels, I. The Quintuple Bottom Line: A Framework for Place-Based Sustainable Enterprise in the Craft Industry.
5. Glückler, J.; Panitz, R. Live Music in the Time of Corona: On the Resilience and Impact of a Philharmonic Orchestra on the Urban Economy.

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Article

Creative Hubs and Intercultural Dialogue—Towards a New Socio-Economic Narrative

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Abstract: This paper argues that creative hubs are enablers and curators of intercultural dialogue. Building upon an internationally funded project bringing together creative hubs from Turkey, Greece, Serbia and the UK, research was carried out through a survey analysis across these four countries with 98 creative hubs and four workshops in co-working spaces (involving 29 creative hub experts). Based on the data collected, this paper suggests a new framework for understanding intercultural dialogue in creative hubs through their spatial and cultural attributes, as well as through their levels of activity. The findings support the argument for a shift from an economic to a socio-economic narrative around creative hubs.

Keywords: intercultural dialogue; creative hubs; intercultural communication; creative industries

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1. Introduction

In the last decade, we have seen the emergence of so-called creative hubs as a concept for bringing creatives together. Creative hubs have seen investment from both public and private stakeholders, which resulted in them developing in cities across the world (Pratt, 2021 [1]). The British Council estimates that creative hubs host the activities of upwards of 1.2 million creatives word-wide (see https://creativeconomy.britishcouncil.org/projects/hubs/ accessed on 20 June 2022). Creative hubs are often used in practice and research as synonyms for co-working spaces that host mostly micro companies, SMEs and freelancers from the creative industries. However, a creative hub is also described more broadly as a *curated* space: a convenor, providing support for networking, business development and community engagement (Matheson and Easson, 2015 [2]; Gill, Pratt and Virani, 2019 [3]). The National Endowment for Science, Technology and the Arts (see NESTA: The value of creative hubs, in Creative Economy & Culture, 16 August 2018.) highlights that creative hubs "house creative practitioners and businesses" which ignite "networks that bring people together".

These definitions pin down, on the one hand, the importance of geographic location, which includes both physical and virtual spaces and on the other hand, the organisation and a set of aims and activities through the management of these spaces that take place, which jointly constitute what a creative hub is. The economic benefits of such hubs—also described as entrepreneurial spaces and clusters—are often discussed in academic literature (Porter, 2011 [4]) and policy documents (and are the reason for the increasing interest expressed through investments and policy initiatives).

We argue in this paper that the value of creative hubs, which we identify as managed spaces for diverse creatives, permeates their organisation, activities and objectives beyond

the often discussed and researched economic benefits. So far, the socio-cultural benefits that creative hubs can contribute to are often overlooked and less understood. We focus in this paper specifically on one specific socio-cultural value to close this research gap: the creation of intercultural dialogue in creative hubs. According to the Council of Europe, intercultural dialogue "is an open and respectful exchange of views between individuals and groups belonging to different cultures that leads to a deeper understanding of the other's global perception" (see Council of Europe: The concept of intercultural dialogue: https://www.coe.int/t/dg4/intercultural/concept_EN.asp accessed on 28 October 2022). Other organisations, which include, for example, UNESCO and the British Council, have also developed their own definitions and highlight the need for intercultural dialogue to advance peace, reconciliation and democracy (Holmes, 2014 [5]).

Taking the importance of intercultural dialogue in our society and for policymakers as given, the question arises: What role can creative hubs play in creating intercultural dialogue? Research has already recognised the potential of creative hubs to act as natural venues for intercultural dialogue, creating positive engagement across cultural groups to strengthen social cohesion (De Leede and Kraijenbrink, 2014 [6]). The nature of creative hubs also highlights the clear links to intercultural dialogue, namely by bringing diverse people together in the same places. However, there is a lack of structured research in this regard.

The aim of this paper is to close this gap and provide structured documentation and analysis of potential linkages between creative hubs' functioning and opportunities for intercultural dialogue to broaden our understanding of the value that creative hubs generate. This paper builds upon an internationally funded project. The 18-month project had the goal of forming a network of creative hubs across the European Union and the Republic of Turkey to foster creative exploration and collaboration that contributes to building a more cohesive, open and connected civil society. The research for this paper took place within the project and utilised the network of participating partners (more information can be found in the acknowledgement at the end of the paper). In bringing together creative hubs from Turkey, Greece, Serbia and the UK, our research is based on desk research, a survey of 98 creative hubs and in-depth data gathered through workshops in the four countries that participated in the project. The goal of this paper is to operationalise intercultural dialogue as a functioning value created by creative hubs and investigate the opportunities and barriers cultural hub managers face in this context.

1.1. The Role of Creative Hubs in Creating Intercultural Dialogue: Towards a New Framework

As discussed above, the focus of research on creative hubs has been on economic growth, while the wider social impacts of creative hubs—like much non-economic activity—tend to be undervalued (Gill et al., 2019 [3]). There are three main reasons for this. First, hubs and clusters are often framed as catalysts for establishing local comparative economic advantages (Komorowski, 2017 [7]). In recent years the narrative of regional economic advantages (Porter, 2011 [4]) through creative industries has been prominent in policy discourse. Second, the determinants and outcomes of these comparative economic advantages are also reasonably well understood (Komorowski and Fodor, 2020 [8]). Economic advantages are often seen as more easily measurable, and they have been subjects of previous analyses (Weisbrich and Owens, 2016 [9]). Creative hubs are predominantly businesses with their own performance indicators and financial goals, and therefore reporting on such measures is common. Third, because societal and cultural benefits are less tangible (Komorowski, Lupu, Pepper and Lewis, 2021 [10]), they are often seen as more elusive, escaping analytical attention, and are therefore often overlooked.

To the best of our knowledge, a systematic taxonomy of creative hubs' operations regarding socio-cultural value creation (and, more specifically, intercultural dialogue) is nonexistent in the relevant literature. Moreover, the measurement and operationalisation of socio-cultural values, specifically intercultural dialogue, is difficult. This is still the case even though the notion of intercultural dialogue has received a great deal of scholarly

attention since the Council of Europe published its White Paper 2008 on the topic. To date, more than 10,000 academic articles have been published on intercultural dialogue and its various applications and manifestations (Elias and Mansouri, 2020 [11]).

In this literature, intercultural dialogue is, for example, described as a regular and interpersonal practice that takes place subconsciously (Kecskes, 2014 [12]). Other scholars referred to intercultural dialogue as a "desire" to understand others with whom communication opportunities are rare (Kudo, Volet and Whitsed, 2019 [13]). Overall, we find that the definition of intercultural dialogue varies by field and application and that the understanding of intercultural dialogue is often vague and therefore doesn't always enable operationalisation for research. However, to understand the impact of creative hubs on intercultural dialogue, we need to understand how these two concepts are interlinked in an operationalisable way. Therefore, we investigated the literature to create these links and develop a new framework for investigation.

1.2. Literature Review

Based on the literature, we argue that within creative hubs, processes occur which ultimately produce services and practices that can facilitate intercultural dialogue. Scholars have focussed, for example, on the challenges of intercultural dialogue (e.g., Kondrateva, Sabirova and Plotnikova, 2018 [14]). This can include cultural barriers (Vlajcic, Marzi, Caputo and Dabic, 2018 [15]; Liu and Kramer, 2019 [16]), linguistic barriers (Risager and Tranekjaer, 2019 [17]) and other socio-economic barriers (Lähdesmäki and Koistinen, 2021 [18]). The practical steps highlighted by many scholars that enable individuals, as well as private and public organisations, to overcome these barriers and to prepare for them imply that intercultural dialogue can also be developed and steered (Pikhart, 2019 [19]). As highlighted above, creative hubs are managed and curated spaces. We, therefore, see how such management of creative hubs can steer intercultural dialogue.

Intercultural dialogue has often been emphasised within the context of definable and interlinked spaces. Research has already highlighted the issues that arise from cultural differences in well-delineable geographical spaces (Liou and Lan, 2018 [20]). In this context, creative hubs can be seen to be open for—and to create—an inclusive space for creatives involving culturally (and potentially geographically) distant individuals and ideas. Also, Wood and Landry (2007, [21]) argue that one way to foster intercultural dialogue is the creation of "shared spaces", which may be thought of as what we define here as creative hubs. The main added value of such "shared spaces" resides in giving the individual the ability to detach from elements of their own cultural pathways to create output that transcends tangible or intangible barriers.

Florida (2019, [22]) argued that for creative cities to emerge (a similar phenomenon as creative hubs but on a larger scale), talent, technology and tolerance are required. Tolerance can be understood as the convergence in ideas and workflows across the artificial divides between individuals and organisations. Achieving this requires intercultural dialogue to also be thought of as a methodology for fostering constructive and positive interaction at the service of a set of common goals. This is applicable both internationally and locally (Modood, 2018 [23]) and therefore shows how creative hubs can steer and apply this as a methodology.

In addition, within the context of creative industries, the notion of intercultural dialogue can be seen as a definable phenomenon (Harvey and Bradley, 2021 [24]). The digitisation of processes and ease of travel (despite the recent COVID-19-related obstacles) have meant that the creative industries have undergone unprecedented internationalisation (Burhanuddin and Beddu, 2020 [25]), creating potentially rich possibilities for intercultural dialogue. However, the local aspect of intercultural dialogue is as important as its international reach because variations in creative processes may be caused not just by distance but also by differences in vocational interests, age, health differences, sexual orientation, religion and social standing (see UNESCO, 2022, available online at https://en.unesco.org/interculturaldialogue/ accessed on 10 May 2022).

The promotion of social inclusion, the enhancement of local identities, the establishment of social relationships and the formation of communities are essential to intercultural dialogue. Creativity and location can thus facilitate such dialogue, and the final outputs or production spill-overs from creative processes can help bridge cultural gaps (Roodhouse, 2006 [26]).

Gill, Pratt and Virani (2019, [3]) have highlighted that creative hubs are not merely spaces for co-locating creatives. They also serve as places where collaboration, community, inclusion and the countering of precarious creative labour can occur. In this way, creative hubs serve as conveners, offering space and support for networking, business development, freelancer support and community engagement within the creative industries (see the British Council's Creative Hubkit, available online at https://creativeconomy.britishcouncil.org/blog/15/06/28/creative-hubkit-made-hubs-emerging-hubs/ accessed on 10 May 2022).

1.3. The New Framework

This overview of the literature linking creative hubs to intercultural dialogue shows the clear dependencies of these two concepts. More concretely, as creative hubs are spaces that bring creatives together, we focus in regard to intercultural dialogue on the opportunities that arise when diverse people come together. Based on this, we identify core aspects that many of these studies share (and that also emerged as themes from the data gathered in this study), which we operationalised to create a new framework for understanding intercultural dialogue in creative hubs. We identified three core levels:

1. The spatial level includes the micro, meso and macro embeddedness of the creative hubs. On this level, creative hubs enable intercultural dialogue, i.e., the opportunity for diverse people to come together on a
    a. icro-level (in the hub and among its participants),
    b. meso-level (in the immediate vicinity of the hub, for example, at the municipal level) and
    c. macro-level (cross-border collaboration, partnerships with other hubs).
2. The cultural level describes the cultural diversity of the people that come together in creative hubs. There are potentially three major groups connected by creative hubs:
    a. people from different countries,
    b. people with different work backgrounds and skills and
    c. minority or disadvantaged groups.
3. The action level shows the functions and activities within and of creative hubs that create diverse cultural encounters and outcomes to enable intercultural dialogue. This involves (see also Skrefsrud, 2016 [27]):
    a. encounters,
    b. forms of communication,
    c. discourse and
    d. approaches to training and learning (the distinction is derived from the elaborations of Thor-André Skrefsrud in his book *The intercultural dialogue* (2016)).

We argue that each of these levels carries primordial significance in placing various creative hubs on various paths in terms of abilities and incentives to host, foster and implement intercultural dialogue in the creative process. Shortcomings in these domains may also point to a specific action that has the potential to be taken from the side of the creative hub.

Because of these opportunities, this framework was applied in this study and to the data gathered in an attempt to identify the extent (quantity and quality) of intercultural dialogue that is enabled through creative hubs. Each level of this framework is further outlined and defined with data and insights below. This framework allows for the development of an approach to understanding—and advancing/measuring—the socio-cultural impacts of creative hubs.

2. Materials and Methods

2.1. The Data Collection Process

The geographical scope of the study was defined based on an internationally funded project bringing together creative hubs from Turkey, Greece, Serbia and the UK (see also above). This paper builds its insights on both quantitative and qualitative research data from the countries and the creative hubs (and their networks) that participated in the project. The project allowed the researchers access to various creative hubs and support in the research process through the participating partners and creative hubs. Further, investigating four countries with significant differences across them in terms of the development of creative industries and policy support (see more on this below) allows us to extract more universal results on how creative hubs and intercultural dialogue interact. While a cross-country comparison of results may yield valuable insights, our aim in this research was primarily to identify significant patterns that remain consistent across varying creative hub landscapes. Consequently, the results are more likely generalisable to other geographical regions.

The study objects were identified based on our definition given above and their roles in the functioning of creative hubs: members, managers and stakeholders of creative hubs (defined as managed spaces bringing creatives together). We used the British Council's definition of creative hubs, as also present in Matheson and Easson (2015, [2]) and in Gill, Pratt and Virani (2019, [3]), which includes clusters, co-working spaces, studios, creative centres, networks, online platforms, or alternative places and organisations that support and develop local creative businesses and individuals. This definition was introduced to the respondents and workshop participants to delineate what constitutes a creative hub. Due to the nature of the creative hubs participating in the project, in-depth data was gathered from co-working spaces for creatives. It should be noted that the differences among creative hubs mean that they have divergent aims when it comes to cultural and societal value creation. However, our findings suggest a clear comparability of the responses.

The research process based on the geographical scope and the defined study objects included two stages: (1) a survey and (2) workshops.

1. Between August and September 2019, a comprehensive online survey was conducted to gather insights from over 400 creative hub members, managers and local private and public stakeholders in four countries. The survey participants were identified through thorough desk research and an extensive network of contacts. A total of 98 organisations that met the criteria for creative hubs were included in the data collection process. The validity of both the creative hubs and the respondents interviewed has been checked by identifying the respondents as stakeholders of the hubs (managers, members, or active stakeholders) and by cross-checking the websites of the creative hubs. We asked all survey participants the same set of multiple-choice and open-ended questions. After identifying the hub, the location and the sector of activity, we established its basic attributes in relation to intercultural dialogue. In most of our questions, we have not made it explicit to the participants that we are measuring aspects of intercultural dialogue to avoid introducing various types of response biases. We constructed the questions with the three-pillar framework in mind (related to spatial, cultural and action-level attributes). Each question yielded information that is useful on its own (for instance, on the cultural diversity of hub members), but it still fits into one of the three domains regarding intercultural dialogue. For more information on this mapping, please consult Section 2.3 below. We asked our respondents about the approach of the creative hub to intercultural dialogue (and whether promoting it was an explicit aim within the hub) and their attitudes towards and perceptions of intercultural dialogue.
2. The survey data was enriched with qualitative material from four workshops. In October 2019, we invited 29 experts to workshops in four different creative hubs (based on the expressions of interest from hubs studied in the project and located in one of the four countries of interest). The two-hour workshop involved creative

hub managers, members, academics and local private and public stakeholders who were identified by the organisers based on their professional networks. The workshop was held in co-working spaces of creative hubs. A participatory action research (PAR) approach was used to facilitate discussions and generate new ideas. PAR is a research approach that emphasises participation and action, seeking to understand the world by collaboratively changing it and emphasising collective inquiry and experimentation based on experience and social history. The workshop discussion was guided by a framework and informed by the survey findings. The semi-structured format allowed participants to freely express their thoughts and ideas, which were recorded, coded and later analysed for the research.

Data from the survey and workshops were analysed using an inductive approach to identify the main opportunities, challenges and best practices for creating intercultural dialogue in creative hubs. Desk research was also conducted to complement the data gathered from the survey and workshops.

2.2. Background: The Creative Hub Landscapes in Turkey, Greece, Serbia and the UK

In order to give background information about the study findings, we first outline the creative hub landscapes in the four studied countries, Greece, Serbia, the UK and Turkey (see Table 1 below). The insights presented are based on desk research, survey findings and workshops. While we do not attempt to compare the countries (see above), having insights about the background of each country enables the reader to frame the findings below more meaningfully.

Table 1. Overview of the differences in the four analysed countries (Sources and notes: for GDP numbers, please consult https://www.theglobaleconomy.com/compare-countries/ (accessed on 30 November 2019). Our data show that in advanced economies, creative workers such as scientists, technologists, artists, cultural creatives, media workers and knowledge-based professionals, make up between a third to over forty per cent of the workforce. Further information can be found at http://martinprosperity.org/media/Global-Creativity-Index-2015.pdf (accessed on 30 November 2019). The Creativity Index is a comprehensive gauge of advanced economic growth and sustainable prosperity based on the "3Ts of economic development": talent, technology and tolerance. It assesses and ranks 139 countries globally on each of these dimensions, as well as on our overall measure of creativity and prosperity).

	Contribution of Creative Industries to GDP	Number of Surveyed Creative Hubs	Creative Hubs Investigated in-Depth in Workshops	Creative Hub Landscape
UK	4.2%	29	Rabble Studio (https://rabble.studio/ accessed on 30 December 2021)	Developed
Serbia	7.1%	14	Nova Iskra (https://novaiskra.com/en/ accessed on 30 December 2021)	Growing
Greece	1.4%	10	BIOS (http://www.romantso.gr/ accessed on 30 December 2021)	Emerging
Turkey	2.7%	45	ATÖLYE (https://www.atolye.io/en/home/ accessed on 30 December 2021)	Growing

2.2.1. Turkey

Over the past decade, Turkey's creative hub scene has flourished following a period of strong economic growth. As a G20 economy, Turkey ranks seventh among developing nations for its export of creative goods (see https://unctad.org/en/PublicationsLibrary/ditcted2018d3_en.pdf accessed on 30 December 2021). In 2017, the British Council and ATÖLYE mapped out 100 creative hubs in Istanbul alone, including virtual hubs, co-working spaces, research centres, maker spaces, incubation centres, technoparks and a living lab. Creative industries generate roughly 2.7% of Turkey's GDP (Demir 2022, [28]).

The year 2010 marked a significant shift in discussions surrounding creative hubs in Turkey, with a growing focus on development programs (see https://graphcommons.com/

graphs/21cc69ad-86d7-489d-99ac524a3aeb15b8?auto=true accessed on 30 December 2021). Istanbul was named the European Capital of Culture that year. Although private organisations typically sponsor and fund creative hubs in Turkey, the government now supports them through various programmes, including the Competitive Sectors Programme, the Startup Support and Organisation Programme, Startup Funding and Access to Capital, and the Startup Globalisation Support. Turkish universities are also establishing their own creative hubs, such as Mersin University's Young Entrepreneurship Center. This platform connects companies, angel investors and professionals to collaborate on innovative projects (see https://www.girisimlimani.org/ accessed on 30 December 2021).

Our survey identified 45 creative hubs in Turkey, providing a snapshot of the overall scene. Around 50 per cent of surveyed hubs were in Istanbul, with 20 per cent in Izmir and 10 per cent in Ankara. The majority of hubs had between 10–50 members and fewer than 15 full-time employees. However, large and very large creative hubs were also present in Turkey. Given the recent establishment of most creative hubs and political support, the Turkish creative hub landscape is still expanding.

2.2.2. Greece

The creative and cultural industries in Greece made up 1.4 per cent of GDP in 2014, a figure close to the more established economic sectors like construction and food and beverage. The Attica region, which is home to Athens, has seen a rise in creative hubs (see https://www.enterprisegreece.gov.gr/en/greece-today/why-greece/humancapital accessed on 30 December 2021). However, in comparison to other nations, the number of hubs that match our definition is still limited. The Greek Ministry of Culture is a significant proponent of the creative and cultural industries, but private foundations like the Onassis Foundation, the Stavros Niarchos Foundation, the Hellenic Foundation for Culture and foreign foundations provide most of the funding.

Our survey uncovered ten creative hubs, with the majority being in Athens. We also discovered hubs in Thessaloniki and Mytilini. Most of the hubs in our study depend on private funding or earned income, and only a handful receive public funding. This indicates that the creative hub landscape in Greece is still modest and growing, with most employing fewer than 20 people and representing no more than 100 members.

2.2.3. Serbia

The development of local creative and cultural industries has been facilitated by a focus on European integration. These industries contribute 7.1 per cent to Serbia's GDP and consist of over 30,000 registered companies that employ more than 115,000 individuals (see https://www.srbija.gov.rs/tekst/en/130164/creative-industries.php accessed on 30 December 2021). The idea of creative industries is a new concept in Serbian policymaking. In 2018, the establishment of a program named Serbia Creates and a Creative Industries Council was the latest attempt to make the cultural and creative industries a genuine policy priority. A study by Serbia Creates in 2019 revealed an increase in the number of co-working and co-living spaces, startup centres, creative hubs and cultural stations throughout Serbia, offering conducive environments for creatives from various fields to collaborate (see https://issuu.com/kreativnaekonomija/docs/creative_industries_serbia_2017 accessed on 30 December 2021). The study identified 30 creative hubs, with the majority located in Belgrade.

Our survey experts reported on 14 creative hubs in Serbia. Sixty per cent of the hubs we surveyed are located in the capital city, Belgrade, with others located in Nis, Pozarevac, Novi Sad and Zajecar. Our survey results indicate that financing is sourced from approximately 50 per cent private and 50 per cent public sources. Most of the creative hubs we studied have small membership numbers (up to 50 members), but there are a few with over 100 members. Overall, we believe that the creative hub landscape in Serbia is expanding based on these findings.

2.2.4. The UK

Ranked as the fourth top exporter of creative goods globally, the UK is one of the most developed countries in terms of creative sectors. It is also among the top importers of cultural goods and services. The creative industries in the UK contributed 4.2% of the GDP in 2016 (see https://www.nesta.org.uk/blog/rd-inthe-creative-industries/ accessed on 30 December 2021). The country has several centres for creative production, with Cardiff being one of the largest media centres in the UK, with over 600 firms (see https://clwstwr.org.uk/sites/default/files/2021-01/Clwstwr%20Creative%20Industries%20Report%20No%202%20the%20media%20sector%20in%20the%20Cardiff%20Capital%20Region%20-driving%20economic%20growth%20through%20audiovisual%20activities.pdf accessed on 30 December 2021).

Creative hubs are well-established throughout the country, with hundreds of examples of different types, structures, financial plans and staff sizes. The creative industries receive support at various governmental levels, including local, regional, national and the UK levels. According to a study by the British Council, most UK cities now host a thriving number of creative hubs (see http://project.creativehubs.net/wpcontent/uploads/2016/12/HubsReport.pdf accessed on 30 December 2021). Our survey comprised experts from 29 creative hubs in the UK, providing insights into the landscape. While these hubs represent only a small snapshot of the number of creative hubs in the UK, they show a wide range of sizes, from creative hubs with more than 1000 members to different organisations and financial models. These findings indicate that the creative hub landscape in the UK is diverse and well-established, with a long history of public and private support.

2.2.5. Understanding the Background: Creative Hubs and Intercultural Dialogue in the Four Countries Studied

As observed above, we discovered that each country experiences distinct types of economic and social progress and responds differently to cultural and economic changes. Nonetheless, urbanisation, the effects of digitisation and the decreasing role of heavy industries are transforming local economies in all four countries. Political challenges such as Brexit, COVID-19, military conflicts and immigration-related changes also pose a range of challenges. The "refugee crisis" in 2015, which occurred following the unrest in the Arab Spring and the Syrian civil war, had an impact on our four partner nations. Turkey, for instance, is home to almost four million refugees and asylum seekers, making it the largest refugee population worldwide (see http://reporting.unhcr.org/node/2544 for more details accessed on 30 September 2021.). In 2019, almost 40,000 people entered Greece (see https://quillette.com/2019/09/13/greece-tensions-rise-again-asmigrant-crisis-escalates/ accessed on 15 September 2021). As a result, intercultural communication is critical in all four countries.

In addition, creativity is closely linked to a nation's economic development, competitiveness and prosperity, and the creative and cultural industries have become increasingly important for local economies in all four countries. The creative industries are expanding in all four countries and are increasingly recognised as a crucial component of their local economies. Creative hubs have been established and are acknowledged as critical drivers for the growth of local creative industries. However, we discovered that each country has a distinct level of development in terms of its creative hub landscape, taking into account differences in socio-economic status (refer to Table 1).

2.3. Mapping between the Data from the Survey and Our Analysis

In order to understand how the results in the next section have been compiled, it is important to put the questions of our survey into context and to conceptualise a link between the answers that the respondents have given and the three pillars of our theoretical framework. First, we list the questions, and in Table 2 below, we summarise the statistics of the answers that we have received. The underlying raw data (completely anonymized and GDPR-compliant), which was used to generate this table is included as Supplementary Material to this paper.

Table 2. Summary statistics of the answers to key survey questions for our research.

Question	Possible Answers	Breakdown of Answers
How culturally diverse are the creative hub members, in your opinion (compared to the local demographics)?	Not diverse Quite diverse Relatively diverse Slightly diverse Very diverse	8.33% 26.19% 27.38% 19.05% 19.05%
Does your hub organise international events?	Yes/No, % of yes:	44.45%
Does your hub organise business internationalisation events?	Yes/No, % of yes:	25%
Does your hub provide translation services?	Yes/No, % of yes:	6.17%
Does your hub organise local events with diverse groups?	Yes/No, % of yes:	61.7%
To the best of your knowledge, what kind of groups of a different cultural background did your activities target to support?	Local target groups (e.g., minorities, including immigrants, religious groups) International groups	60% 40%
Do you meet with people from different cultures through the creative hub (e.g., through events of the hub or business contacts established through the hub)?	Always Never Regularly Sometimes Usually	21.43% 2.38% 13.10% 41.67% 21.43%
To the best of your knowledge, does the creative hub actively state goals in relation to supporting cultural diversity and intercultural dialogue?	No Yes, in its mission statement Yes, through admission strategies Yes, by a behavioural conduct statement Yes, by other means	24.39% 39.50% 8.53% 17.07% 10.97%
Does the hub offer or has offered training or workshops that create competencies for intercultural dialogue?	Cooperation skills Language skills No Other	30.86% 8.64% 46.91% 13.58%
How operationally intense are your international connections to each of your partners?	Strong (regular collaboration) Good (occasional collaboration) Light (one-off collaborations)	39.6% 25.6% 34.8%

First, regarding the spatial level and the various spheres of impact and influence that hubs have on creating and/or fostering intercultural dialogue, we have asked survey questions at three different levels. On the micro-level (i.e., within the hub itself), we were curious to uncover information about the cultural diversity among the member of the hub. To do so, we have asked the following question: *How culturally diverse are the creative hub members, in your opinion (compared to the local demographics)?* This is an important consideration from the get-go, as our theoretical framework stipulates that at the micro-level, creative hubs facilitate the harmonious and productive collaboration between creatives of diverse backgrounds, creating the primordial form of peer-to-peer intercultural dialogue. At the meso-level, i.e., regarding the hub's interactions with its geographic vicinity (neighbourhood or municipal level), we have asked respondents whether they formally organise community events attracting culturally diverse crowds from a local catchment area (broadly defined as a neighbourhood, city, mini-region, etc.). The question that prompted respondents to declare if this is the case was the following: *Does the hub provide services that enable communication in any kind of way with people from other cultures?* On the macro (i.e., interregional or international level), we have asked the following question: *We would like to know how internationally connected the creative hub is and to which countries. Please enter the country and rate the degree of connection to the best of your knowledge.* We have tabulated the answers that were given, which allowed us to understand the degree of interconnectivity of each respondent's creative hub.

The second pillar of our theoretical framework is the cultural level. At this level, we were most interested in the concrete measures and programmes in place to enhance dialogue, cooperation and joint innovation across individuals of hubs separated by vast geographical (and thereby also cultural) and social distances. In order to understand this, we asked our respondents whether they had *strategies and concrete actions in place or taking place*

regularly that directly support or enable intercultural dialogue. As a follow-up to this particular question, we have asked about whom these actions target concretely (international partners, local disadvantaged groups, etc.). We have also inquired about fostering dialogue across various skill sets and levels of education, but we have done so during our workshops and case studies (i.e., not concretely within the context of our survey).

The third pillar of our research is the action level. For this pillar, we were mainly interested in how much of a priority intercultural dialogue is in shaping the practical engagement and the value of creative hubs. In order to discover more about this domain, we have asked our respondents whether they agree that *"The creative hub is a space for intercultural encounter"*. We have also tried to understand what services our respondents offer to link their members to other countries (and thereby to other cultures), which is why we have tried to measure what percentage of the hubs offer internationalisation/translation services. Furthermore, we have also tried to proxy the respondents' commitment to intercultural dialogue and diversity by asking about their mission statements. Finally, we asked creative hubs whether they offer any form of training to foster intercultural communication or collaboration skills.

The summary statistics of the answers to all of these questions above are in Table 2 below.

3. Results: Understanding the Relationship between Cultural Hubs and Intercultural Dialogue

As previously stated, the creative hub landscapes of the four countries under study differ significantly. Nevertheless, our survey results indicate that creative hubs are viewed as platforms and facilitators for intercultural communication to varying degrees across all locations. According to the survey, which involved representatives from 98 creative hubs, 75 per cent of respondents believed that creative hubs contribute to and function as platforms and enablers for intercultural dialogue.

This is the case even though the surveyed creative hubs in our study represent various organisational forms, financing models, sizes and services, as well as aims (as outlined above). However, this underpins our argument that creative hubs are natural convenors and spaces for intercultural dialogue and are experienced this way by a majority of creative hub stakeholders. In order to understand the extent of the impact of creative hubs on enabling and creating intercultural dialogue, the following sections present the findings of the research in more detail, following the above-described framework underpinning three levels for intercultural dialogue in creative hubs:

1. the spatial level, which includes the micro, meso and macro embeddedness of the creative hubs,
2. the cultural level, which describes the cultural diversity of the people linked to the creative hubs and
3. the action level, which shows the functions and activities within and of creative hubs that create diverse cultural encounters and outcomes.

3.1. The Spatial Level

As previously mentioned, creative hubs are characterised by a location (whether physical or digital) and a geographical context (such as a city, neighbourhood or region). Our research demonstrates that the economic and cultural endeavours established within distinct spatial zones of a creative hub generate fresh linkages or strengthen preexisting ones, ultimately fostering intercultural communication.

- On a micro level (within the hub), the curated space of creative hubs creates the platform for intercultural dialogue within the hub. This usually involves people of different cultural backgrounds who regularly interact within the space. For example, creative hubs often invite culturally diverse groups to events. Members of creative hubs also come from diverse cultural backgrounds: in the survey, nine out of ten creative hubs reported a diverse group of hub members, which means that within the hub itself, encounters with people from different cultural groups are established. One

of the workshop participants stated, for example, that the success of the creative hub is dependent on this diversity: "It is the people, which keep the community alive at our hub. It is important to find the right and diverse talents".

- On a meso level, the creative hub is embedded in its local surroundings. When the creative hub is a physical space, the hub is integrated into a certain neighbourhood, for example. Digital platforms as creative hubs also tend to have a local focus. Creative hubs are also often located in emerging neighbourhoods because rental space is cheap in these areas. Because these neighbourhoods have different economic and cultural backgrounds, their local embeddedness (which is a key factor here) creates intercultural dialogue. For example, BIOS is a creative hub, which is located in a majority Pakistani neighbourhood in Athens. The creative hub organises local events regularly, inviting the Pakistani community into the hub to interact and meet on a regular basis. The local neighbours use the event spaces of the hub for free. 'Food galleries' are organised where the Pakistani community is invited to offer their food in the hub.
- On a macro level, creative hubs foster collaboration across borders. Action at this level is an essential component of good neighbourliness between states and, therefore, an excellent frame for the development of intercultural relations. Of the creative hubs represented in the survey, 67 per cent reported having international connections. A creative hub may collaborate with other hubs, businesses and contacts in other countries through, for example, common projects, residency programmes and business contacts. As one of the workshop participants stated: "A lot is happening on the international level with creative hubs including international projects, collaborations and exchange between creative hubs from different countries". Overall, we found that the surveyed hubs have connections to 56 different countries. The respondents reported that about 30 per cent of international connections happen on a regular basis.

3.2. The Cultural Level

As illustrated earlier, creative hubs operate within relational, institutional and cultural contexts. The rise of multiculturalism in cities due to globalisation has led to increased cross-cultural connections among urban dwellers, sparking creativity. The innovative nature of these hubs often prioritises the development of new ideas and innovation, embodying the complexities of the diverse identities within a given location.

Our research indicates that international connections and activities are a significant feature of many creative hubs. Nearly half of the hubs surveyed offer international events, with 25 per cent providing services to aid their members' businesses' internationalisation. Such activities facilitate connections between local and international members and other stakeholders or collaborators from different countries. For example, the Connect for Creativity project's art and technology residency program brought together artists from various nations to establish bridges and understanding within and across societies. Twelve participants spent six weeks in a different creative hub in another participating country, a residency program that we discovered is prevalent in creative hubs.

Connecting individuals from diverse backgrounds with varying skill sets is another essential aspect of creative hub activity. Often, these hubs aim to connect creatives with people from technological sectors by providing a shared space for intercultural dialogue that leads to new projects, businesses, products and services. Nova Iskra, a Serbian creative hub, offers different programs and training to match the skillsets of its community. This includes an Erasmus for Young Entrepreneurs project that matches various skills, encouraging creative individuals to learn about business approaches.

Our research shows that creative hubs often prioritise a combination of local embeddedness and an ethos of social responsibility, playing a critical role in creating an intercultural dialogue with local minorities or disadvantaged groups. This occurs through minority communities residing in the neighbourhood or focusing on projects and activities that support these groups. Sixty-one per cent of the creative hubs in our survey host local

events for or with culturally diverse groups, while more than half have specific activities that target local groups (e.g., minorities, immigrants, religious groups, etc.). Imece, a social innovation platform established by the creative hub ATÖLYE and Zorlu Holding in Istanbul, exemplifies this approach. The platform brings together individuals and institutions to tackle social challenges, offering an incubation process for social projects, including mentorship, workspace, grants, training, access to the landscape and investor relations to teams providing solutions to social challenges. Since March 2016, imece has supported projects benefiting women, children, parents, people with disabilities and people from different economic backgrounds.

3.3. The Action Level

Previous research has emphasised the importance of community building and serving members within creative hubs. While there are various ways in which creative hubs engage with their members and stakeholders, they primarily focus on enabling encounters between culturally diverse individuals, fostering effective communication, promoting discourse around intercultural dialogue, and offering training to develop intercultural competencies. Our study identified the following actions that creative hubs take to promote intercultural dialogue:

- Enabling encounters between culturally diverse people is crucial to the functioning of most creative hubs. Almost all survey respondents (97 per cent) reported that creative hubs enable them to meet people from different cultures. Many creative hubs also curate their membership through quotas and social events to enable individuals to encounter diverse groups.
- Communication is key for creative hubs to promote intercultural dialogue. Nearly all creative hubs provide information in their national language and English, and some in minority languages. Bilingual communication channels are often used to establish an environment for dialogue. Many hubs offer matchmaking services and support communication by providing translation or internationalisation services. About 30% of creative hubs in the survey offer these forms of activity.
- The discourse around intercultural dialogue, cultural diversity and societal goals is often embedded in creative hub activities. Of the creative hubs represented in our survey, 40 per cent have cultural diversity and intercultural dialogue as goals in their mission statements. Many creative hubs see themselves as playing an active role in creating positive intercultural dialogue, with 30 per cent of creative hubs in the survey having behavioural conduct statements that members need to follow and 40 per cent specifically mentioning a commitment to supporting cultural diversity and intercultural dialogue. Rabble Studio, a creative hub in Cardiff, Wales, has a charter in place and provides manuals and policies of the creative hub to its members, stating the hub's values.
- Creative hubs actively shape intercultural dialogue through learning: some 50 per cent of creative hubs in the survey offer courses and training to develop intercultural competencies. This includes courses on languages, cooperation skills, conflict resolution skills and courses on different cultures more generally. Developing such skills has a significant impact on future successful interactions between different cultural groups. Creative hubs can be seen as alternative education institutions, providing a platform for learning and participatory processes to engage different cultural groups within the city and neighbourhood.

4. Final Thoughts and Discussion

The aim of this paper was to provide structured documentation and analysis of potential linkages between creative hubs' functioning and opportunities for intercultural dialogue to arise, and to broaden our understanding of the value creative hubs create. We have applied a new framework for analysing the extent of the impact of creative hubs on intercultural dialogue. We have used survey data, practical examples and quotes from

workshops with creative hub experts. These sources of evidence highlight the potential that creative hubs have in this regard, showcasing the direct and implicit effects of creative hubs on intercultural dialogue. The framework enabled us to show these effects on three main levels.

On a spatial level, creative hubs enable members to connect internally in the hub, with its surroundings and internationally. On a cultural level, we found that creative hubs connect three major groups: people from different countries, creators with different professional backgrounds and minorities and disadvantaged groups. Finally, creative hubs create an intercultural dialogue on an action level that takes the form of encounter, communication, discourse and learning/training. Nevertheless, diversity is a necessary condition for intercultural dialogue in these setups. If this precondition exists, intercultural dialogue may develop as an externality, but it may also be nurtured consciously in creative hubs.

Still, while creative industries have been recognised as important for sustainable economic growth, creative hubs are not yet fully recognised more broadly as convenors for socio-cultural impacts. This is why creative hubs are still first and foremost considered economic agents (in practice and in literature). However, as already Gill, Pratt and Virani (2019, [3]) argued: too much emphasis on economic, market-driven value works against the ability of hubs to promote diversity and inclusion.

The impact of creative hubs on socio-cultural values is, therefore, often only implicit and unacknowledged. As shown above, intercultural dialogue is not necessarily the outcome of a premeditated agenda but an externality generated by the core activities and functions of creative hubs. One creative hub manager addressed this point directly, describing the way in which: "Our aim is not to be generally intercultural when doing projects. But these projects have a strong effect on intercultural dialogue, and we should explicitly name this".

This missing understanding of the socio-cultural values of creative hubs is often based on existing institutional silos among public and private institutions. It is often the distinction between cultural and economic policies and goals, we would argue, that has created these silos. This is exemplified by statements from two workshop participants: "Institutional openness is often a problem. When you want to do something, there are no ways to collaborate with public institutions because of procedural limitations, bureaucracy, and their willingness to do new things". "The challenge is how we can bring the different players together. It is a matter of changing mentalities and not only thinking about us but also about others and for the others if needed. We need open-minded stakeholders in our city to create great advice for policy makers and support the efforts of creative hubs".

The concept of 'intercultural dialogue' is, in this sense, also often overlooked by creative hub managers, members and other relevant stakeholders. Additionally, the curation needed to create diversity and intercultural dialogue requires resources, and our respondents highlighted the limited funding and resources available to them to create activities and strategies to promote intercultural dialogue. We found that economically driven funding initiatives lack an understanding of—and measurements for—initiatives with a socio-cultural impact. As one workshop participant who manages a creative hub stated: "It is always a question of capacity. There are so many problems and questions that we want to get involved with, but we don't have the time or the track record to justify such activities". Another participant described how: "Money in the past couple of years has always been a challenge to come by and it's quite hard to sell the idea of getting funding to support cultural engagement activity as it sometimes sounds like an amorphous activity and it's also quite hard to measure in terms of jobs etc. It is a challenge to sell that into cash strapped local authorities".

Nonetheless, the newly developed framework in this paper helps create a new understanding of the socio-cultural value of creative hubs. In any case, our aim with it was to provide first insights into a large untapped potential for further engagement in intensified and conscious intercultural dialogue by creative hubs. The findings in this paper, therefore, aim to create new knowledge for creative hubs, hub partners (existing and future), stake-

holders, policymakers and academia and to create a first step into re-framing the narrative of the impact of creative hubs from an economic to a socio-economic one. In other words, we are not suggesting abandoning the well-trodden policy drive towards an appreciation of the economic value of creative hubs but want to stress the need to supplement this with an appreciation and acknowledgement of their socio-cultural value.

Furthermore, it is important to mention that COVID-19 also impacts creative hubs and their ability to create intercultural dialogue. While the data for this paper was gathered preceding the COVID-19 lockdown period, our results also have further implications for future developments and values of creative hubs now after the pandemic. First, due to lockdowns and social distancing measures, creative hubs needed to adapt by moving their activities to online platforms. Second, COVID-19 has disrupted traditional ways of collaborating, with many international partnerships and events being postponed or cancelled. Third, the economic impact of the pandemic has been significant, which in turn might have created further financial difficulties for creative hubs. Fourth, the mental health and well-being of individuals and communities have been significantly impacted by the pandemic, which also includes diverse members of creative hubs. Overall, such developments pose new challenges but also give creative hubs new opportunities for creative intercultural dialogue post-COVID-19. To this end, we recommend further enquiry and understanding around intercultural dialogue—and its relation to diversity and inclusion—in the context of creative hubs and creativity by academia in the future. The purpose of this should be to further strengthen a shared understanding of the wide range of impacts of creative hubs and the creative industries.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/10.3390/su15108282/s1, Date S1. Raw, anonymised dataset (GDPR compliant).

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The Relationship between Firm Attributes and Attitudes towards Diversity

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Abstract: The attitudes of creative firms towards issues of equality, diversity and inclusiveness ("EDI") can significantly affect their willingness to sponsor and implement effective measures in the domain. It is, therefore, essential to examine the readily measurable firm attributes that influence these attitudes. We have collected a wide range of data on almost 330 creative businesses. Our empirical investigation establishes a robust and unequivocal pattern. It indicates that more established companies tend not to view the underrepresentation or the discrimination of people with various protected characteristics as problematic. Young, innovative and efficient firms on the other hand are systematically more likely to consider these same issues as prevalent. These findings are in line with the conclusions from the previous literature which relied predominantly on anecdotal evidence. The patterns that we document suggest that EDI policies and recommendations must be tailored to the precise characteristics of the firm implementing them.

Keywords: EDI; discrimination; firm attributes; underrepresentation of minorities; creative industries

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1. Introduction

In recent years, there has been growing recognition of the importance of equality, diversity and inclusiveness (EDI) in the creative industries. EDI is essential for the sustainable growth of the creative industries as it enhances innovation, creativity and talent development while also contributing to social and economic development. This paper seeks to explore firm-level attitudes towards EDI in creative industries and draw lessons for policy. We have conducted empirical studies that show stark and consistent patterns indicating that larger and more established firms have a lax attitude towards discrimination and the underrepresentation of various protected characteristics (disabilities, ethnicity, sexual orientation, etc.). On the other hand, more innovative and more efficient firms that also tend to be younger consider that people with such attributes face underrepresentation or discrimination in the creative industries.

The creative industries are an important driver of economic growth and development, accounting for a significant share of employment and economic output in many countries (UNCTAD, 2018 [1]). However, the sector has been criticized for its lack of diversity and inclusiveness, with many individuals from underrepresented groups, such as women, people of color, and people with disabilities, facing significant barriers to entry and advancement (Banks, 2020 [2]; Pratt and Jeffcutt, 2009 [3]: Cunningham et al., 2019 [4]; Watson, 2019 [5]). This lack of diversity not only limits opportunities for individuals but also stifles creativity and innovation, ultimately affecting the sector's competitiveness and long-term sustainability.

Therefore, there is a need to foster EDI in the creative industries to ensure that the sector is inclusive and reflective of the wider society it serves. In recent years, there has been a growing recognition of numerous initiatives aimed at increasing diversity and inclusion in the workforce and promoting inclusive practices (Banks, 2020 [2]; Nicholls and Lee, 2019 [6]). However, there is little discussion around tailoring these initiatives to observable firm characteristics which are correlated with companies' attitudes towards EDI policies in general. Our paper serves as a solid starting point for this discussion based on sound empirical evidence.

1.1. Literature Review

The link between the performance of creative firms and their inclusiveness has been well documented. Firms with diverse boards are more likely to have better financial results than those without (Carter et al., 2018 [7]). Diverse teams are also more innovative, perform better and attract a wider range of clients and consumers (Kochan et al., 2003 [8]). Firms with an adequate level of independence at the level of the management board to implement social responsibility practices are also more likely to simultaneously pursue innovation (Shafeeq Nimr Al-Maliki, Salehi and Kardan, 2023 [9]) Diversity can also bring less tangible but equally important value to firms' operations, such as increased creativity, innovation and talent retention (Jackson and Ruderman, 2020 [10]; Tregaskis and Taylor, 2019 [11]).

However, these links between diversity and profits may not be clear to firms that have not yet prioritized EDI policies. This lack of understanding of the benefits of diversity and inclusiveness poses a significant barrier to fostering EDI (Shah, 2020 [12]). The correct implementation of EDI policies, therefore, requires a fundamental shift in the way firms operate.

Moreover, implementing EDI policies can be challenging and requires significant resources and commitment from firms. They may be more likely to prioritize profit and short-term gain over long-term sustainability, and EDI policies may be viewed as a hindrance to these objectives (Dobbin and Kalev, 2018 [13]; Kanter, 2018 [14]). EDI policies require the development of training programs, the creation of inclusive hiring practices and the establishment of diverse leadership teams (Banks, 2020 [2]). Firms need to re-evaluate hiring policies and implement a culture of inclusivity. Some firms may be hesitant to implement such measures because of the assumption that there is a limited pool of diverse talent to recruit from. A survey by the Creative Industries Federation found that over 75% of creative industry leaders found it challenging to find and recruit talent from diverse backgrounds (Creative Industries Federation, 2021 [15]).

Another significant barrier to the implementation of EDI policies is the fear of backlash from the dominant group. When firms begin to implement EDI policies, individuals from dominant groups may feel threatened and believe that they are being unfairly disadvantaged (Dobbin and Kalev, 2018 [13]). Therefore, EDI measures may be seen as a threat to the status quo, leading to resistance from those who benefit from the current system (Hunt et al., 2015 [16]). This fear of backlash can lead to resistance from both employees and management, ultimately hindering the effectiveness of EDI policies.

Finally, there is a lack of regulatory support for EDI policies in many countries. While some countries have introduced legislation to encourage EDI in the workplace, others have not (UNCTAD, 2018 [1]). Without regulatory support, firms may not see the need to implement EDI policies or may prioritize other policy measures that are mandated by law. For example, in the UK, the Gender Pay Gap Reporting requirement was introduced in 2017 to address gender inequality in the workplace. However, only those firms that have more than 250 employees have an obligation to report on the issue, leaving many smaller companies "free" to address or ignore EDI reporting (Banks, 2020 [2]).

1.2. Objectives and the Theoretical Framework

The objective of this paper is to build on this existing literature to operationalize the firm-level attitudes that may systematically impact how creative businesses view EDI-

related challenges. Their attitudes toward the challenges themselves may significantly affect their willingness to sponsor and implement EDI measures and policies. We have collected a sample of more than 300 creative businesses. Specifically, we seek to evaluate whether firm attributes, such as size, turnover, profitability and innovativeness, determine attitudes toward EDI policies.

Our work is novel in several ways. First, we focus specifically on the creative industries which have received relatively little focused attention in the literature on EDI policies and attitudes toward them. Second, we collect data on a large sample of firms, enabling us to conduct a rigorous study. Third, we examine a wide range of observable firm characteristics, allowing us to identify the factors which are most strongly associated with EDI attitudes. The need for the type of rigorous empirical evidence that we provide in this paper cannot be overstated. As observed by Baumann and Albinsson (2020) [17], the current discourse on EDI in the creative industries is often influenced by anecdotal evidence. We briefly summarize the previous pieces of the literature that have attempted similar empirical studies, resulting in conflicting outcomes.

Firm size has been found to be positively associated with the implementation of formal diversity and inclusion initiatives (Berggren and Magnusson, 2019 [18]; Banks, 2019 [19]). At the same time, other studies have suggested that larger firms are less likely to prioritize EDI policies than smaller firms (McPherson et al., 2016 [20]; Pendleton and Valizade, 2019 [21]). Other papers have found no significant relationship between firm size and EDI attitudes (Majid et al., 2020 [22]). Similarly, while some studies have suggested that more profitable firms are less likely to prioritize EDI policies (O'Regan and Ghobadian, 2006 [23]), others have found no significant relationship between profitability and EDI attitudes (Bello et al., 2020 [24]). Research shows that fostering equality, diversity and inclusiveness within an organization can contribute positively to its long-term sustainability and financial performance (Hunt et al., 2018) [25]. Companies that prioritize EDI can benefit from improved decision-making processes, a better understanding of diverse markets, and an enhanced ability to attract and retain top talent (Orlitzky et al., 2003) [26].

Additionally, there is growing evidence that diverse teams can enhance creativity and innovation within an organization which, in turn, may lead to better financial results and increased competitiveness (Lorenzo et al., 2018) [27]. Firms that actively work towards creating an inclusive environment can also bolster their corporate reputation which plays a crucial role in attracting customers, investors and employees (Brammer et al., 2007) [28].

It has also been found that companies that integrate sustainability and EDI into their core business strategies are better positioned to mitigate potential risks and adapt to changing market conditions, thus contributing to long-term financial success (Eccles et al., 2014) [29]. By addressing issues of inequality and underrepresentation, organizations can not only improve their social and environmental performance but also enhance their economic performance in the long run (Husted and de Jesus Salazar, 2006) [30].

More innovative firms are more likely to prioritize EDI policies (Lepak and Snell, 2002 [31]; Appelbaum et al., 2018 [32]). However, it is unclear whether this relationship holds in the creative industries which are characterized by high levels of innovation and creativity as a baseline. Firm characteristics that can be classified as "soft" (such as organizational culture and leadership) have been suggested by the literature as critical drivers of attitudes to EDI-related issues (e.g., Nkomo et al., 2019 [33]; McCormack and Wergin, 2018 [34]). Nevertheless, such "soft" explanatory variables are very hard (if not impossible) to measure rigorously.

In light of some of the conflicting results from the previous literature, our study aims to provide theoretical clarity and empirical evidence on the way that firm-level attributes influence EDI-related attitudes. To do so, we have developed a theoretical framework set on five pillars that allow for establishing systematic, causal and testable relationships. These pillars include insights from institutional theory, the resource-based view (RBV), innovation theory, social identity theory and from ambidexterity theory. We use this five-dimensional theoretical framework to formulate the hypotheses that we test empirically

(see Section 2.1). Overall, all of the theoretical pillars suggest—both jointly and separately—that large established firms have limited incentives in engaging with EDI incentives, while smaller, more innovative ones have a vital operational incentive in fostering them.

1.2.1. Institutional Theory

Institutional theory offers a useful lens to understand how organizations operate within their social and cultural environment (DiMaggio and Powell, 1983 [35]). This theory posits that organizations conform to established norms, rules and practices to gain legitimacy and increase their chances of survival (Meyer and Rowan, 1977 [36]). Within the context of EDI, the institutional theory suggests that organizations may adopt diversity and inclusion practices to comply with societal expectations, gain legitimacy and align with the norms of their industry (Greenwood et al., 2002 [37]).

However, as organizations become more established, they may become more resistant to change due to the process of institutionalization (Selznick, 1957 [38]). This resistance to change may manifest in older, larger firms as being less likely to adopt innovative EDI practices or view underrepresentation and discrimination as problematic. This observation suggests that older and more established firms will tend to be less concerned with EDI-related issues than smaller and younger ones.

1.2.2. The Resource-Based View

The resource-based view of the firm posits that organizations can achieve a competitive advantage by leveraging their unique resources and capabilities (Barney, 1991 [39]). In the context of our study, diverse human capital can be considered as a valuable resource that enhances creativity, innovation and problem-solving (Jackson and Ruderman, 2020 [10]; Tregaskis and Taylor, 2019 [11]). Therefore, the RBV suggests that firms that prioritize EDI may benefit from a competitive advantage in the marketplace.

This theory predicts that smaller, more innovative firms which rely on and early stage competitive edge to establish themselves in their marketplace are more likely to view EDI as important, potentially due to their recognition of the value of diverse human capital. Conversely, larger, more established firms may not view EDI as essential for their competitive advantage, possibly due to their focus on other resources or capabilities that have historically contributed to their success.

1.2.3. Innovation Theory

Innovation theory highlights the importance of creativity, experimentation and risk taking in driving organizational performance and growth (Schumpeter, 1934 [40]). Organizations that prioritize innovation are more likely to adopt novel practices, experiment with new ideas and adapt to changing environments (Tidd and Bessant, 2009 [41]). Our study suggests that more innovative firms are more likely to prioritize EDI policies, possibly because they view diversity as a driver of creativity and innovation.

In contrast, larger, more established firms may be less innovative and more risk-averse, leading to a reluctance to implement EDI initiatives or address issues of underrepresentation (Bartlett and Ghoshal, 1990 [42]).

1.2.4. Social Identity Theory

Another theoretical perspective that can help explain the relationship between firm attributes and attitudes toward EDI is social identity theory. Social identity theory posits that individuals categorize themselves and others into social groups based on shared characteristics, such as race, gender or nationality (Tajfel and Turner, 1979 [43]). These social categorizations can lead to in-group favoritism and out-group discrimination which may contribute to organizational attitudes and behaviors related to EDI (Tajfel and Turner, 1986 [44]).

In the context of our study, social identity theory suggests that the composition of a firm's workforce may influence its attitudes toward EDI. Firms with a more diverse

workforce are likely to have employees with a broader range of social identities which may foster a more inclusive organizational culture and promote positive attitudes towards EDI (van Knippenberg and Schippers, 2007 [45]). Conversely, firms with a more homogenous workforce may exhibit stronger in-group biases, leading to less favorable attitudes toward EDI initiatives and a reluctance to address underrepresentation and discrimination.

As smaller firms are more agile and adaptable, they are known to be able to recruit employees from diverse backgrounds and foster a more inclusive culture (Joshi and Roh, 2009 [46]). Consequently, they are more likely to prioritize EDI policies. In contrast, larger, more established firms may have a more rigid organizational structure and culture which may impede their ability to embrace diversity and foster an inclusive environment.

1.2.5. Ambidexterity Theory

Ambidexterity theory is another relevant framework for understanding the relationship between firm attributes and attitudes towards EDI. Organizational ambidexterity refers to the ability of firms to simultaneously pursue exploration (innovation, experimentation and risk-taking) and exploitation (efficiency, optimization and refinement) to achieve long-term success (March, 1991 [47]; O'Reilly and Tushman, 2008 [48]). Achieving ambidexterity requires organizations to balance the conflicting demands of exploration and exploitation which can be challenging, particularly for larger, more established firms (Gibson and Birkinshaw, 2004 [49]).

In the context of our study, ambidexterity theory suggests that firms that are more successful at balancing exploration and exploitation may be better positioned to prioritize and implement EDI policies. These firms may recognize the value of diversity as a driver of innovation (exploration) while also implementing policies and practices to ensure that diverse employees are included, and their contributions are maximized (exploitation). This suggests that smaller, more innovative firms are more likely to view EDI as important which may be related to their ability to achieve ambidexterity.

On the other hand, larger, more established firms may struggle to balance exploration and exploitation, leading to less favorable attitudes toward EDI. These firms may prioritize exploitation, focusing on efficiency and optimization, at the expense of exploration and innovation. This focus on exploitation may contribute to the reluctance of larger, more established firms to address underrepresentation and discrimination, as they may not view EDI initiatives as necessary for achieving their short-term goals.

1.3. The Research Gap

Despite existing research on the benefits of EDI for firm performance, innovation and talent retention, there is a lack of understanding of how specific firm attributes affect attitudes toward EDI. This gap is particularly pronounced in the creative industries which have been underrepresented in EDI research. The conflicting results from previous studies on firm size, profitability and innovation in relation to EDI attitudes further underscore the need for a more robust and comprehensive investigation. This study aims to provide such an analysis, rooted in sound theory and ultimately offering insights for policymakers and further research.

We find that the previous literature has shown a lack of quantitative focus on the creative industries in the EDI literature despite the unique challenges and opportunities these industries present in terms of fostering diversity and inclusiveness. We also believe that there is insufficient empirical evidence taking into account a wide range of firm attributes jointly. This results in inconsistent findings and a limited understanding of the underlying dynamics.

Filling this research gap has several significant implications for the field of EDI and the creative industries. It provides a more nuanced understanding of how different firm attributes may shape attitudes toward EDI, enabling policymakers to design more targeted and effective interventions. It also offers insights into the theoretical foundations for explaining firm attitudes toward EDI as a function of their measurable attributes, borrowed

from innovation theory, social identity theory, ambidexterity theory, etc. These insights can inform future research on the mechanisms underlying the relationship between firm attributes and EDI attitudes. The paper also contributes to theory development by highlighting the importance of firm attributes in shaping attitudes toward EDI, expanding upon existing knowledge in the field.

2. Materials and Methods

Our research focuses primarily on South-East Wales and most prominently on Cardiff and the Cardiff Capital Region, even though we have received answers to our survey from other regions of Wales as well. We have focused primarily on Wales, as we had encountered a large number of creative businesses from this region during our recent research and policy work. We do not have any reason to assume that the geographical scope of our study impedes the generalization of our results to the creative industries at large. We have gathered data on 328 creative firms between 2019 and 2021. The dataset that we work with is effectively a cross-section, even though some respondents to our survey answered at different points in time. We have chosen the firms to survey essentially by their subsector of activity. Consequently, the respondents in our dataset operate in one of the creative industries identified by the DCMS (See, for instance https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/203296/Classifying_and_Measuring_the_Creative_Industries_Consultation_Paper_April_2013-final.pdf (accessed on 15 January 2023)).

We have identified the potential respondents by gathering all of their email contacts from the FAME dataset (provided by Bureau van Dijk). We have updated contact information for emails that bounced back through thorough desk research. We have ensured that each firm that we contacted was active in one of the creative sectors as identified by the DCMS. Given that we blindly solicited answers, we acknowledge that there might be an incidence of voluntary response bias in our sample. Nevertheless, the questionnaire was unusually broad, and the EDI-related questions were not primary focus. Instead, most questions focused on innovation, collaborations, sources of funding for R and D, etc. Therefore, it is highly unlikely that the few EDI-related questions (amounting to less than 3% of all questions asked) were a crucial point in shaping our respondents' willingness to participate in our survey. A total of 75% of the actual responding individuals identified themselves as the founders/directors/managers/vice presidents of their companies, while 25% of respondents were professionals (designers, programmers, artists, etc.).

The sectoral breakdown of the respondents to our survey is inTable 1 below. Note that the proportions in the table are broadly in line with the composition of creative industries in South-East Wales (Fodor et al., 2021 [50]). An overview of the general EDI patterns of the creative firms in the region can be found in Komorowski et al. (2021) [51].

Table 1. Sectoral breakdown of respondents to our survey.

Sector	Percentage Frequency in Our Dataset
Advertising and marketing	6.1%
Architecture	1%
Crafts	1.8%
Design and designer fashion	2.8%
Film, TV, video, radio and photography	33.4%
IT, software and computer services	10.1%
Museums, galleries and libraries	1.8%
Music, performing and visual arts	20.3%
Other creative sectors	17.2%
Publishing	5.6%

The data that we have collected are very wide and is applicable to a large number of topics and research questions. In particular, we have collected data on innovation (attitudes,

results and spending), skills, corporate culture, management, etc. The data that we use for this article include hard quantitative information on the following firm-level characteristics: turnover (revenue by company in GBP), profit ratio (as a percentage of turnover), the number of full-time employees, the age of the company, R and D spending and the number of ongoing R and D projects. We summarize the values of the responses for these variables in Table 2 below.

Table 2. Summary statistics of the most important firm-level attributes used in our study.

Variable	Average	Standard Deviation	The Number of Respondents Providing Information about the Variable
Turnover	£ 800,937	5,947,491	202
Profit margin	26.6%	29.9	132
FTE employees	9.9	31	186
Age of the firm	12.7 yrs	15.8	244
# of ongoing R&D projects	2.3	2.8	188
R&D expenditure per year	£ 23,508	127,121	98

The "soft" information in our dataset is about attitudes towards various discrimination-related issues. The questions track 5 aspects of discrimination and representation, i.e., those related to (i) women, (ii) people of different races, (iii) the LGBTQ2+ community, (iv) people with disabilities in the creative sector and (v) the discrimination of minority groups. Each respondent stated whether they agree or disagree with these 5 statements, e.g., "People with disabilities are underrepresented in my business or business network"—and the five possible answers were (i) strongly disagree, (ii) somewhat disagree, (iii) neither agree nor disagree, (iv) somewhat agree and (v) strongly agree. The data is encoded from 1 to 5 on an ordered scale with 1 corresponding to "strongly disagree" and 5 corresponding to "strongly agree". The percentage breakdowns of the answers to these questions are given in the Table 3.

Table 3. Percentage breakdown of answers to the questions related to attitudes towards questions of representation and discrimination.

Question: *[. . .] Are Underrepresented in My Business/Business Network*	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Women	17.74%	21.37%	20.16%	14.11%	26.61%
People with disabilities	29.84%	33.47%	25.81%	4.44%	6.45%
The LGBTQ2+ community	17.74%	20.16%	37.5%	10.89%	13.71%
Different races	27.02%	27.02%	25.81%	11.69%	8.47%
Minority groups face discrimination in my business network	17.81%	17%	33.6%	10.53%	21.53%

The main aim of the analysis is to provide evidence of systematic correlations between the firm attributes that we have collected and answers to the questions regarding discrimination and representation. We regress each set of answers to EDI questions on each measurable firm-level characteristic. We use ordered logit regressions to do so. We report the significant regression coefficients and odds ratios that allow for a straightforward interpretation of the results. Naturally, we do not claim causality in our analysis and, therefore, these magnitudes are merely indicative. We also do not exclude the possibility of reverse causality in our regressions (meaning that some of the attitudes towards EDI may affect firm performance). Despite the establishment of causality, our empirical studies give an idea of how concrete, measurable changes in firm size, turnover, profitability, etc. are associated with the probability of the answers that the companies' representatives give to our EDI-related questions.

When analyzing survey data with categorical responses, such as "strongly agree", "agree", "neutral", "disagree" and "strongly disagree", it is important to choose an appro-

priate statistical method that accurately captures the relationship between the independent variables and the categorical response variable. While Ordinary Least Squares (OLS) regression is commonly used to analyze survey data, it is not the optimal choice for modeling categorical responses with more than two categories. In such cases, using an ordered logit model is a better option (Cameron and Trivedi, 2013 [52]). The model is based on the proportional odds assumption which states that the coefficients of the independent variables are constant across all levels of the response variable (Long, 1997 [53]). This means that the association of an explanatory variable with the likelihood of being in a higher category of the response variable (in our case, "agreeing more" with the possible statements) is the same, regardless of the current category of the response variable.

In contrast, OLS regression assumes that the dependent variable is continuous and normally distributed which is not the case with categorical response variables (Agresti, 2002 [54]). When OLS regression is applied to categorical data, it can produce biased and inefficient estimates of the regression coefficients, leading to incorrect statistical inferences (Long, 1997 [53]). OLS regression also assumes that the residuals are normally distributed and homoscedastic which is often not the case with categorical data.

Furthermore, using an ordered logit model allows for the interpretation of the regression coefficients as the change in the log odds of being in a higher category of the response variable is associated with a one-unit increase in the independent variable (Agresti, 2002 [54]). This provides a more meaningful interpretation of the results compared to OLS regression which only provides the change in the mean value of the dependent variable.

2.1. The Hypotheses to Test Empirically

It has been suggested in the previous literature (based primarily on anecdotal evidence) that larger, older firms with higher turnover and more employees may be less concerned with EDI-related issues. We explore whether this hypothesis has any empirical underpinning and present the results of our inquiries in Section 3 below. They suggest that there, indeed, is a significant correlation between firm size (turnover, employees), age and lax attitudes towards discrimination.

One possible explanation for why larger, older firms may be less concerned with discrimination and underrepresentation is the idea of institutionalization. Institutionalization occurs when an organization becomes embedded in its routines, procedures and structures, leading to resistance to change. In the case of discrimination and underrepresentation, larger, older firms may have been operating with discriminatory practices for a long time, making it difficult for them to recognize or change these practices. Research has shown that institutionalization can lead to resistance to diversity initiatives, making it difficult for larger, older firms to address issues of discrimination and underrepresentation (Greenwood, Hinings and Suddaby, 2002 [37]).

Moreover, larger, older firms may also feel that they have already done enough to address discrimination and underrepresentation in the workplace. For instance, they may argue that they have implemented equal employment opportunities policies, diversity training programs and other initiatives designed to promote diversity and inclusion. However, research suggests that such initiatives may not always be effective in addressing discrimination and underrepresentation (Cox and Blake, 1991 [55]; Kalev, Dobbin and Kelly, 2006 [56]). Instead, organizations need to take a more proactive approach to diversity and inclusion by implementing policies that target the root causes of discrimination and underrepresentation (Kalev et al., 2006 [56]).

Larger, more established firms also tend to be less innovative and more risk averse than smaller firms (Bartlett & Ghoshal, 1990 [42]). This risk aversion may translate into a reluctance to take on initiatives that may be perceived as risky, such as recruiting more diverse employees or implementing policies to address underrepresentation. Furthermore, larger, older firms may not feel the need to address underrepresentation if they believe that it does not affect their bottom line. This is true even though research suggests that diversity and inclusion can have a positive impact on a firm's financial performance

(Catalyst, 2018 [57]; McKinsey & Company, 2015 [58]). Smaller firms may, therefore, be more likely to view EDI as essential for their survival, particularly in the highly competitive creative industries. They may also be more likely to view diversity and inclusiveness as a source of innovation and creativity rather than a burden or a risk. For example, a study by Edmondson and colleagues (2015, [59]) found that smaller firms were more likely to engage in creative problemsolving than larger firms and that this was partly due to the diversity of their workforce.

These insights, as well as those outlined in our theoretical framework, result in the following testable hypotheses.

Hypothesis 1: *The age of the firm is a clear determinant of EDI-related attitudes. The older and more established a company is, the less it is concerned with inclusivity-related issues for any type of protected characteristic. Analogously, the younger the company is, the more it is reliant on including and fostering a diverse workforce.*

Hypothesis 2: *The more innovative a firm is, the more preoccupied it is with EDI-related challenges. This insight stems from ambidexterity and innovation theories.*

Hypothesis 3: *Firms that are more efficient (and thereby generate higher profit margins) are more likely to exploit individual skillsets regardless of social composition and institutional rigidities. Therefore, they will attribute more weight to EDI-related challenges than less efficient firms.*

2.2. The Empirical Strategy

Our empirical strategy relies on a two-step iterative method that involves the following.

1. We test each hypothesis above by regressing the attitude scores regarding each protected characteristic (ethnic minorities, disabilities, LGBTQ2+, etc.) on each relevant firm-level attribute (turnover, firm age, the number of employees, R and D investment, the number of R and D projects, profit ratio). We report and discuss only the statistically significant correlations, sorted by attitudes regarding the inclusion of each protected characteristic. If we do not report a particular attitude-firm characteristic pair, it entails that the correlation between them is statistically insignificant in our univariate logit regressions.
2. We take the significant correlations that we find in step 1 and we test if they are robust to the inclusion of all other firm-level attributes. This ensures that the firm characteristic actually has autonomous explanatory power as opposed to just being a false proxy for some other firm-level attribute. To the extent that the correlations that we find in step 1 remain statistically significant, we are able to conclude that varying the attribute independently of all other characteristics, indeed, changes EDI attitudes.

Note that the correlations we report below are robust, but they do not establish causality. We have attempted to find instrumental variables in our dataset to establish quasi-natural experiments that could pin down causality. We have strived to find variables that exogenously change firm-level attributes without changing attitudes towards EDI. However, our dataset lacks adequate instruments. One noteworthy candidate variable that we had considered was the amount of funding that the respondents received from public bodies. Upon thorough inspection, we have had to conclude that this variable was not perfectly adequate, as funding schemes are often tied to implementing EDI initiatives. All other candidate variables exhibited similar issues. Consequently, at this iteration of our research, we are constrained to examining robust correlations only.

3. Results

As stated above, we document the statistically significant correlations stemming from our logistic regression analysis. All the pairs between firm-level attributes and EDI questions that are not in the text below came back as statistically insignificant. This implies

that on at least a 90% confidence level, we were unable to reject the null hypothesis that there exists no effect of the firm attribute on any given EDI-related attitude.

The structure of the section below is uniform for each EDI-related aspect that we study. We first show the logistic regression coefficient(s) and the odds ratio(s) of all variables that exhibit a significant statistical association with EDI attitudes. Then, we provide a brief intuitive explanation of what our results suggest. We repeat this process for the underrepresentation of women, people with disabilities and different ethnicities, the LGBTQ2+ community and for the discrimination of minorities in general.

3.1. Underrepresentation of Women in the Creative Industries

The only measurable firm-level characteristic that shows a significant statistical relationship with the perception that women are underrepresented in the creative industries is firm age. This correlation is negative, meaning that the older the firm is, the less it believes that the underrepresentation of women in the creative industries is prevalent. We present the ordered logit regression coefficient as well as the odds ratios in Table 4.

Table 4. Results of an ordered logit regression of the answers to the statement "Women are underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm. **: Significant on a 95% confidence level.

Dependent Variable: Answer to the Statement "*Women Are Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Age of the firm (regression coeff.)	−0.0147 **	0.007
Age of the firm (odds ratio)	0.985 **	0.007
Pseudo R-squared	0.01	N/A
Number of observations	240	N/A

The odds ratio is the exponential of the regression coefficient and has a relatively straightforward interpretation. It shows how the likelihood of a firm "strongly agreeing" with the statement above changes with a unit increase in firm age. Conversely, it also shows how an increase in firm age switches the firm's answer from "strongly disagreeing" with women being underrepresented to any other "higher" category ("somewhat disagreeing" to "strongly agreeing" with it).

In this regression, this interpretation above implies the following. If we take two firms, A and B, with firm B being one year older than firm A, then firm B is 1.5% less likely (one minus the odds ratio of 0.985, i.e., 0.015 or 1.5%) to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 1.5% less likely to choose any other answer than "strongly disagree" than firm A. To put this into an even simpler context, if firm B was 10 years older than firm A, it would be 10.84% less likely to choose the "strongly agree" answer to women's underrepresentation than firm B (The odds ratio for a 10-year change in firm age is the exponential of 10 times the regression coefficient, i.e., 0.8916. The complementary of that is 0.1084, i.e., 10.84%). Conversely, younger firms are more likely to "strongly agree" with the statement that women are underrepresented in the creative industries.

The correlation between the age of the firm and attitudes towards women's underrepresentation remains strongly significant after the inclusion of all other firm attributes as shown in Table 5. This allows us to conclude that independent of R and D activities, the size of the workforce, turnover and profits, the age of the firm decreases the perception that women are underrepresented in the industry. This entails that even amongst the most innovative firms, an older one is significantly more likely to take a lax attitude towards women's underrepresentation. Analogously, younger firms, independent of all other firm-level attributes consider that women's underrepresentation is a serious issue to tackle.

Table 5. Results (regression coefficients only) of an ordered logit regression of the answers to the statement "Women are underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm. ***: Significant on a 99% confidence level.

Dependent Variable: Answer to the Statement "*Women Are Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Age of the firm	−0.14 ***	0.006
Number of R&D projects	−0.07	0.23
Total R&D investment (in pounds)	0.00	0.00
Turnover (in pounds)	0.00	0.00
Profit (profit to turnover ratio)	0.0001	0.01
Number of full-time employees	0.099	0.074
Pseudo R-squared	0.07	N/A

3.2. Underrepresentation of People with Disabilities in the Creative Industries

The only measurable firm-level characteristic that shows a significant statistical relationship with the perception that people with disabilities are underrepresented in the creative industries is firm innovativeness, measured as the number of ongoing R and D projects (R and D in the context of our survey was defined as costly activity undertaken to develop a new product, service, experience or procedure). This correlation is positive, as shown in Table 6. This entails that the more R and D projects a firm is leading, the more it believes that the underrepresentation of people with disabilities in creative industries is prevalent. We present the ordered logit regression coefficient as well as the odds ratios below.

Table 6. Results of an ordered logit regression of the answers to the statement "People with disabilities are underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm. **: Significant on a 95% confidence level.

Dependent Variable: Answer to the Statement "*People with Disabilities Are Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Number of R&D projects (regression coeff.)	0.111 **	0.056
Number of R&D projects (odds ratio)	1.12 **	0.06
Pseudo R-squared	0.01	N/A
Number of observations	188	N/A

The interpretation of the regression is the following. If we take two firms, A and B, with firm B leading one more R and D project than firm A, then firm B is 12% more likely to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 12% more likely to choose any other answer than "strongly disagree" than firm A.

This correlation, while interesting, is not robust to the inclusion of all other observable firm-level attributes. Its coefficient turns negative and insignificant once total R and D investment, the age of the firm, turnover, profits and the number of employees are included in the specification. Consequently, it appears as though there are no significant drivers of the attitudes toward the underrepresentation of people with disabilities in our dataset.

3.3. Underrepresentation of the LGBTQ2+ Community

There are two measurable firm-level characteristics that show significant statistical relationships with the perception that the LGBTQ2+ community is underrepresented in the creative industries. These are firm age and innovativeness, measured by the number

of ongoing R and D projects. The correlation with firm age is negative (as Table 7 shows), meaning that the older the firm is, the less it believes that the underrepresentation of the LGBTQ2+ community in the creative industries is prevalent or problematic. The correlation with innovativeness on the other hand is positive, meaning that the more R and D projects a firm lead, the more likely it is to consider the underrepresentation of the LGBTQ2+ community a problem.

Table 7. Results of ordered logit regressions of the answers to the statement "The LGBTQ2+ community is underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm and on the number of R and D projects. *: Significant on a 90% confidence level.

Dependent Variable: Answer to the Statement "*The LGBTQ2+ Community Is Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Age of the firm (regression coeff.)	−0.011 *	0.006
Age of the firm (odds ratio)	0.988 *	0.006
Pseudo R-squared (for the reg. on firm age)	0.004	N/A
Number of observations (for the reg. on firm age)	240	N/A
Number of R&D projects (regression coeff.)	0.092 *	0.053
Number of R&D projects (odds ratio)	1.097 *	0.058
Pseudo R-squared (for the reg. on R&D projects)	0.01	N/A
Number of observations (for the reg. on R&D projects)	188	N/A

The interpretation of the regression is the following. If we take two firms, A and B, with firm B leading one more R and D project than firm A, then firm B is 9.7% more likely to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 9.7% more likely to choose any other answer than "strongly disagree" than firm A.

Analogously, if firm B is a year older than firm A, it is 1.2% less likely than firm A to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 1.2% less likely to choose any other answer than "strongly disagree" than firm A. Put into a more straightforward context, if firm B is 10 years older than firm A, it is 10.4% less likely than firm A to choose the "strongly agree" answer to the statement above rather than any other answer (The odds ratio for a 10-year change in firm age is the exponential of 10 times the regression coefficient, i.e., 0.896. The complementary of that is 0.104, i.e., 10.4%).

The correlation between the age of the firm and attitudes towards the LGBTQ2+ community's underrepresentation remains statistically significant after the inclusion of all other firm attributes. This allows us to conclude that independent of R and D activities, the size of the workforce, turnover and profits, the age of the firm decreases the perception that LGBTQ2+ are underrepresented in the industry. On the other hand, the positive and significant correlation between the number of R and D projects and this perception of underrepresentation disappears after the inclusion of all available firm-level attributes. This entails that the number of R and D projects was—on its own—absorbing some of the partial explanatory of other variables which are now included in the specification shown in Table 8 below. Consequently, innovativeness is not a robust driver of the attitudes towards the underrepresentation of the LGBTQ2+ community while the age of the firm is.

Table 8. Results (regression coefficients only) of an ordered logit regression of the answers to the statement "The LGBTQ2+ community is underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm. *: Significant on a 90% confidence level.

Dependent Variable: Answer to the Statement "*The LGBTQ2+ Community Is Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Age of the firm	−0.06 *	0.03
Number of R and D projects	−0.07	0.21
Total R and D investment (in pounds)	0.00	0.00
Turnover (in pounds)	0.00	0.00
Profit (profit to turnover ratio)	−0.007	0.01
Number of full-time employees	−0.009	0.04
Pseudo R-squared	0.04	N/A

3.4. Underrepresentation of Various Ethnicities in the Creative Industries

The only measurable firm-level characteristic that shows a significant statistical relationship with the perception that people with different ethnicities are underrepresented in the creative industries is firm innovativeness, measured as the number of ongoing R and D projects. This correlation is positive, meaning that the more R and D projects a firm is leading, the more it believes that the underrepresentation of people with different ethnicities in the creative industries is prevalent. We present the ordered logit regression coefficient as well as the odds ratios in Table 9.

Table 9. Results of an ordered logit regression of the answers to the statement "People with different ethnicities are underrepresented in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the number of R and D projects a firm leads. ***: Significant on a 99% confidence level.

Dependent Variable: Answer to the Statement "*People with Different Ethnicities Are Underrepresented in My Business or Business Network*"	**Coefficient**	**Standard Error**
Number of R and D projects (regression coeff.)	0.179 ***	0.063
Number of R and D projects (odds ratio)	1.19 ***	0.07
Pseudo R-squared	0.02	N/A
Number of observations	188	N/A

The interpretation of the regression is the following. If we take two firms, A and B, with firm B leading one more R and D project than firm A, then firm B is 19% more likely to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 19% more likely to choose any other answer than "strongly disagree" than firm A.

This correlation, while interesting, is not robust to the inclusion of all other observable firm-level attributes. Its coefficient turns negative and insignificant once total R and D investment, the age of the firm, turnover, profits and the number of employees are included in the specification. Consequently, it appears as though there are no significant drivers of the attitudes toward the underrepresentation of people with disabilities in our dataset.

3.5. Discrimination against Minorities

There are three measurable firm-level characteristics that show significant statistical relationships with the perception that minorities are discriminated against in the creative industries (The level of R and D expenditure also shows a statistically significant correlation with this EDI-related question. Nevertheless, the regression coefficient is so small (−0.00001) that it has no tangible economic interpretation and is, therefore, omitted). These are turnover (revenue), the number of employees and profit rates. The correlations with turnover and the number of employees is negative (see Table 10), meaning that more

revenue the firm generates and the more people it employs, the less it believes that discrimination against minorities is prevalent in the creative industries. The correlation with profit rates on the other hand is positive, meaning that the more efficient a firm is, the more likely it is to consider discrimination against minorities as a problem.

Table 10. Results of ordered logit regressions of the answers to the statement "Minorities are discriminated against in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on revenue, the number of employees and on the profit ratio. ***: Significant on a 99% confidence level. **: Significant on a 95% confidence level.

Dependent Variable: Answer to the Statement "*Minorities Are Discriminated against in My Business or Business Network*"	**Coefficient**	**Standard Error**
Revenue (in £ 100 K) (regression coeff.)	−0.05 ***	0.01
Revenue (in £ 100 K) (odds ratio)	0.95 ***	0.02
Pseudo R-squared (for the reg. on revenue)	0.02	N/A
Number of observations (for the reg. on revenue)	200	N/A
Number of employees (FTE) (regression coeff.)	−0.011 **	0.005
Number of employees (FTE) (odds ratio)	0.988 **	0.005
Pseudo R-squared (for the reg. on employees)	0.01	N/A
Number of observations (for the reg. on employees)	182	N/A
Profit ratio (in %s) (regression coeff.)	0.01 **	0.005
Profit ratio (in %s) (odds ratio)	1.01 **	0.005
Pseudo R-squares (for the reg. on profit ratios)	0.01	N/A
Number of observations (for the reg. on profit ratios)	132	N/A

The interpretation of the regressions is the following. If we take two firms, A and B, with firm B generating £ 100 K more turnover than firm A, then firm B is 5% less likely to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 5% less likely to choose any other answer than "strongly disagree" than firm A.

Analogously, if firm B employs one more full-time worker than firm A, it is 1.2% less likely than firm A to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 1.2% less likely to choose any other answer than "strongly disagree" than firm A. Put into a more straightforward context, if firm B has 10 more employees than firm A, it is 10.4% less likely than firm A to choose the "strongly agree" answer to the statement above rather than any other answer (The odds ratio for a 10 employee change is the exponential of 10 times the regression coefficient, i.e., 0.896. The complementary of that is 0.104, i.e., 10.4%).

Finally, if firm B's profit-to-turnover ratio is one percentage point higher than that of firm A, it is 1% more likely than firm A to choose the "strongly agree" answer to the statement above than any other possible answer. Conversely, firm B is also 1% more likely to choose any other answer than "strongly disagree" than firm A. Put into a more straightforward context, if firm B has a profit-to-turnover ratio that is 10 percentage points higher than that of firm A, it is 10.5% more likely than firm A to choose the "strongly agree" answer to the statement above rather than any other answer (The odds ratio for a 10 percentage point profitability increase is the exponential of 10 times the regression coefficient, i.e., 1.105. This is the numerical equivalent of 10.5%).

The correlation between the profitability of the firm and its attitudes toward the discrimination of minorities remains statistically significant after the inclusion of all other firm attributes, as Table 11 shows. This allows us to conclude that independent of R and D activities, the size of the workforce, turnover and profits, the profitability of a firm increases the perception that minorities are discriminated against in the industry. On the other hand, turnover and the number of employees cease to be a significant determinant of the perceptions towards discrimination in this specification.

Table 11. Results (regression coefficients only) of an ordered logit regression of the answers to the statement "Minorities are discriminated against in my business or business network" (on a scale from 1 to 5, 1 being "strongly disagree") on the age of the firm. **: Significant on a 95% confidence level.

Dependent Variable: Answer to the Statement "*Minorities Are Discriminated against in My Business or Business Network*"	**Coefficient**	**Standard Error**
Age of the firm	−0.05	0.035
Number of R and D projects	−0.07	0.23
Total R and D investment (in pounds)	0.00	0.00
Turnover (in pounds)	0.00	0.00
Profit (profit to turnover ratio)	0.03 **	0.01
Number of full-time employees	0.014	0.04
Pseudo R-squared	0.09	N/A

Note that, while profitability in and of itself is a significant positive driver of awareness regarding EDI issues, it does not correlate to the age of firms in our sample at all. The correlation coefficient between the two variables has a negligible value of 0.011. We highlight the age of firms again at this point as that is the most robust negative driver of concern for EDI-related issues. The lack of correlation in our sample between profitability and the age of firms suggests, while contradicting the previous literature somewhat, that more established firms do not necessarily face a tradeoff between shortterm profits and social responsibility. Instead, it would appear that a potential association between profitability and firm age (possible in other samples) could make it appear that there is a tradeoff between pursuing profits and EDI initiatives. This then creates simultaneity bias, which the results stemming from our sample may resolve. As it is the age of firms that makes companies' attitudes more lax towards EDI-related issues at any level of profitability, the entrenched organizational practices at these firms seem to show a lack of awareness towards EDI without any particular regard for the impact that such attitudes have on profitability. This suggests that firms may have lexicographic preferences for a reluctance to change fundamentally. Such strategic preferences may point to the need for top-down policy initiatives that instill EDI-related performance indicators instead of the companies themselves. If more established firms consciously ignore the link between profitability and diversity, then other policy interventions (such as education and policy briefs) might be insufficient on their own.

3.6. A Summary of Our Results

Our rigorous correlation analysis confirms Hypothesis 1 that we set out in our study from the get go. Indeed, as Hypothesis 1 suggests, older and more established firms tend to view numerous issues of underrepresentation and of discrimination as less problematic compared to younger ones. This result holds even when we control for other firm-level attributes, implying that the age of the firm shares an autonomous relationship with EDI-related attitudes.

We also find some robust empirical support for Hypothesis 3, predicting that more profitable and efficient firms will consider EDI-related issues to be of significant importance. While this relationship does not hold across all protected characteristics, it is highly robust regarding discrimination against minorities. More profitable companies, independent of their age, size or innovativeness, consider that minorities are indeed discriminated against.

We find limited support for Hypothesis 2, suggesting that innovativeness is positively correlated with the concern for EDI-related issues. While univariate correlations across a number of protected characteristics seem to suggest that this is the case, the relationships break down after the inclusion of further control variables. This entails that left on their own, innovativeness measures absorb the effects of other explanatory variables, such as firm age or profitability.

4. Discussion

4.1. Research Limitations Due to Identification Issues

One potential alternative explanation for our findings above could be that larger firms are more likely to have inherent prejudices and, thus, view discrimination as acceptable. However, this explanation is unlikely, as research has shown that most firms strive to present themselves as committed to equality and diversity even if they do not necessarily practice it (Cox, Lobel, and McLeod, 1991 [60]). Additionally, larger firms are often subject to more scrutiny and pressure to appear inclusive which would make it more difficult for them to openly express discriminatory views (Bendl and Schmidt, 2010 [61]). Therefore, it is unlikely that our findings are due to inherent prejudices in larger firms.

Another possible alternative explanation for our results (that we also address above) is that larger firms may have already implemented measures against discrimination and underrepresentation. However, this explanation is also unlikely. Previous research has shown that larger firms tend to have less diverse workforces and leadership teams than smaller firms (Richardson and Sawyer, 2001 [62]). Additionally, larger firms tend to have more bureaucratic structures that make it difficult to implement and enforce diversity and inclusion policies (Jackson et al., 2003 [63]; Ely and Thomas, 2001 [64]). Additionally, larger firms often struggle with issues, such as "diversity fatigue", where initiatives become routine and lose their impact over time (Kulik, 2004 [65]). Furthermore, larger firms are often more focused on short-term financial gains which can lead them to prioritize profits over diversity initiatives (Bartel and Borjas, 1981 [66]). Therefore, it is unlikely that our findings are due to larger firms already having implemented measures against discrimination and underrepresentation.

4.2. Correlation versus Causation

While our study does not address causality between firm attributes and attitudes toward underrepresentation and discrimination, it still contributes significantly to the literature by highlighting important patterns and correlations. The documentation of these correlations can inform future research and policy interventions. It can also serve as a starting point for identifying potential causal mechanisms.

Our study utilizes a cross-sectional dataset which limits our ability to establish causal relationships between firm attributes and EDI attitudes. While our analysis provides evidence of systematic correlations between the variables, we cannot rule out the possibility of reverse causality or the impact of unobserved factors influencing both firm attributes and EDI attitudes. Longitudinal studies tracking the same firms over time could offer more robust evidence of causal relationships and shed light on the dynamics of EDI attitudes and their determinants.

Several studies have emphasized the importance of documenting such correlations in the context of discrimination and underrepresentation. For example, Smith et al. (2019, [67]) argue that understanding the relationship between gender and representation in organizations can help identify potential barriers to representation and inform interventions to address them. Similarly, Robinson et al. (2020, [68]) note that the identification of correlations between underrepresentation and factors, such as organizational culture and leadership, can help organizations develop more effective diversity and inclusion strategies.

Therefore, while establishing causality is important, documenting correlations between firm attributes and attitudes toward underrepresentation and discrimination is still a valuable contribution to the literature. This documentation can inform future research and guide policy interventions.

4.3. Further Research Limitations

First, our research focuses primarily on South-East Wales, specifically Cardiff and the Cardiff Capital Region. Although we believe that the findings are generalizable to creative industries at large, the geographical scope of our study may limit the applicability of our results in other regions and countries. Future research could expand the scope of the

analysis to include creative firms from different regions and countries to further validate our findings and ensure their broader applicability.

Second, our analysis relies on self-reported data from firms which may introduce biases due to social desirability or the potential for misreporting. Respondents might provide answers that they perceive to be more socially acceptable or favorable rather than accurately reflecting their true attitudes toward EDI. Future research could employ alternative data collection methods, such as experimental designs or objective measures of EDI policies and practices, to mitigate these biases and obtain more accurate assessments of firms' attitudes toward EDI.

Third, other factors besides the ones that we have measured may influence firms' attitudes toward EDI, such as organizational culture, leadership styles, or industry-specific factors. Including a broader range of firm attributes and potential determinants of EDI attitudes in future research could provide a more comprehensive understanding of the factors shaping firms' attitudes towards EDI and inform the design of more targeted interventions.

Fourth, our study examines creative industries as a whole which may obscure important differences between subsectors. Creative industries are diverse and encompass a wide range of activities from advertising and architecture to film production and software development. The factors influencing EDI attitudes may vary across subsectors due to differences in business models, workforce characteristics or market dynamics. Future research could explore the role of subsector-specific factors in shaping firms' attitudes toward EDI and identify potential barriers and opportunities for promoting EDI within specific creative subsectors.

Last, our study does not directly examine the effectiveness of different EDI policies and practices in addressing issues of discrimination and underrepresentation. While our findings suggest that certain firm attributes are associated with more positive attitudes towards EDI, further research is needed to determine the specific policies and practices that are most effective in promoting EDI in the creative industries. This could involve conducting case studies of successful firms or conducting experimental evaluations of different EDI interventions to identify best practices and inform policy recommendations.

4.4. Research and Policy Implications

4.4.1. Implications for Industry and Practice

Our findings suggest that a one-size-fits-all EDI policy may not be effective for all types of creative firms, given the differences in attitudes towards discrimination and underrepresentation between larger, more established firms and innovative, profitable younger ones. This implies that EDI policies need to be tailored to the specific characteristics of each creative firm and to the challenges that they face.

Diversity management initiatives can fail when they are not tailored to the specific needs of an organization (Cox and Blake, 1991 [55]). Moreover, initiatives that are not aligned with the organizational culture and strategy can create unintended consequences (Jackson et al., 2003 [69]). In the creative industries, research has highlighted the importance of understanding the unique dynamics of each sector, as well as the differences in the experiences of different groups within those sectors (Deuze, 2007 [70]; Banks, 2017 [71]).

Larger firms with more employees and higher turnover may have established structures and processes that are more resistant to change. Overall, entrenched management practices deteriorate firm performance (Salehi and Moghadam, 2019 [72]), despite the fact that they may exert positive effects on innovation to a certain extent (Salehi et al., 2018 [73]), while in other contexts, they may stifle it (Salehi et al., 2018/2 [74]). In any case, larger firms may have more resources to invest in superficial diversity initiatives that do not address the root causes of discrimination and underrepresentation (Schwartz and Carroll, 2003 [75]). In contrast, efficient and profitable firms may be nimbler and may take more risks, thereby being able to adapt to changing circumstances (Hansen et al., 2021 [76]), including those related to EDI. Such firms may be more likely to value diversity and inclusion as drivers of creativity and innovation8. Therefore, policymakers and practitioners should consider the

role of institutionalization in shaping firms' attitudes toward EDI. Strategies that focus on disrupting entrenched routines and structures may be more effective in promoting change in larger, older firms. On the other hand, smaller, more innovative firms may benefit from policies that encourage risk taking and bold projects related to diversity and inclusion.

This underlines the need for a tailored approach to EDI policies is necessary to address the specific challenges faced by each type of creative firm. For larger, more established firms, policies that focus on systemic change and address the root causes of discrimination and underrepresentation may be more effective. This could involve investing in long-term initiatives, such as mentoring programs, leadership training, and policies, that promote transparency and accountability. For profitable firms, policies that focus on promoting diversity and inclusion as drivers of creativity and innovation may be more effective. This could involve initiatives that encourage collaboration across diverse teams as well as policies that recognize and reward diversity and inclusion efforts.

4.4.2. Implications for Theory

This study contributes to theory development by highlighting the role of firm attributes in shaping attitudes toward EDI beyond what has been previously discussed in the literature. The following insights expand upon the existing understanding of these relationships.

The notion of "organizational inertia" could be explored as a possible explanation for larger, older firms' resistance to EDI. Organizational inertia refers to the difficulty firms face in adapting to new environments and changing internal structures. Future research could examine how organizational inertia affects firms' ability to recognize and address discriminatory practices and underrepresentation in the workplace.

The impact of "psychological safety" on attitudes toward EDI should be further investigated. Psychological safety refers to the extent to which individuals feel comfortable taking interpersonal risks within a group or organization. In more innovative and efficient firms, employees might feel more psychologically safe which could contribute to the firm's willingness to address EDI-related issues.

4.4.3. Implications for Further Research

Building on the novel insights from our study, future research could focus on investigating the role of human resource management (HRM) practices in mediating the relationship between firm attributes and attitudes toward EDI. For example, how do HRM practices in larger, older firms differ from those in smaller, more efficient firms, and how do these differences affect EDI implementation?

Further research could also explore how external factors, such as market competition, industry norms, and legal regulations, influence the relationship between firm attributes and attitudes toward EDI. Understanding these external factors may help to identify additional levers for promoting greater diversity and inclusiveness in the creative industries.

5. Conclusions

Overall, our study adds to the growing body of the literature on EDI policies and highlights the importance of considering firm-level characteristics when promoting diversity, inclusiveness and equality in the workplace. Our findings suggest that firm size, turnover and profitability significantly impact attitudes toward discrimination and underrepresentation. In particular, we found a significant correlation between firm size and age and more lax attitudes toward discrimination and underrepresentation. Conversely, more profitable firms that value risk taking and bold projects consider discrimination in creative industries as more of an issue.

Our work is novel in several ways. First, we focus specifically on the creative industries which have received relatively little attention in the literature on EDI policies. Second, we collect data on a sizeable sample of firms, enabling us to establish robust correlations across many aspects related to EDI. Third, we examine a wide range of firm attributes, allowing us to identify those that are most strongly associated with EDI attitudes.

Our findings have important implications for policymakers and industry leaders seeking to promote EDI in the creative industries. Specifically, our results suggest that smaller, younger and more innovative firms may be more receptive to EDI policies than larger, older ones given their differing attitudes toward inclusion. Policymakers and industry leaders should therefore focus their efforts on engaging differently with different types of firms to promote diversity, inclusiveness and equality in the workplace. Our study provides guidance on how these methods of engagement depend on firm attributes that policymakers can observe.

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Out of Print: What the Pandemic-Era Newspaper Crisis in Australia Teaches Us about the Role of Rural and Regional Newspapers in Creating Sustainable Communities

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Abstract: Print newspapers tend to form part of the conversation on sustainable development goals in terms of the ability to communicate goals to the public, but to what degree are print newspapers part of the solution to sustainable rural and regional communities in particular? The COVID-19 pandemic coincided with a global crisis in print journalism. This article takes Australia as an extreme case study of the collapse of print news, tracing both the immediate causes as well as the scale of the decline, and the impacts in terms of community conversation, building social capital, and improving governance, particularly in sub-populations such as the aged, and in digitally disadvantaged regional and remote communities. This paper uses a range of secondary and primary data sources to build a paradoxical picture of a revival of rural and regional journalism, a revival that is focused on survival rather than revisiting the activist origins of early independent rural and regional media in the country. The new papers include part of the traditional mission of print news—building social capital—but are less engaged in creating political and financial transparency. It is concluded that the new wave of rural and regional titles may be simply at an early stage of evolution, but with the digital divide in Australia reducing, they may have little time to evolve.

Keywords: sustainable communities; SDGs; community; print newspapers; entrepreneurship

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1. Introduction

When scholars discuss sustainable development goals (SDGs) in relation to the media in general, and the presence of print newspapers in particular, the discussion tends to centre around how newspapers frame and communicate those goals (e.g., [1,2]) rather than the direct role newspapers may play in delivering SDG outcomes. How print newspapers might help determine educational, gender equality, health, and even public health outcomes is rarely directly considered, but there is a substantial body of work delineating the relationship between the presence and use of print newspapers in developing community literacy and social capital, and the role that literacy and social capital play in turn, in delivering SDGs. What does print media offer that digital options do not?

It is timely to consider this nexus, as there are a range of clear indicators of a global crisis in print news, particularly in vulnerable rural and remote communities. The capacity of the world's major producers of newsprint has been falling steadily [3], and that fall equates to both a decline in the number of publications, editions, and pages being produced globally. In almost every market, bar India, circulations continued to shrink—ranging from a 15% decline in Japan to a 48% fall in Brazil in the five years from 2013 to 2018 [3]). In fact, the Indian digital news sphere, despite being new to the game, is "already as big as some of Europe's largest markets" thanks to a large and growing educated middle class [3]. Elsewhere, in 2019, in the run-up to the COVID-19 crisis, newspaper circulations continued to fall, with Pew research showing circulation figures in the United States (US), for example, dropping to their lowest level since at least 1940, when reliable records began

to be collated [4]. In some cases, these figures have been more dramatic—particular titles in Australia and internationally lost two-thirds of their audited circulation over a period of just five years [5], leading to restructures, amalgamations, and closures.

Not coincidentally, advertising spending is also falling. In 2019 alone, the global advertising spending on newspapers declined by over US$6 billion, while television, radio, cinema, and outdoor advertising continued to grow, and digital advertising boomed. The share of advertising spending allocated to newspapers has fallen since the year 2000 from over half to a quarter [6]. There is a linkage between ongoing reader shrinkage and cuts to advertising revenue that undercuts the business model of the small to medium-sized newspaper. The newspaper industry is what Angelucci and Cagé call a "canonical example" of a two-sided market [7]), where advertisers and readers form the two 'markets' for the newspaper proprietor, with the characteristics (and presence) of readers determining the characteristics and presence of advertisers, and to a large extent, vice versa. In terms of sustainable communities, active participation by both groups remains imperative.

Collectively, not surprisingly, this rapid downward trend in numbers has translated into an absolute loss of newspaper titles. The loss of iconic titles, including the 168 year old *News of the World* [8] and the Pulitzer-prize winning *Tampa Tribune* and the *Cincinnati Post* [9] are just small examples of closures, mergers, or movement to online-only editions.

If print newspapers are an endangered species in the developed world, then a particularly vulnerable sub-species are regional and remote newspapers where the pool of revenue and readers is smaller. The high-profile closures mentioned previously, however compelling, mask the far greater numbers of small rural or community newspapers which have collapsed and closed in recent years. For small newspapers, operating closer to the margins in terms of advertising sales and readership, declines are lethal. In the US, for example, in the five years to 2018, a net 1779 US-based publications ceased to operate without national fanfare.

Circulation of local, as opposed to state or national, newspapers in the United States declined by 27% from 2003 to 2014 according to Pew research [10], while more recent Australian data show similar patterns [11]. Even more concerningly, between 2013 and 2018, there was a 15% decrease in the number of local and regional newspaper titles in Australia (ACCC analysis). In the ten-year period to 2018 alone, 21 local government areas in that country, the equivalent of counties in the United States or shires in the United Kingdom (UK), were left without even a single local or regional newspaper. In the 2005–2018 period, the Press Gazette reported on the net loss of 245 local news titles in the UK [12], creating what Abernathy refers to as "news deserts" or what might more aptly be called "*newspaper* deserts" [13].

The questions this article poses are: What are the impacts of this decline of rural and regional newspapers (as distinct to other forms of media) on sustainable development goals? Does the disappearance of small, local, and regional newspapers matter, or will social media or large multi-media publishing conglomerates be able to fill the gap? The SDGs address issues of social justice, health, human rights, and economic growth, and in this analysis, we first examine how local print newspapers have a role in securing the aims of sustainable communities. Scholarly and non-scholarly debate on the importance of local print newspapers indicates community sustainability is threatened by the loss of regional titles [14–17]. We first examine what the literature shows happens to a community when it becomes part of the 'newspaper desert' through the loss of local print news and associated newsrooms.

We then examine, as a case study, the unprecedented mass collapse of regional print newspapers that occurred in Australia during 2020, and early signs that small entrepreneurs have moved rapidly to fill the breach, sensitive to the role that community newspapers play in terms of producing sustainable communities. Finally, this analysis shows how, remarkably, the pandemic appears to have revitalized, at least temporarily, independent press in a market that has been traditionally one of the least diverse in the world, and offers caveats on optimism that might arise from this resurgence in relation to the delivery on the SDGs.

2. Newspapers and the Sustainability of Communities

The impact of the closure of a newspaper in a discrete rural community is severe and involves the loss of social capital and the loss of the ability to tell and retain the historicity of communities, thus resulting in weakened community identity. The closure of newspapers in regions of low digital literacy, poverty, and poor internet access has consequences that can be understood without a scholarly study to 'prove' impact. Local newspapers are the keystone of local news ecosystems according to Nielsen [18], and when they disappear, the community itself disappears from the radar of central government. (One rural mayor told the authors that one of the reasons a newspaper—whether critical or supportive of the shire council—was important to the shire was that it made the region visible to the state government in Australia. Press clipping services take the outputs of small newspapers and put them on the desks of policy makers and politicians on a state and national level.

The difficulty a community may experience in accessing death notices or statutory advertising relating to government regulations and local developments, the absence of a public clearinghouse of birth and wedding photographs, local sports pictures that can be clipped out and placed in an album of memories without the need for a printer or computer or indeed electricity, and the increased reliance on uncurated news, obscuring the local in a mass of generic, national news and entertainment, means that the community is inevitably less informed about itself.

But is this summary of a priori truisms true?

2.1. Social Capital

In *Life is Harder*, the regional editor of a series of daily newspapers describes a recent, extended study of one community in Caroline County, Virginia, which suddenly and without notice, lost a 99 year old newspaper, the *Caroline Progress*, in 2019. Matthews [13] colours in the wounds that accrue to a community when it loses its sole dedicated print newspaper, describing "community members' sense of community, with participants missing celebrated gatherings, suffering from an increased sensation of isolation and diminished pride in the community" (p. v). The sudden shut-down recalls what Sarason influentially wrote of this connection to community: "You know when you have it and when you don't" [19].

Matthews' qualitative study saw him spend extended time in the community mapping the days after the collapse of the paper, noting that older locals desperate for local news turned to purchasing papers sourced from major population centres to fill the gap, accessing or not accessing online news and eventually turning "to what gets printed on the back of their water bill" out of desperation (p. 49). It is interesting to note that Davidson and Cotter [20] conducted a telephone survey of over 1000 county residents in rural United States and found that those rated high on psychological sense of community were more interested in reading the news.

2.2. Health

Beyond the perceived loss of community experienced by, in particular, the older members of a community, the literature shows that the shift from print to online and social media has measurable impacts on significant outcomes. International studies show that rural newspapers traditionally played a role in providing accurate access to health information in rural areas [21,22], with the Public Health Association of Australia [23] more broadly expressing concern about the proliferation of inaccurate information facilitated by digital platforms. In print, such messaging is easier to monitor and correct. In a developing-world context, newspaper readership is associated with a higher likelihood to use modern contraceptives, for instance, and increased confidence in healthcare [24].

2.3. Governance and Civic Engagement

Local newspapers demonstrably improve governance and are related to markers of the political health of a community. Studies show that local newspapers improve

government accountability and operating efficiency [25,26]. They reduce polarization of voting behaviours by increasing voter access to local news on which to base political decisions [27]. Closures lead to fewer candidates standing for elections and a reduction in voter turnout [9] and lower voter turnout [28]. These impacts are not only observed at the local level. An analysis of both short- and long-term impacts of the closure of the *Cincinnati Post*, the only daily newspaper in its particular market in Ohio, saw fewer candidates stand for the subsequent election and a reduction in voter turnout [8], a finding confirmed elsewhere in the US [29,30]. Even three years after the closure, voter engagement remained impacted. The study found the suppression of civic engagement confirmed in other studies e.g., [31,32], suggesting that digital media does not act as an adequate substitute.

The closure of newspapers certainly leads to a reduction in the quantity of reporting, and competition in the news market, that can have impacts well beyond the regions in terms of ensuring the airing of accurate and diverse content. There is some evidence that the mere presence (rather than the absolute quality) of a newspaper results in improvements; a Danish study showed that even newspapers with low intensity of local government reporting had a positive impact on policy quality [33]. A Tilburg University study longitudinally examined small county newspaper closures in the US and stock price informativeness of firms in the US, finding statistically significant associations between closures and accuracy in corporate information [34], a pathway confirmed separately by Cahan et al. [35].

The net impact of newspaper closures on civic life is clear: the absence of traditional printed newspapers leads to an erosion of local knowledge that digital media fails to address [36], discussed in the next section.

2.4. Trustworthy Information and News Diversity

The vacuum left when a newspaper departs may be filled with online media, but digital media is associated with increased distrust in journalism, is often politicised, lacks quality gatekeeping such as subediting, and fails to enhance the physical community (as opposed to online communities). Speakman showed that exposure to online news leads to an increasing distrust in news [37], and Australian regional media consumers trust local print newspapers more than digital (19% to 9%). A Reuters Institute digital news report in 2021 confirmed these attitudes persist [38]. Mersey [39] found that the internet was not as powerful a builder of sense of community as print newspapers, recording a weakening of community institutions in the wake of the loss of a sole community newspaper in rural Arizona. Digital media also tends to be more partisan [40–42] due to consumers having more control over what they read in this relatively less curated space [35]. This is a factor that became of elevated concern during the pandemic, particularly in relation to public health information dissemination [43].

This reduction in trust is at least partially justified. Staff reductions, an indicator of a shaky community newspaper, see stressed journalists increasingly rely on sources other than their own investigation, notably agency work [44] and public relations/press releases [45–47]. There is also a global tendency for media companies to form strategic alliances to improve efficiency [48]. Even in markets experiencing significant disruption, there has been a concentration of media sources of information. For example, in the small and relatively diverse Swiss newspaper market, a textual analysis shows that in recent years, there has been a convergence in content, particularly in the coverage of international news [49]. Scholars agree on the value of diversity in news content [50] and ownership [51] in maintaining political dialogue and improving the quality of policy outcomes.

Finally, it is worth examining which sector of the population the loss of print impacts the most. American research suggests that those regions that have been left with no papers are the poorest, least educated, and most geographically isolated [52]. Newspaper reader demographics are collected and published diligently by publishers keen to attract advertisers drawn to specific demographics, and thus these data vary in integrity.

A better understanding of reader characteristics can be found in government statistical data, and here, good-quality data are particularly scarce for the developing world. However,

evidence from national American studies, for example, shows the median age of print newspaper readers is 53.5, while those viewing news on mobile phones is 38.6 [53]. A recent UK analysis shows that in the over 65 category, print newspapers remain a key means to access news (with 60% naming it as a main platform), while for those aged 16–24, by contrast, the internet dominates (82%) [54]. Available Australian data indicate a similar pattern: older Australian Bureau of Statistics data showed that those reading print newspapers at least once a week fell proportionately with age [55].

3. Case Study: The Pre-and Post-Pandemic Australian Print News Landscape

3.1. Historical Backdrop

Australia has a short print history relative to Europe and the United States, but with a surprisingly vibrant rural and regional media dimension, considering the low population density of non-metropolitan regions. Relative to the metropolitan dailies that dominate the newspaper landscape today, the Australian newspaper market developed a regional and rural presence surprisingly rapidly. Kirkpatrick [56] notes that only in Western Australia was there a substantial delay between the first publication in the state capital, and the first publication of newspapers in country towns (38 years). In other states (which were then independent colonies), the gap between the emergence of a city and a country press was less than 15 years. Only 400 people lived in the Corio Bay settlement of Geelong in 1840 when the *Geelong Advertiser* (which still exists) began publication—just two years after a paper was launched in Melbourne. Newspapers were established at a time in Australia when the idea of a free press was by no means settled or accepted by the government [57]. The first provincial newspaper appeared in the island state of Tasmania in 1825. Lack of profitability rather than government interference appeared to lead to a very high turnover of regional and rural titles during the early years.

3.2. The 21st Century and the Pandemic: Gradual and Sudden Losses

After the early rapid increase in titles in both metropolitan and rural/regional markets, the change in the population of titles settled, profits were made, and further major challenges to the power of print only arose with digitalization later in the 20th century. Australian newspapers took the same path as global operators, seeking to monetize digital offerings by placing paywalls on mastheads or key stories, with the consequent revenue seemingly unable to sustain the same level of journalism staffing [58].

As a result, most Australian cities have gone from at least two daily mastheads to one; now only the two largest cities in Australia, Melbourne and Sydney, have more than one daily. In the US, the number fell from a peak of almost 700 cities to under a dozen by 2010 [9]. Similarly in Australia, 121 dailies were published in 47 rural and regional centres at the peak before the decline in the 20th century. This loss of pluralism has come with an absolute loss of diversity of voices, even in the urban market. The newsrooms of major urban dailies have shrunk significantly. The two largest players, News Corp and Fairfax, cut 3000 jobs between them in 2012 alone [59], proportionately fewer jobs than in the US or Britain during the same period. For example, from 2008 to 2017, the decline in newspaper newsroom employees in the US fell by 45% [60].

In Australia, the job losses of the first two decades of the 21st century were minor, when the single year of 2020 is used as a comparator. The Australian Newsroom Mapping Project indicated that in 2020, 194 newsrooms showed a net contraction in staff, with 66 enjoying some expansion [61]; this number includes non-print operations. While the job losses were hard to quantify exactly due to limited transparency of commercial information, job losses in the arts and media totalled 22,200 nationally in the first four months of 2020, second only to job losses in the hospitality sector [62]. There were temporary halts in printing in many smaller rural and regional sites, with News Corp and ACM/Fairfax leading the way [62]. In many of the larger towns and regional cities, News Corp maintained a digital presence, but these titles maintained no office, and the news was largely generated by journalists geographically located outside the region on which they were reporting.

The Australian Communications and Media Authority states in its opening statement "we encourage diversity in Australian broadcasting services", but its encouragement is exercised at arm's length through the Broadcasting Services Act 1992 which sets limits on the control of commercial TV, radio, and newspapers. In fact, despite the encouragement of the ACMA, Australia's newspaper industry has in recent years been ranked the world's third least diverse, behind two nations with media significantly in state ownership or control, namely China and Egypt [63]. Australian media ownership, however, was very much in private hands and dominated by three families over generations: the Murdoch, Packers, and Fairfax families [64]. A high newspaper proportion of this ownership concentration, particularly in the last two decades, can be explained by Rupert Murdoch's News Corp alone, which, at its peak, held 57% of the newspaper market by circulation [65].

There have been no global comparisons since 2016 looking at diversity, but the Australian market was fundamentally changed in 2020, ostensibly due to the pandemic. However, ironically, the fall in circulations has meant a decrease in the dominance of News Corp, according to one analysis [65]. The large news networks in the five years prior to the pandemic had changed hands and ownership structure in a rapid sequence of transactions, and it was these new reformatted networks that experienced the large proportion of both job and title losses in 2020. The sudden rush of newspaper ownership changes and mergers with the three remaining big players in the nation, Australian Community Media (ACM), News Corp Australia, and Nine, agreeing to print each other's newspapers to save costs [66]. In the following section we will look more closely at what the data suggest how this lopsided collapse impacted differently in rural and regional Australia.

3.3. Data Trends

The emerging big player in regional newspapers, the Star News Group, snapped up rural titles that had been historically owned by the Fairfax group in late 2022 [67]. Apart from a further reshuffle in ownership, new newspaper titles also emerged. A Google Ngram frequency search for the phrase "new newspaper" in the corpus of books and magazines included in the Google database shows a sequence of peaks and troughs in the frequency of the term, with the peaks being separated by troughs of increasing size. The last major peak in the appearance of the term was in 1955, which coincides with the date of the launch of the last new daily newspaper in regional Australia, a record ironically only broken post-pandemic.

In the latest data, the term has declined to the lowest level seen in over 110 years. However, Google Ngram does not account for the extraordinary events of 2020. If one limits one's search to just the last 12 months, and limits it to the single publishing context, Australia, the search for the term "new newspaper" produces over 50 results, barring results excluded for repetition. Set the search for the previous 12 months, and the results return just 5. Curiously, the pattern of 6 or fewer results per year was broken only once before the pandemic, in 2019, with 13 results, before the numbers quadrupled again in 2020. Exploring further the contents of these 2020 results shows that almost all of these titles appeared in rural and regional locations [68]. This is part of a global pattern: hyperlocal and in particular rural media appears to have been partly insulated against the collapse in advertising spending over the last two decades [6]. One of the correlates of rurality, for many in the readership catchment of these titles, is inferior internet access, meaning digital options (for example in rural Australia) are not currently viable. Rural Australia is also demographically different to metropolitan Australia, in particular, older, thus with a greater history of print familiarity and lower levels of digital literacy.

A second, more direct approach to examining where the revival appears to have happened is The Australian Newsroom Mapping Project database [54], which provides a more comprehensive but still not exhaustive overview of the revolution that has occurred. Dickson described it as an 'extinction event', but it was a crisis disproportionately experienced by the big three, most notably News Corp. An analysis of the Australian Newsroom Mapping Project database [61] shows that of 70 of the 287 titles that experienced growth

in newsroom resources during 2020, 19 were News Corp products, while of the 217 titles that experienced contraction, 119 were owned by News Corp—almost exactly double the proportion. Of the 67 new mastheads that appeared in 2020, 45 had ownership structures outside the major newspaper chains, a pattern which we will return to in the next section.

The pandemic thus appears to have led to a closure of newspaper titles completely unprecedented in Australian history, with our analysis showing a greater impact on larger media conglomerates.

However, if the change in media titles has hit the regions harder, then, as noted earlier, this change would have a great impact, as these regions are relatively more reliant, due to demographic and technology access reasons, on print. A study into the state of regional newspapers was undertaken by the Australian federal government during the pandemic. Dr. Anne Webster, chair of the inquiry, explained the role of regional newspapers in the sustainability of their communities, calling them a "shared community experience [69]. "Regional newspapers", she noted, "put into the public area the stories of people who have excelled in sport, school or their business enterprise, as well as coverage of valuable community-based issues such as council decisions, court matters, public health issues and local weather events" (p. v). During the pandemic, reliance on online rather than print sources of papers may have contributed to a profusion of conspiracy theories, with particularly low COVID-19 vaccination rates experienced in rural and regional centres, relative to the metropolitan areas.

As an ACCC analysis shows, 92% of metropolitan local government areas were serviced by at least one newspaper at some point during the period 2008–2018, compared to 59% of regional areas. Our analysis of 2023 data in the Public Interest Journalism Initiative database shows that the number of 'news deserts' has, if anything, shrunk [54]. It is worth noting that the pandemic is unique in terms of its impact in Australia. During the First World War, the last occasion of a significant global pandemic, as well as economic and social crises associated with both the war and public health, there was no such fall in the number of newspapers circulated [56].While this suggests that the 2020 pandemic appears to have struck the industry at a point of vulnerability, the disproportionate loss of titles belonging to the fiscally more stable major players suggests the decision to close print sites may have been more strategic than imperative. The executive chairman of News Corp made the closure announcement by blaming COVID-19, which he said "has impacted the sustainability of community and regional publishing" [70]. However, he noted the company planned to redesign its business into a more digital shape. The closure of papers was accompanied by the closure of presses, with some News Corp print sites going from 24 houraday operation to shut down, overnight The 'sustainability' that News Corp was talking about, however, was financial sustainability, with the company experiencing a US$1.26 billion loss in 2020, turning that around to a $US330 million profit in 2021.

The Webster report [69] concludes that the closure of local newspapers has left residents "feeling mistrust and unattached to their communities" (p. 3). The Local News Consumers report indicates that regional areas bear the brunt of news deserts. Two-thirds of residents of local government areas with populations of less than 30,000 reported a decrease in information about their own communities, and one-third reported having "fewer topics to share with friends" [14], suggesting a significant decline in social capital and cohesion.

3.4. What Do These 'New' Newspapers Look Like?

With the pandemic stripping newspapers disproportionately out of rural and regional areas, and disproportionately impacting the large newspaper brands, what are the implications for the Australian newspaper landscape and its role in delivering on SDGs?

The Australian government has become a key player in regional media due to the creation of the Regional and Small Publishers Innovation Package, an AUD 60.4 million 3-year programme. The Package was released with a statement that indicates that the federal government has concerns about the regional newspaper industry. "The media

industry is in a significant and sustained transition period, putting the delivery of quality journalism under pressure. This poses challenges for small publishers and small regional newspapers in particular", the announcement of the package stated [63]. The stimulus package appears to have at least partially succeeded, and succeeded at adding new publishers to the Australian media landscape.

For instance, the *Lockyer and Somerset Independent* was launched as a print-only news source in Queensland in October 2020; the *People's News* was launched January 2021 in Mackay, Queensland; the *Nyngan Weekly* started in October 2020 published by Gilgandra Newspapers; the *Murray Bridge News* was launched by journalist Peri Strathearn after his employer, Australian Community Media, temporarily closed the *Murray Valley Standard* (Victoria) in April 2020; the *Ararat Advocate* (Victoria) was launched after another Australian Community Media (ACM) closure (the *Ararat Advertiser*). Publisher Craig Wilson originally intended it to be a temporary publication but confirmed to the Public Interest Journalism Initiative that it "would continue permanently" [54]. In addition, the *Daily Journal* appeared in Warwick as the first new Australian print daily in almost half a century, and, although it ceased daily production after six months, it continues as a twice-weekly two years later (The *Daily Journal* was launched by the authors in late 2020, but is now majority-owned by local parties).

However, the intent of these new media outlets appears to be modest, if one reviews the public statements of the new newspaper proprietors. The following brief analysis is based on public statements made by new newspaper publishers online during 2020, as well as non-exhaustive sample of statements made on radio and television during the same period.

The new newspapers are firmly 'community' in orientation, which we would define as working with the geographic community rather than serving a grander purpose 'for' the community. There is little evidence of a focus on 'hard' news; instead, a tendency to share positive community information and acting, as one new publisher called it, as a "communication engine" [71]. "There could be a profile on the new nurse, the owner of the pub, or the backpacker working at the store. I am pretty much working on keeping it focused on positive news and people" [72], one new publisher in a very remote region commented. Almost all of the public statements, in light of the mass collapse of print newspaper titles, mention the minimal benchmark of survival of 'a' paper in their region, rather than aspirations to tackle the issues that might otherwise be forgotten. "It's too early to be closing newspapers", said one publisher. "In fact some may never close if they are set up right, for the community they serve" [73]. As yet, there is little evidence in the public discourse of an understanding of an activist role for newspapers, or an understanding of their role as educators, standard-bearers or record-keepers. Instead, the focus on sheer survival is reminiscent of the struggle of the first wave of newspapers in Australia, which Kirkpatrick notes also struggled more with profitability than political cross-currents [56].

The struggle for survival of these 'green shoots' regional and rural newspaper titles is exemplified by the outlier new publication, the *Daily Journal*. It appeared in the market 9 months after the closure of the *Daily News* in the same footprint, and was partly initiated as a result of local pressure for the restoration of a daily paper, which the region had enjoyed for a century. However, the 9-month delay had seen the atrophy of essential local infrastructure such as a delivery crew capable of making morning newspaper rounds to local lawns, as well as the creation of new digital habits that shrank the daily circulation of the new product well below the last circulation numbers of its predecessor.

The Public Interest Journalism Initiative adds quantitative evidence to what is happening with these new newspapers. The overall newsroom staffing of Australian newspapers from January 2019 to January 2023 shows 294 newsroom contractions and 165 newsroom expansions. The bulk of these expansions (including new firms) are in rural and regional areas, and the content that is available is in the public domain, suggesting that the new titles are focused on survival rather than a news mission. Overall, the number of dedicated journalists in these newsrooms has decreased, and instead an increasingly large number of

enthusiast owner-operators with no newspaper heritage are taking on the role, again an echo of the first wave of rural/regional newspapers in Australia.

4. Conclusions

Newspapers predate television, radio, and the internet, but still hold surprising power in the current complex media landscape. In regional and remote areas, where television, radio, and internet reception are variable, newspapers hold surprising sway, and studies show the importance of print media in maintaining a community conversation, building social capital, and improving governance. Studies show that when a newspaper is lost, there are impacts on everything from engagement with politics to access to public health information, with particular demographics, such as the elderly, impacted differentially.

The focus of this paper has been on Australia and other key English-speaking markets. The pandemic represents an exceptional moment in the history of media, particularly in Australia, with the pandemic coinciding with the collapse of print newspapers on an unprecedented scale. We present data showing that the collapse was concentrated on both the monolithic media chains and the smaller (regional and rural) markets. As the pandemic passes, it will be possible to separate the causes of the collapse: what can be allocated to pandemic-related triggers for closure (lockdowns and economic crisis) and what can be allocated to pre-existing structural weakness of print media. Clearly, the power of print was receding prior to the pandemic.

The vacuum that appeared in rural and regional Australia created a natural experiment replicating to a degree what existed in Australia two centuries earlier, but this time with the additional complexity of television, radio, and digital news. Data from the Australian Newsroom Mapping Project database [61] and our own analysis of public announcements show that dozens of community-driven print newspaper projects have sprung up to replace the 'missing' newspapers, despite the economic downturn associated with the pandemic.

The data are sparse but indicate that while diversity has clearly increased in the pandemic, and new independent players have rapidly emerged in the markets vacated by large network media, there are reasons to temper optimism. Firstly, in the pause between the closure of legacy media and the arrival of the new print options, habits have changed. The power of social media during the pandemic rose, and with it, its capacity to create 'imagined communities' [74] that crossed geographical boundaries: the authors observed the largest political rally in half a century in their rural home town, with the speakers using tropes and language imported, sometimes without any attempt at cultural translation, from American conspiracy theories on the pandemic and the loss of freedom.

The papers that may have reclaimed some of the 'newspaper deserts' the pandemic created are emerging in an environment of high levels of active government support, which reduces the true viability and independence of new players. Indeed, the presence of government support is an indicator of the weakness of the sector. When newspapers first developed, they attracted activist entrepreneurs interested in taking on issues of interest to the publishers and the public [56] with profit a happy side effect.

In the new media landscape, profit is not assured. The new independent operators are understandably focused on goals typical of new entrepreneurs, rather than the bolder 'mission' sometimes found in new news-oriented digital players. In-depth interviews with journalists in Europe and Australia about their motivation to engage in new digital media projects tends to show them driven by the activist, interpretative, and sense-making aspects of the journalist's role [75]. By contrast, the sparse data currently available on the new Australian community media appear to be driven by a relatively basic community information-sharing motive, meeting the need for a community noticeboard that Matthews [13] found was one of the key functions of a small regional or rural newspaper. This limited mission may evolve with time, but as the digital divide between rural and metropolitan regions reduces (for example, due to the increased availability of fast satellite internet) [76], it gives this new wave of print publishers little time to settle in their markets.

Despite these initial modest missions, the presence of this new cohort of print newspapers may ultimately still change their host communities more than their founders intended: community cohesion and public discourse provide a check on government whether or not the publishers categorise themselves as political activists. Newspapers have traditionally been regarded both in popular and scholarly analysis as both community-building and cathartic in that their role is to underscore the activities of locals as well as providing a conduit for revelations of corruption and political abuse [77]. The mere presence of print media may act to repress misbehaviour and improve governance [33].

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Article

Cultural Mapping Tools and Co-Design Process: A Content Analysis to Layering Perspectives on the Creative Production of Space

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Abstract: This study draws on the lessons learned during a summer school on cultural mapping (CM), which linked these methodologies and the co-design process to the city's re-application to the UNESCO creative city designation. The event implemented artistic and participatory approaches, such as experimental initiatives that focused on the involvement of artists—the main creative producers of space—to foster participatory governance processes and reflect on the validity of the UNESCO label and its inherent monoculture emphasis. A content analysis of the course was done to provide a conceptual analysis of the theory and practice of cultural mapping that is generally under-theorized. By situating the course's exercises in the theoretical triad of Lefebvre's social production of space, the article indicates a possible structure for multi-perspective layering toward the participatory practices on the creative production of space. The results show that there is still no consistent way of presenting CM methodologies and processes, and for that CM remains not fully integrated into the planning and development practices of places. The study suggests further investigation on the links between cultural mapping and design science for co-design process crafting, and cultural mapping tool selection according to the different stages of multi-stakeholder work on articulating people-place meanings.

Keywords: cultural mapping methodologies; co-design process; UNESCO creative city designation; cultural and creative industries in Portugal; layering perspectives; creative production of space; qualitative content analysis

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1. Introduction

Since the 1990s, the creative city concept has become an inspirational paradigm and model of orientation for urban planning, management, and politics [1]. The urban theorist Landry, the cultural policy planner Bianchini, and the economist Florida have become the main representatives of what can be conceptualized as the creative city, stressing the importance of culture, creativity, the arts, and the "creative class" in the development of urban areas [2]. In *The Creative City: a tool for urban innovators* [3], Landry describes how planning should become a more holistic endeavor, combining the perspectives and expertise of spatial planners, architects, and those concerned with the physical hardware of a city, as well as those concerned with the soft and intangible matters. This strategic model is considered a call for imaginative action and public participation and has been further developed by UNESCO and deployed by local and national authorities until now. However, this has been done without much scrutiny, and the public engagement processes in the planning of creative city labeling are often not developed.

The UNESCO Creative Cities Network (UCCN) [4] was created, in 2004, to promote cooperation with and among cities that have identified the cultural and creative industries and sectors (CCIs) as strategic drivers for urban development at the local level and cooperating actively at the international level. CCIs include all the sectors with activities that are

based on cultural values, as well as individual artistic or collective creative expressions, which are defined under the framework of the Creative Europe program [5]. According to the ESSnet-Culture report [6], CCIs' occupations include a wide variety of activity/product providers, such as various crafts, jewelry and precious-metal workers, musicians, musical instrument makers, tuners, and technicians, as well as authors, journalists, librarians, archivists, art curators, among many others. However, one of the main limitations of the CCI sector, pointed out by the European Union, is to clearly delimit creative domains of activity (i.e., the literature, music, and film industries). Thus, the complex notion of the CCI system is not yet well explored in the strategy of urban development and planning, and authorities still struggle to implement participatory systems of cultural governance. The assumptions underlying the present models of governance still fail to recognize the potential of cultural and creative workers' involvement in emancipatory systems thinking within the CCI sector. This is particularly relevant to be analyzed, as the cultural and creative industries are concerned with the generation and communication of the symbolic meaning that embodies or conveys "cultural expressions, irrespective of the commercial value they may have" [7]. As Galloway and Dunlop [8] describe, unpacking these industries "has been found to be rather like a Russian doll; once the layers are discarded at heart, it appears an amorphous entity" (p. 29).

The UCCN provides a divisional structure of the CCI sector, covering seven creative fields: crafts and folk art, design, film, gastronomy, literature, media arts, and music. The main idea behind this is that creative cities are places that reflect a singular creative identity, and the creative development of urban areas that hold this designation is associated with only one creative field, which is placed at the core of the city branding process and urban development [4]. The identity of a place is constructed to distinguish one place from others, referring to its natural features, and the local culture is used in the discourses of politics, governance, city branding, and tourism marketing purposes [9]. In the case of creative city planning, as Duxbury [10] notes, this recipe for urban renewal and cultural re-invention has proven unsuccessful because its approaches "are tailored to large metropolitan centers that tend to neglect issues of social equity and inclusion, dislocation of existing creative communities, and favored big and flashy globally circulating art products, over nurturing approaches to authentic local cultures and heritage" (no page). Cities are living organisms endowed with a variety of creative expressions, with communities of people, and creatives working and making a living on several art forms. Therefore, the monoculture emphasis of the UNESCO Creative City label associated with little public participation presents a strategic dilemma that is worth exploring.

This study investigates cultural mapping (CM), a field of interdisciplinary research and methodological tools for participatory planning and community development. The focus of the research is on tools, as they concern the representations of how humans understand their social and physical environments and relationships [11]. CM is a form of participatory action research (PAR) in which researchers and community members-as-researchers create maps collectively [11] to bring a diverse range of stakeholders into the conversation about the cultural dimensions and potentials of a place, and make visible the ways that local cultural assets, stories, practices, relationships, memories, and rituals constitute places as meaningful locations [12]. As a mode of inquiry, CM intersects two main areas of study and practice. The first documents the cultural and creative assets of a territory by identifying, locating, and quantifying tangible and intangible resources. Hence, from an operational perspective, cultural mapping is "a process of collecting, recording, analyzing, and synthesizing information in order to describe the cultural and creative resources, networks, links, and patterns of usage of a given community or group" [13] (p. 8). The second area is linked with emotional geographies and critical cartography, combining tools of modern cartography with creative practice and arts-based research methodologies to record and represent individual perspectives, and the local knowledge of communities, creating a multivocal narrative of places, bringing stakeholders together in purposeful conversations on the meanings of places [14,15]. From an outcome-purpose perspective,

CM provides "an integrated picture of the cultural character, significance, and workings of a place" [16] (p. 1). Taking this into account, a defining aspect of CM methodologies is the participatory co-design approach, which offers opportunities for multi-stakeholder value construction. Therefore, cultural mapping methodologies become emergent as post-representational cartographies and emotional geographies, allowing space to layer multiple perspectives on intangible, emotional, social, and cultural dimensions of a place.

Considering this, the article asks the following question: How can cultural mapping methodologies further our understanding of the involvement of artists in validating creative city designations? More specifically, we investigate the art-informed tools and co-design process used during a course on CM to give visibility to the diversity of the creative activities of a city. Therefore, this study provides insights into the implementation of cultural mapping tools in situ, in the context of the validation of one UNESCO creative city designation. This is a one-time-limited and intensive example of a participatory action research approach to cultural mapping, which supports the complicity of creative communities' experiences as a valid knowledge space, to understand their potential contribution to the meaning of a creative city. The focus on working with the creative community is precisely because they are the makers/providers of cultural and creative products and activities.

A content analysis of the course is done to examine the cultural mapping theory and practice. This research is among the first studies to explore the nexus between Lefebvre's spatial constructs and cultural mapping methodologies. By situating the course's exercises in the theoretical triad of Lefebvre's social production of space, the article provides a conceptual analysis of the practice of cultural mapping that is generally under-theorized. Moreover, highlighting Lefebvre's theories in a CM inquiry could further inform its empirical practice, in terms of providing a possible structure for the multi-perspective layering toward participatory practices on the creative representation of space, envisioned by the cultural mapping inquiry.

The paper is organized into six sections. Section 1 introduces the background of this research, placing the question addressed in a broad context while highlighting the purpose of the study. Section 2 includes a description of the methods applied, namely directed qualitative content analysis. Section 3 concerns the literature review on cultural mapping in relation to *The Production of Space* of Lefebvre [17]. The results and findings are presented in the Section 4. Section 5 includes discussions to respond to the monoculture emphasis of the creative city label, and Section 6 summarizes the article's main conclusions.

2. Methods

This is a qualitative study directed through content analysis. Directed qualitative content analysis (DQCA) is a research approach commonly used for the analysis of qualitative data across the health care research literature for describing, interpreting, and structuring textual data [14,18]. DQCA has been classified as a deductive and theory-driven process [19], as it is often used in studies that seek to build upon a theoretical framework or conceptual theory. In this research, the theory supporting DQCA is based on Henri Lefebvre's *Production of Space* [17], a fundamental work on the metaphysical meanings of space, influencing the development of the cultural mapping inquiry. This method was chosen because this theoretical lens is generally under-theorized. We used the process of directed content analysis suggested by Assarroudi et al. [14] as guidance. The authors divided the process into three phases (preparation, organization, and reporting). However, we did not follow the step-by-step order due to the specificities of this research that are described throughout the process below.

Process of Data Analysis of Qualitative Content

In the preparation phase, we started by identifying and defining the themes and main themes from the existing theory and course materials, and we deductively related Lefebvre's triadic relationship of social space, with the three parts of the event (shown in the schedule—the activity guiding document of the event). The sampling methods

selected were expert and purposive sampling, as this study involved individuals with a high level of knowledge of cultural mapping, and the focus of the study was on a particular group (artists). The participants included the team of international research experts leading the cultural mapping event, doctoral researchers working in the fields of tourism, spatial planning, heritage, cultural policy, creative placemaking, sociology, arts, and urban studies, cultural mapping practitioners working in the private and public sector, and local-based artists at different career stages, working in several creative fields. The content of the course covered the following areas: cultural mapping processes and methodologies, art-informed cultural mapping, place-based meanings, cultural/artistic heritage, and dimensions of care with communities, to apply cultural mapping techniques in practice and connect findings to cultural and creative tourism, and the local development policy of one city in Portugal. This was done through ice-breaking exercises, artistic workshops, daily visits, learning seminars, and hands-on workshops, as well as discussions on community-based cultural and creative tourism, cultural planning, local territorial, and strategic planning, and engaged social change working with communities. The collected materials included the event's schedule, learning documents, and PowerPoint presentations provided by the summer school organizers, as well as observations and personal reflections through note-taking. Concurrently, we conducted interviews with the local-based artists. However, the interview guide was not developed by us. A general guideline for open-question interviews was predetermined by the organizing team of the summer school and given in accordance with sub-themes outlined in the event's calendar. The questions were the following:

- What connects you to this place?
- What inspires you here?
- What resources—tangible and intangible—are important to you?
- What are the challenges in terms of work and personal life?
- What are your aspirations regarding your creative work in the city?
- How do your personal aspirations align with the development and plans for the city?

During the organization phase, we transcribed all the content from oral presentations, a question-and-answer session, and interviews, considering these as the units of analysis. After rendering all the materials to writing, we immersed ourselves in the textual data, to obtain a sense of the whole data, and analyzed the manifest and latent content found by simultaneously recurring to the literature to code and sort the data into the predetermined themes and sub-themes. At this stage, we broke the data into three main parts and grouped the coding samples under the higher-order headings (themes and sub-themes), generating categories and subcategories (tools/description) that served as the anchor for the higher-order headings to link the cultural mapping theory and practice. This process was done manually and, to fully make sense of the contents, all the materials were read several times to produce an overall impression of the data until reaching redundancy.

In the reporting phase, we converged all steps of the analyzing process into a conceptual model of content analysis (Figure 1) and reported the results in two tables further below.

The proposed model distinguishes two aspects of meaning: (1) philosophical meaning, to explore the foundations of the theoretical framework; and (2) functional meaning, to detail the participatory process of the cultural mapping practice. Thus, the model is divided into two tables, respectively: theory and process. The first table is theory-guided and outlines the main themes from Lefebvre's theories of space, while the sub-themes were pre-determined by the team of research experts organizing the event, according to the existing cultural mapping theory. With Table 1, we wanted to check how the cultural mapping sub-themes were related to the main themes, based on the triadic relationship of Lefebvre's production of space [17], as this knowledge is not yet explicitly validated. In Table 2, we linked the main themes with categories of cultural mapping methodologies to refine the theory underlying the co-design process, as there is a need to expand the existing knowledge and the description of this process from a design science perspective.

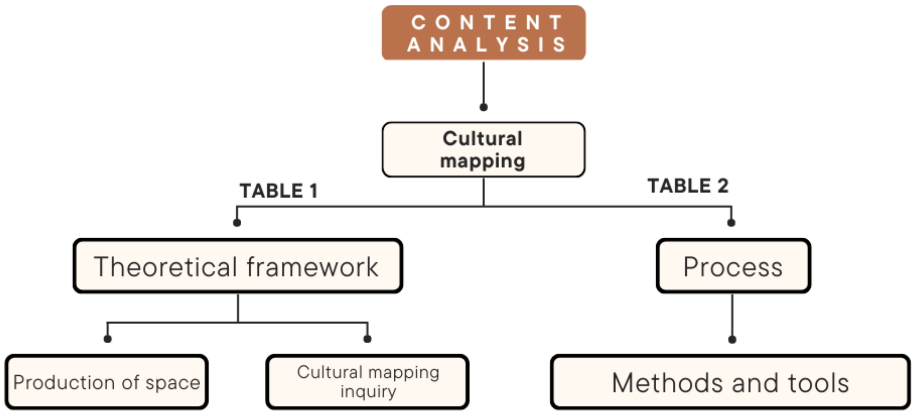

Figure 1. Content analysis model. (Source: own).

Table 1. Themes identified from Lefebvre's production of space and the related sub-themes pre-determined by the CM research experts and identified in the event's schedule, supported by coding samples found in the data.

Themes	Sub-Themes	Coding Samples
Conceived space	Territory and characteristics of a place	- Local historic and contemporary context/know the place; - Natural features;- Soil and water; - Spa thermal city, Thermal Hospital; - Ceramic tradition, arts, artists, museum, production, and industry; - Bridge between artisanship and industry; - Potential of stakeholders' network to the creative city application, and events as initiatives to link multiple stakeholders; - Creative hub: the multidisciplinary creative platform that hosts the creative mass; - Several artistic events are created by artists in the city.
Lived space	Stories of (creative) community and their connections/attachments to a place	- National and international students studying to become artists in different fields; - Creative community develops work in jewelry, painting, graphic design, ceramics, embroidery, architecture, and other fields. - Creative community shares the feeling of familiarity about the city, translated as "carrying art around, using piercings, tattoos, freak hairs, and not feeling judged"; - A common dream is to grow their businesses, and some want to have small factories; - Artists' challenges concern job stability, fair housing rentals, and decent housing conditions.
Perceived space	Self-perspectives	- (Re)discover places by using the five senses to get in touch with emotions, and understand the needs and potential of a place; - The main goal was joint narrative building; - Language barrier: some summer school attendees (internationals) had difficulties in working with research participants from Portugal, and making sense of their trajectory and the creative objects/activities produced, to better understand the creative DNA of a place; - The formal type of communication used by key stakeholders was understood as a limitation to developing work with participants.

Table 2. Main themes related to the categories of methodologies, and the description of tools used in each theme.

Main Themes	Categories	Tools (Description)
Conceived space—Territory and characteristics of a place	Field visit and guided tour with local architect	Walking tour, and storytelling as tools to learn more about the territory and characteristics of a place.
	Seminar on cultural mapping	Learning on the cultural mapping theoretical framework for layering the process of finding the meaning/DNA of places.
	Municipality's presentation	Communication of the city's "official narrative" on cultural heritage, creative activity, and an explanation of the UNESCO creative city re-application.
	Question-and-answer session with municipality's deputies	Clarification session on practices of planning and working with different actors on the UNESCO creative city designation.
	Presentation of creative hub	Introduction of the multidisciplinary creative platform that hosts the creative mass for creative business development.
Lived space—Stories of (creative) community and their connections/attachments to a place	Interviews with artists at different career stages	Conversations to understand different perspectives on the local reality of living as an artist.
	Learning seminar on story mapping	Best practices from a cultural mapping practitioner on how to use story mapping as a tool/framework for the professional development of those individuals or groups wishing to make a career in the cultural and creative industries.
	Story mapping activities with artists at different career stages	Field visits, conversations, and working with tools: - City map; - Drawing; - Journey mapping; - Storytelling. - Presenting the findings with the tools: - Business model canvas; - Mind mapping; - City map; - Sticky notes; - Photographing; - Drawing; - Story/journey mapping; - Storytelling.
Perceived space—Self-perspectives	Learning seminar on story mapping for recognizing and interpreting maps of lived and living experiences	Tool to identify patterns of senses and emotions and activate communities' knowledge of the place.
	Emotional Mapping	Exploration walks to layer different/new perspectives on a place based on emotions, and documenting with tools: - Photos; - Video recordings; - Sound recordings; - Note-taking. - Presenting the findings with: - Sticky notes; - City map; - Drawings; - Storytelling; - Poetry; - Audio walk presentation.

3. Theoretical Framework

According to ref. [17], the theoretical underpinnings of cultural mapping are grounded in the 'spatial turn' of the social sciences, bringing to the forefront several cultural inquiries, such as the unpacking and development of the idea of sociocultural space [13], and the construction of different meanings on place identity, by several groups of actors' perspectives. The identity of a place refers to the subjective descriptions of feelings of identification with specific places, the meanings attributed by their inhabitants and users, and how these meanings contribute to conceptualizations of places [9]. In the context of defining the identity of cities with creativity, through specific creative fields, few studies examined how the so-called "creative class" contributes to the formation of a creative city's identity, as developing the participatory processes with multiple stakeholders to unfold the meaning of places is quite complex [16]. Thus, there is still the need to investigate deeper how to facilitate the involvement of creative agents/artists and other potential enactment stakeholders' perspectives in the process of labeling creative cities [15].

3.1. Lefebvre's Production of Space in the Theoretical Underpinnings of Cultural Mapping

Lefebvre advances a general dialectical understanding of space that offers three main points of view in the process of space production: conceived space, lived space, and perceived space [17]. First, the conceived space (or the physical space) is the space of planning and the quantitative ordering of a territory. This is the domain of spatial planners and policymakers and includes "the production of certain forms of narratives, which encapsulate selected readings of the environment" [17] (p. 37). Second, the lived space (or social space) is formed by the invisible degree of people's connection/attachment to a place, which also comprises complex symbolisms that are difficult to decode [17] (p. 33). This representational space is a product of a specific society at a specific time, determining the use of space and its social formations [17]. Third, the perceived space (or mental space) is produced by the spatial practice of all users due to their daily interactions and is loaded with symbolism and stimuli, with a visual essence infused with the social reality from which it exists and fits one's personal experience and perception. For Lefebvre, the three perspectives of space exist simultaneously, interact, and overlap. The symbolisms inherent to the production of space can be decoded through language, the study of practical relationships, and the "interaction between subjects, their space, and surroundings" (p. 18). This is where cultural mapping comes in, as a conversational tool used to combine different human perspectives, symbolic constructions, and interpretations of space to provide knowledge on cultural and creative resources.

3.2. Cultural Mapping Methodologies—Artistic Approaches

Cultural mapping methodologies serve to understand the impact of territories, in which emotions arise while participating in intangible cultural practices, to draw an emotional landscape linking both communities' perceptions, their living experience, built heritage, and territory [16]. Artistic approaches are a form of socially engaged practice that highlight critical interest in mapping cultures and the creativity of places, in an attempt to tackle issues of artistic production, and social engagement in the strategic planning of places, stressing the role of artists (and arts) as agents for enhancing community self-knowledge on the creative identity of cities [20]. These approaches are present in informal types of communication, such as verbal (oral and written texts), customary (behaviors and rituals), or materials (physical objects), expressed through a wide variety of artistic mediums, such as handicrafts, design, performing arts, music, architectural forms, and many other creative and cultural traditional expressions, to more contemporary approaches. Therefore, the use of artistic mediums is a prerequisite to developing work in this direction. Artistic approaches are usually abstract and expressive of their creators' and users' emotions [20] and are embedded in the constructivist approach found in Lefebvre's production of space [17], in which the materials and the symbolic dimensions of human activity are constitutive elements of a socially organized universe.

Examples of this constructivist approach in research include emotional mapping, to map the affective, sensual, and ephemeral complexity of spaces, focusing on intangible "subtleties" (i.e., EmoMap Project [21], Invisible City Project [22], and Mn'M Project—Measuring the Non-Measureable [23]), and cultural mapping with objects (CREATOUR Project 2017 [16]), using these tangible/intangible assets as probes to formulate individual perceptions and attachments to a place, and explore the relationship between the self, the object, and individual experience to make sense of a place.

3.3. Co-Design Approach

Cultural mapping theory explains that its methodologies encompass artistic activities, used both as processes and methods, to bring individuals together to co-design a joint understanding of their cultural and creative resources, stories, practices, relationships, memories, and rituals toward building the meaning(s) and character, to connect with a place [24]. Worth highlighting, is the term "co-design", as the action verb in cultural mapping, which is not yet well explored from a design science perspective and will be further deconstructed in this study. As a participatory form of inquiry, the co-design process of cultural mapping interweaves knowing, doing, and making, and follows a place-based approach to giving a voice to people and honoring local knowledge. Therefore, cultural mapping focuses on a collaborative design process as a way of seeing, listening, and engaging with communities' stories, and history, to co-create meaningful place narratives [13]. Moore and Borrup [25] present an overview model of cultural mapping as a process, placing the local community at its center, arguing that cultural assets are best recognized by its members. These authors advocate that "the process itself of getting people together to share resources and stories—and the working relationships that can result—have equal or greater value than the map or inventory of the assets that might be generated" (p. 147).

Co-design is the umbrella term used in the design of cultural mapping projects [24] to refer to the co-creation initiatives among stakeholders. Co-design can be linked to two design science approaches: (1) user-centered design, translated by the users' knowledge that designers could work with to formulate and conceptualize an idea or service [26]; and (2) participatory design, pioneered by Kristen Nygaard [27], and described as a set of methodologies that include multiple perceptions on the design process. However, these can only be articulated if users are provided with the appropriate tools to express them [28]. Both approaches have been influencing each other over time, marking the way co-design is defined within design science. From this perspective, co-design is broadly understood as the co-creation process of designing *with* rather than designing *for* others [26]. Designing with others is a central distinction that underscores the commitment to learning, empowerment, ownership, and the ongoing involvement of actors, as "the people destined to use the system play a critical role in designing it" [29] (p. 11). Therefore, at its roots, co-design is a very political view of design, with a focus on users' engagement, and the development of relational practices among people, and organizations [27].

4. Results

4.1. Themes

According to Lefebvre's triadic relationship of social space embedded in the theoretical underpinnings of cultural mapping, three main themes, and related sub-themes, were identified: (1) conceived space—territory, and characteristics of a place; (2) lived space—stories of the (creative) community (and their connections/attachments to a place); and (3) the perceived space—self-perspectives of a place (Table 1).

In Table 2, the main themes are linked with the categories of the cultural mapping methodologies and the tools used to make sense of the co-design process.

4.1.1. Theme 1: Conceived Space—Territory and Characteristics of the Place

- Field visit and guided tour

During the field visit around the city center, the local historic and contemporary context of the city was introduced. The architect guiding the tour told stories about the founding queen of the Municipality: "*one of the most important symbolic figures of the city*". The storytelling during the guided tour was about one of her travels when she saw a group of humble people bathing in hot springs. Intrigued by this, she stopped to learn more about the mud and hot water treatments. The story notes that: *"the muddy waters were miraculous: calming pain, and healing wounds"*. As the Queen was suffering from a chest ulcer that had no way of closing, she wanted to "test the waters" and saw that everything she had been told was true: she was cured in a few days. Following this, the Queen ordered a building for therapeutic purposes to be built there—the Thermal Hospital, which is one of the main landmarks of the city.

The architect highlighted that since the creation of the Thermal Hospital in the XV century until the XX century: *"the ceramic tradition has been a mark of the city's identity and recognition, national and internationally"*.

The XIX century is understood as the golden age period of ceramics, marked by the transition of this craft from a more utilitarian character of kitchen dishes production to the recognition of ceramics as decorative arts. Rafael Bordalo Pinheiro is one of the most famous city artists, and the creator of the ceramic statue *Zé Povinho* (a national icon), also appointed as the artistic director of the faience factory of the city, establishing the connection between ceramic art and industrial production, which has been continued by his descendants.

- Seminar on cultural mapping history and contemporary approaches

On the second day, the first cultural mapping scholar gave a seminar on the topic, focusing on the concept's history and contemporary approaches.

According to the expert: "cultural mapping has come to be a way of recognizing and making visible many tangible and intangible aspects of communities of a place that make it meaningful both for the people who live there and visitors".

The scholar briefly introduced the process that participants needed to engage in within the following days to conduct cultural mapping and mentioned that: "*there is no standard way of presenting the process or a consistent way of managing cultural mapping projects yet*".

Following this seminar, a presentation on the UNESCO creative city application was given by the director of the Cultural Department of the Municipality.

- Presentation on the UNESCO creative city designation and process description

The director started by telling information about the artistic context of the city, which is based on its "*natural features, more specifically soil and water*". The city has 500 years of history of being an important center for "*ceramic production*" in Portugal. The city is served by two large industrial units as well as around 17 workshops dedicated to this craft, which have shaped not only the city's educational infrastructures but also its commercial and economic vitality. Above all, the director of the Cultural Department of the Municipality stressed: "*the importance of ceramics to the city's cultural life and heritage*". According to the municipality's officer, the purpose of labeling the city as a creative city in this specific field is *to "find the balance between artisanship and industrial production"*.

The creative city's application procedure is led by the local municipal council and several civil society members and institutions. The application involved several local institutional partners, all of which played an important role in attaining the success of this endeavor. The first stage of the application encompassed the following initiatives: exhibitions, cultural exchanges, conferences, research projects, and concept stores. These actions generated a new momentum of interaction between local agents (both individuals and companies), with little or no previous connections among one another. The cultural department officer also mentioned that "*the long-standing tradition of the city's ceramics (both handcrafted and industrial) prompted the emergence of a new generation of creative designers*".

A last remark mentioned by the director that adds to the potential of the city itself and deserves to be continued is the "*stakeholders' network*", which was referred to as the

origin of the creative city application. In addition, the director re-emphasized "*the key role of ceramics to the city, without neglecting the other artistic expressions that are so dear to the city, but this art form is important to the community and deserves an attentive look by the local authorities as well as the municipality's special support*".

- Question-and-answer session

This presentation was followed by a question-and-answer session, in which the summer school attendees wished to further explore the reasons behind the relevance of this application to the city.

Municipality's officer: "*There is always a symbolic value to anything that is international, especially such a stamp from an organization like UNESCO. I believe this is an extra incentive to do our work and to keep the status of the city as a creative city since UNESCO is like a window through which other people and communities can look at our work. UNESCO Creative Cities is a network of many places throughout the world also awarded the designation, so it gives the benefits of being in an international network, as well as the status of an awarded creative city by UNESCO, pushing the local community to do more and better*".

Moreover, the attendees asked about the influence that a UNESCO creative city designation plays on the creative community of the city.

Municipality's officer: "*This designation plays two levels of influence: the symbolic influence and the networking influence, in the sense, that the authorities are going to promote and organize events and activities to keep the standards of the designation and to promote the city as a creative city, and undoubtedly will involve local artists and creators in this process*".

Finally, the attendees asked about the level of involvement of the creative community in the application process.

Municipality's officer: "*Obviously, when we went through the application process for this UNESCO designation, we didn't give or have much notice of the locals, as they always do with these things, especially if we talk about culture. Preparing for a huge sports event is one thing, but when we prepare for cultural events, the public at large usually doesn't get so much involved. But once we attained this award in the past, which was widely publicized, and people got to know about it, of course, they liked to be part of it. Nevertheless, the UNESCO creative city designation is mostly cherished among the creative community then the public at large, but it is something that people like to have as part of their identity and would obviously feel very disappointed if we would lose the designation.*"

- Presentation of the creative hub

The creative hub was introduced by its director as "*a multidisciplinary creative platform that hosts the creative mass*" coming from the school of arts and design. The former students use the space for "*creative business development*", and "*networking within the cultural and creative industries sector*". The building used to be the old grinding plant of a factory, appropriated by the creative community in 2010. The students and artists living in the city started giving visibility to the creative hub, through the creation of art events, contributing to the value and visibility of this space, as a creative platform. The presentation was followed by a mapping activity/group work, based on interviews with creative hub-based well-established creators.

4.1.2. Theme 2: Lived Space—Stories of the (Creative) Community and Their Connections/Attachments to a Place

This is the second theme of the cultural mapping process and it included the collection of creative community members' stories and their connections to the city.

- Seminar on "Cultural mapping with communities in world heritage sites and vacant urban landscapes"

This seminar was given by a second research expert on the topic, who presented the Artéria project [30], explaining the creation of a cultural programming network of agents from eight cities in the central region of Portugal to foster the circulation of cultural production in the region. The aims of the project were to rediscover places, their identity, and

material and immaterial resources through local knowledge using creative and disruptive methodologies, in which the ways of conducting and participating in the research were constantly redesigned and co-constructed. The seminar provided insights into cultural mapping practices and the use of critical and creative thinking as strategies for artistic mapping, as a result of the participatory cultural mapping process. It included key methodological aspects on layering the cultural mapping process of the research process, toward a flexible strategy research design, through integrated research-practice strategies for knowledge exchange, with the involvement of participants (local partners) in knowledge co-creation.

- Seminar on "Story mapping initiatives in Cape Town, South Africa"

The following seminar was given by one cultural mapping practitioner, with examples of practices in Cape Town, South Africa. The practitioner explained how story mapping can be used as a tool/framework for the professional development of those individuals or groups wishing to make a career in the cultural and creative industries. Worth highlighting from this seminar are the lessons learned by the practitioner, namely the design of a process for cross-organizational collaboration in support of developing a strong cultural plan through relationship building, and investigating the ways to optimize the (cultural) priorities as identified by the community, identify possible sources of external funding for future priority projects, and develop a draft cultural planning framework using the information gathered during the project.

This was followed by applying new knowledge into practice. Therefore, the summer school participants broke out into groups of 4–5 people to conduct interviews with artists at different career stages.

- Interviews and tools used with the creative hub-based creators

The tools used by the groups to present their findings on the creative hub-based artists included:

1. Business model canvas;
2. Mind mapping;
3. City map;
4. Post-its;
5. Drawing.

The interviews show stories of foreign and national students (Germany, England, Porto, and Lisbon) that came to study arts in the city, with the wish of "*becoming artists in different creative fields*". It was observed that the creative hub-based creators develop work in jewelry, painting, graphic design, ceramics, embroidery, and architecture. All interviewees stated that they decided to stay in this city because they found "*familiarity*" with the city. This familiarity was translated by "*carrying art around, using piercings, tattoos, freak hairs, and not feeling judged*". It was also noticeable that the creators and small business owners based in the creative hub are at different stages of development (cases of startup, growth, and maturity stages), and all wish to build successful companies, where one interviewee's dream is "*to have a small factory*". The cultural and creative workers´ stories revealed difficult life trajectories to make a living out of their artwork and pointed out that their biggest challenges concerned living conditions, such as job stability, fair housing rentals, and decent housing conditions. A common need stated by all was business and marketing guidance to strengthen their companies.

- Story mapping—group work and tools used by young creators/students at ESAD, and well-established artists

The summer school attendees visited the young creators studying at the school of arts and design to map their experience in the city. Story mapping was the main method used for collecting user stories to understand their trajectories and the use of space. The materials used by the groups were city maps, as well as cardboard sheets, recycled papers, sticky notes, color markers, and other office supplies. The results showed that participants experienced difficulties in pinpointing the places they usually go to on the map.

On a second occasion, the groups visited the workshops of well-established creators of the city to also collect the stories of their use of space. The participants showed little interest in using these while telling their stories. Overall, they were more engaged in the storytelling process than in using and marking their trajectory on the physical map. It is important to highlight that some group members had difficulties interacting with the participants (artists) because of the language barrier. Therefore, the interpretation of the story and synthesis of the data collected became difficult to be disseminated. The summer school attendees suggested the use of different, or more interactive, visual representations of spaces, rather than static or satellite maps. Additional group discussions centered around the mapping process and whether it should be conducted after the storytelling session with participants rather than during. This approach would entail researchers conducting the mapping rather than involving participants in the process. The tools used by the groups to present these findings on the artists' story mapping exercises were:

1. Mind mapping;
2. Sticky notes;
3. Story/journey mapping.

4.1.3. Theme 3: Perceived Space—Self-Perspectives of a Place

- Learning seminar on recognizing and interpreting maps of lived and living experiences

This was the last theme of the analysis and concerned the summer school attendees' perceptions of the examined city. This event day started with a seminar on "*recognizing and interpreting maps of lived and living experiences*", conducted by three cultural mapping scholars. These research experts employed an interpretative schema based on Kevin Lynch's five elements of a city—nodes, paths, districts, landmarks, and edges—that give shape to the mental representations of space. Lynch described nodes as the strategic spots in a city: in representing personal journeys, these nodes are more often personified. The paths are routes taken as people engage with their communities. Districts are physical, social, psychological, or class-infused areas for gathering and sharing experiences and identities. Landmarks are external points of orientation, achievement, or validation, often ceremonial in nature. The edges are boundaries and breaks and impediments encountered during the journey.

- Workshop on emotional mapping

Following this seminar was a workshop on emotional mapping, where a cultural mapping tool was explained by the last cultural mapping expert, to explore an individual's emotional responses while moving through space, to add a layer of qualitative emotional observations. The EmoMap tool was conceived by 4is [31], a non-profit organization, and a multisectoral interaction platform for the creation of social innovation projects, in the central region of Portugal. Emotional mapping is used to activate, engage with, and diagnose a specific area by collecting emotions, memories, perceptions, needs, and expectations. It is a process open to all (inhabitants, users, and visitors). It consists of the following steps: (1) define an area; (2) participants start at a rallying point; (3) participants walk around and document the area through photos, videos, drawings, audio, and writing; (4) participants meet at a rallying point; (5) participants jointly build the story about your walk (prepare a creative presentation with collected materials); and (6) participants tell stories to others using these materials. Questions included:

- How to tell your story;
- How was the walk?;
- Which meaningful spots/elements have you found?;
- What were the emotions felt?;
- What surprised you?

The final output was an in-situ multilayered diagnosis—a compilation of emotions, needs, and expectations shared among participants. The tools used by the groups to present these findings on the artists' story mapping exercises were:

1. Maps;
2. Photos;
3. Videos;
4. Sound recordings;
5. Drawings;
6. Poetry;
7. Stand-up show;
8. Audio walk presentation.

The emotional mapping exercise ended with a group discussion to understand what became visible, and what are the needs, and potentials, to build a joint narrative on the newly collected ideas to existing development activities aiming to attract and sustain a local cultural and creative critical mass in the city. The very last exercise involved all the groups working together, which culminated in an artistic public presentation of the findings to the local population, artists, and key stakeholders. On one hand, the course participants ended up with several forms of qualitative data at hand during (and after) the summer school, and with difficulties in processing it. On the other hand, the local authorities (from the municipality) expressed that they expected a strategic plan developed by the summer school attendees to re-apply for the UNESCO creative city designation. However, the aim of the event was to link all cultural mapping findings to broader local development issues, to the city's creative city designation, and foster cultural and creative tourism in the municipality.

4.2. Findings and Limitations

The perspective layering of cultural mapping was found to be a key concept for obtaining the meaning of a place, unfolding several points of view of the different groups of people that conceive, live, and perceive the space. The contrasting angles provided a more comprehensive understanding of the complexity of ascribing a city as creative, showing that the conceptualization of such a phenomenon to a singular or narrow viewpoint and narrative is reductionistic and unfinished. The content model developed by this study around Lefebvre's triad of the production of space helped clarify this idea.

Theme 1 (conceived space—territory, and characteristics of a place) shows that local governance players continue to place ceramic arts at the core of the city's official (and fixed) narrative, constructing the place's identity around this single creative field to re-apply to the UNESCO's designation. Concurrently, the categories, and the tools described in Table 2, can be understood as activities that promoted the characteristics of the physical space, and historical background, following the main discourse conceived by the group of planners (i.e., the walking tour and the visit to the museums guided by the architect indicated the prevalence of ceramic arts). In relation to this, and as stated by Lefebvre, the perspectives on space exist simultaneously and interact and overlap. The symbolisms inherent to the production of a space can be decoded through practical relationships and the "interaction between subjects, their space, and surroundings" (p. 18). Thus, the point of convergence between the conceived and lived spaces is the city's creative hub. This platform has a great potential for connecting the different groups of actors affecting, and affected by, the city's creative development to foster multi-stakeholder networks between creatives, policymakers, and governments, as well as to be an incubator and/or accelerator platform for associated creative businesses. However, business development and management tools need to be available to creatives throughout the developmental stages of their entrepreneurial endeavors. In parallel with this, Table 2 shows the strategic tools used during the work developed with the creative hub-based artists that could be implemented for business guidance (i.e., business model canvas).

Theme 2 (lived space—stories of the creative community and their connections/attachments to a place) provides perspective on the lived experiences of the place. First, the involvement of artists in the process of the creative city re-application raised issues of local creative knowledge production, showing that crafts and folk art, namely ceramics, is not

the only art medium being developed in the city. Instead, there are several creative fields being developed by creative workers, namely jewelry, painting, graphic design, embroidery, and architecture. Second, the creative community's challenges regarding precarious work reflect the fragmented state of the CCI sector of a city that wants to brand itself through creativity and be an urban center of the creative economy, without acknowledging the creative community's production and diversity of artistic expressions. This means that the creative diversity of this city could be better integrated into the planning process of city development, as it is seriously affecting the lived experiences of creatives and the potential to grow their businesses. Worth highlighting from the CM methodologies used in this theme is story mapping, and the difficulties and the lack of interest from the participants in using the city maps to explain their trajectories in the city. This happened for a variety of reasons, such as the lack of knowledge on how to read a map and to find specific places in it. Therefore, the study suggests that in these cases, the process of mapping could be done a posteriori by the researchers involved in the process, with the information collected from participants. This means that the exercise of mapping is not always easy to be done collectively in situ, affecting the level of multi-stakeholder involvement in CM practice.

Theme 3 (perceived space—self-perspectives) included the perspectives of the participants of the summer school, who were visiting the place while developing work with the creative community. These users' mental space was [17] mostly informed by the work and analysis of the other perspectives of the space. Therefore, these reflections are found in the previous themes. The most relevant tool used in this theme was emotional mapping, as the international group of academics and practitioners rediscovered the place using the five senses to get in touch with their emotions and understand the needs, and potentials, of the creative community in the place. However, language was a barrier both to understanding the local people and to making sense of the place. This is an important finding, as Lefebvre posits it, language becomes social practice [17] (p. 5). In fact, there are several references to language in *The Production of Space* of Lefebvre. Therefore, to no surprise, language was constantly brought up by the event's participants to reflect on current practices (i.e., the formal type of communication used by key stakeholders was understood as a limitation to developing work with the creative groups of participants). In line with this, the study found several limitations of layering qualitative data, specifically concerning the participatory processes with creative agents. For instance, local artists were not actively involved in the co-design process per se, as, for instance, they did not participate in the daily iterations carried out by the course's participants, missing out on the daily synthesis and group presentations. Moreover, while it was inspiring to present qualitative data through artistic forms during the event, one of the main limitations found was that it was extremely challenging to convey, for instance, the content of the audio walk presentation, by the means of a literary medium (such as this article). This means that the latent content on emotional and multi-sensorial subtleties, gathered with the use of art-informed tools, are difficult to be disseminated in writing and seem to get lost in this medium. Therefore, there is still a need to accommodate alternative mediums of research dissemination that direct attention to a hands-on qualitative and creative exploration of meaning, without constraining it to literary exposition. These limitations are not new and are shared among many qualitative researchers, particularly the ones that conduct research through creative practice.

5. Discussion

Creativity is a well-established feature in European urban policy, promoted as an essential driver for transforming and developing urban areas in Europe into safe, inclusive, and sustainable places, as stated in Sustainable Development Goal 11, on sustainable cities and communities, specifically target 11.3 on inclusive and sustainable urbanization. The goal is to enhance inclusive and sustainable urbanization and the capacity for participatory, integrated, and sustainable human settlement planning and management. However, the concept of creativity is often used (and abused) as a symbolic and attractivity label by authorities and space planners, who neglect the issues of social equity and the inclusion of

communities who contribute to the creativity of places, resulting in the under-development of public engagement processes for the sustainable urban development of places, as is the case of the creative city designation. This form of strategic planning is usually defined by the conceivers of space, while the lived experiences of people that constitute a place as creative are often not included in the development of cities. Rethinking the practice of creativity could help form future frameworks, to support a more sustained development that could meet the needs of more users of the space, improve the quality of life of creative agents, and foster the development of the CCI sector.

Lefebvre's assertion on the 'politics of space' emphasizes the challenge of planning and designing constructed environments, highlighting the need for layering multiple points of view to understand the complexities of social practices, the production of artifacts, and attributed place meanings [32]. These meanings are constructed by people doing things in a place and, therefore, there is a need to acknowledge the production for the construction of a place through the constant and iterative processes of multi-level negotiation on place meanings. In this sense, incorporating Lefebvre's spatial theory in the cultural mapping inquiry acknowledges more fully the role of participatory design to further elaborate on the processes of multi-level work to reinvigorate, and regenerate, urban space as a socially constructed environment, and not merely as a commercial place designed for consumers and impelled by the needs of power and capital [32]. Lefebvre is critical of a narrow meaning of the production of space in the sense of economic production. According to this author, such a restricted notion hinders the symbolic significance of the non-economic facets of human reality that contribute to the construction of a place's meaning. With his theory, Lefebvre seeks to demonstrate that space is produced and reproduced in connection with the relations of production.

In the context of creative cities, the monoculture emphasis of this designation seems to happen due to a lack of a holistic vision on how to implement creativity in the development of urban areas, as well as understanding the role of artists in the cultures of sustainability of these designated cities. Monoculture is a concept widely used in intensive farming as the practice of focusing on only one crop species in a field at a time. In the short term, this practice is profitable for economic growth but, in the long term, it brings major challenges at different levels, such as soil degradation [33]. Transporting this approach to the creative development of places, the focus on one main creative field per city degrades its diversity, as creative agents are not all dedicated to working in only one art form. In most cases as in this one, the monoculture practice boils down to efficiency. It is simpler to take care of one crop than to individually manage and organize multiple products/activities. It is certain that the artistic background of the creative city examined in this study is rooted in ceramic arts, mainly due to the characteristics of the territory, and the history of the place and, therefore, it is understandable that the group planners set the purpose of the re-application to the UNESCO's designation in finding the balance between ceramics artisanship and industrial production. Nevertheless, it is also important to acknowledge the creative producers' perspectives and the diversity of creative fields they develop in the city to open space for creative agents to improve their living experience, develop networks, and contribute to the narrative of the creative identity of their place [20,33].

Cultural mapping scholars argue that "under the banner of cultural and creative industries development, cultural mapping has emerged as a broad-brush analytical tool used in positive ways (e.g., a technique to delineate the spaces of the city for cultural practices/activities), but also negative ways (e.g., for mounting arguments about the capacity for culture and art in place revitalization, and as a remedy for industrial decline, masking the roll-out of neoliberal creative city planning scripts and exposing "hip" places prone to future gentrification, justifying the privatization of cultural/art spaces, etc.)" [20] (p. 2). On the one hand, cultural mapping has been proven as an effective methodological approach to detail tangible assets on the CCI system (i.e., counting physical spaces, cultural venues, organizations, public art, and other resources) and is, therefore, used by municipalities to identify gaps and access, layering various datasets and future cultural provision, and

as an archiving tool. Some authors argue that "predominantly, there has been a focus on gathering quantitative data at the expense of more textured qualitative information about how such assets are recognized, valued, or used by local communities and visitors. Perceptions of the significance of qualitative data have largely been effaced, in favor of simplistic surveys which promote inter-city competition through image management" [34] (p. 8). On the other hand, cultural mapping has proven less successful in mapping intangible cultural assets (i.e., identities, and a shared sense of place, among others). Most authors agree that the involvement of artists/creative agents in cultural mapping is crucial to make these intangibilities visible, and the implementation of artistic approaches to cultural mapping is said to foster grassroots and experimental initiatives within participative and creative community planning and development more broadly [20,24]. The engagement of artists (and university-based artist-researchers) in cultural mapping is a recent development and is usually a one-time initiative (as in the case of this study), with contributions that are project-based and time-limited. These end up as data accumulation and are considered "art projects" rather than initiatives for long-term strategies. Accordingly, cultural mapping remains not fully integrated within the planning and development practices of places [35].

6. Conclusions

The article uses the three perspectives on space described by Lefebvre, which are core themes embedded in cultural mapping theory and practice. This was examined through the conceptual model developed by this study to analyze the content of a summer school on the topic. The event worked as a conversational platform for discussion, sharing, and learning, to revive the conversation and echo the concern of multi-stakeholder involvement in participatory governance processes of the creative development of urban areas. During the 5-day program, attendees experimented with working with the local creative community at different maturity levels of their careers, with the guidance of research experts and practitioners of the CM field, collecting different perspectives of local-based artists on the creative production of space. The relevance of investigating cultural mapping to further our understanding of the involvement of artists in the validation of creative cities was to highlight the relation of creative production for the conceptualization of places, as well as to detail information on the participatory and sensorial ways of assessing, organizing, texturing, and presenting qualitative data on the intangibilities of places (such as perceptions of creative identity). The most concrete contribution of this study was inviting reflexive engagements on layering perspectives toward participatory practices on the creative production of space, as well as on the role of language as a complex representational system for interpreting and defining space, and human relations.

Concluding, this intensive example made visible the ways language and meaning, through the conversational platform of cultural mapping, are important for the processes of production and the construction of space. However, there remain practical challenges with such conceptualizations. From a methodological point of view, the research confirms the high degree of experimentation of cultural mapping, which still lacks the structure to decode the people–place meaning through language, during multi-stakeholder work processes. Designing places in inclusive ways involves complex work processes in order to combine several perspectives and create a multivocal place narrative. Future research could address these challenges by further investigating the links between cultural mapping and design science, and implementing co-design process models, around the sets of cultural mapping activities, in an attempt to create a system of mapping to interpret the subtleties inherent to place. Such design models could provide detailed information on different stakeholders' perspectives, as well as intended outcomes (i.e., who should be involved for what reason, and in which order cultural mapping activities should take place, according to the different points of view), linking the implementation of CM tools with the different work stages of the co-design process, to help organize its crafting.

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Creative Economy and Sustainable Development: Shaping Flexible Cultural Governance Model for Creativity

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Abstract: With the development of cultural democratization, countries have attached increasing importance to the protection of cultural rights and the promotion of sustainable cultural development. The establishment of a flexible cultural governance model may release the transformative force of culture and creativity, gradually spread cultural values and ideas into governance, and shift activities to more sustainable behavior. This research was divided into two stages. In the first stage, CiteSpace was used to conduct a co-citation analysis of documents published between 2013 and 2022 in the Web of Science database. The results were combined with existing cultural development and value indicators from many countries to design cultural impact indicators suitable for evaluating the sustainable development of creative industries. In the second stage, a questionnaire survey was conducted on the cultural industry, the creative economy, and cultural consumption. Through statistical analysis, six dimensions were obtained, and 20 indicators were cultural sustainability, cultural democracy, cultural innovation, cultural industrialization, cultural vitality, and cultural policy systematization. The cultural governance framework of the creative economy and sustainable development was established through AMOS software. This study found that the humanistic rationality of cultural governance has a significant improvement and stable role in promoting the governance of cultural policies. Adjustable cultural impact indicators are effective cultural practices for shaping and framing creative industries, which should be invented, stabilized and improved.

Keywords: cultural governance; creative economy; cultural policy; regional development; cultural impact assessment

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1. Introduction

In the sustainable development goals (SDGs) adopted by the United Nations in September 2015, culture is first mentioned in the international development agenda. UNESCO believes that the protection and promotion of culture is an end goal and directly contributes to many sustainable development goals: safe and sustainable cities, work and economic growth, reducing inequality, protecting the environment, promoting gender equality, and a peaceful and inclusive society. Sustainable development is a conceptual change beyond economic development and growth. If the economic, social and environmental goals are regarded as the three pillars of sustainable development, UNESCO believes that culture and creativity offer a horizontal contribution to each of these pillars. In turn, the economic, social, and environmental dimensions of sustainable development aid in protecting cultural heritage and fostering creativity. In the cultural development reports and documents of all the countries in the world, focus has consistently been placed on elements such as the cultural economy, economic statistics, and industrial statistics. However, the analysis of the cultural side is still lacking [1,2]. This paper examines the sustainable development of cultural and creative industries from a cultural perspective.

Presenting cultural changes and evaluating the effectiveness of cultural policies has become a topic of culturally sustainable development. At present, the key performance indicators (KPIs) widely used by the government are not wholly suitable for measuring cultural development. The government should establish an evaluation system and investigation method to observe cultural development over an extended period. In addition to building 'cultural basic indicators' based on the current level of cultural development, the government should also refer to the "culture for development indicators" of international organizations. To provide a test basis for the implementation of policies, cultural development indicators suitable for the national conditions should be proposed.

Cultural power is the soft power of a country, as well as the key driving force toward an era of innovation. Contemporary cultural governance is no longer simply the distribution and management of artistic and cultural resources and power. It should neither be seen as the inculcation and discipline of artistic and cultural concepts by administrators to ordinary people [3]. The rise of concepts such as creative cities, cities of art and design, and cultural capitals, as well as the emerging planning discourse such as art intervention space, citizens' cultural rights, cultural capital, and creative economy, refers to a "cultural turn" in contemporary cultural governance strategies [4]. Cultural governance should consider how to realize governance practices rooted in art and cultural logic, flexible governance strategies, and a "governance mentality" that may affect the mood of ordinary people.

Landry [5] advocates that the creative city is a new, strategic urban planning method establishing an interactive and cooperative relationship by connecting culture and other urban strategies. By gathering talent and organizations, and by fostering a creative atmosphere, such a city may become a hub for innovation and provide momentum for development. The UNESCO Creative Cities Network [6] encourages global cities to develop on a foundation of cultural and creative industries and to implement "cultural diversity" as the main axis of cultural governance. Culture is regarded as an important tool for economic revitalization and sustainable urban development. Economic and cultural value should be evaluated in the overall framework. The cultural statistical indicators proposed by UNESCO in 1986 were later revised in response to the trend of cultural concepts and the importance of cultural value awareness under globalization. With the 2014 publication of Culture for Development Indicators (CDIS), UNSECO attempted to establish relevance indicators of different cultural aspects and social development strategies in order to measure cultural values and the diffusion benefits of culture in other fields in more depth [7]. In 2016, the British Department for Digital, Culture, Media and Sport and the Arts and Humanities Research Council (AHRC) analyzed cultural value more thoroughly in their research study titled "Understanding the Value of Arts & Culture: The AHRC Cultural Value Project". It was concluded that such evaluations should not only be for the endorsement of public resource allocation but should also explore the true value of culture and art [8].

Similar systems to assess cultural value and conduct have been promoted internationally for many years. Numerous international organizations have conducted qualitative and quantitative research on both domestic and international cultural values. The overall evaluation framework is formulated for cultural identity, cultural diversity, cultural asset preservation proximity, social harmony, social happiness, cultural interaction and participation, cultural and economic development, as well as cultural industry benefits [3]. For example, the Taiwan Cultural Policy Research Institute, acting as the third sector of civil society, has carried out an early investigation and research on Taiwan's Cultural Values project [9] to explore the trends and connotations of cultural values in Taiwanese society. This was done by collecting and analyzing objective questionnaire data. The government wishes to use the survey results as a guide for the cultural and third sectors in order to formulate artistic and cultural policies, thus triggering a new discussion regarding cultural ontology in Taiwan's society.

As the driving force of economic growth, development, and regeneration, CCI has a significant impact on the social and cultural aspects of welfare, site creation, inclusiveness, sustainability, diversity, and culture. CCI development models include resource activation;

industrial upgrading; technology-driven, urban transformation; and policy guidance [10]. According to the policy guidance model, the government promotes the rapid formation and development of cultural and creative industries in a region by formulating industrial development strategies, policies, and laws; building financial and tax systems; and implementing talent training programs. These actions aid in realizing the leapfrog development of CCI (Figure 1).

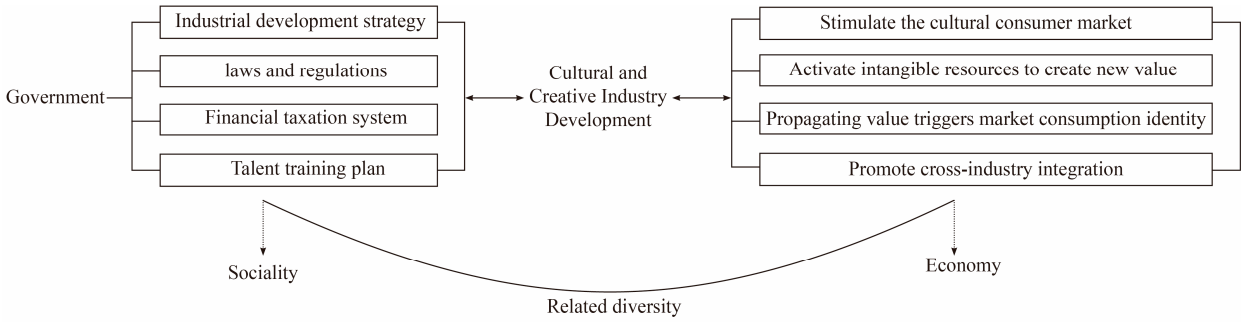


Figure 1. Creative and cultural industry development model integrating policy guidance and resource activation.

2. Literature Review

2.1. Theoretical Research on Cultural and Creative Industries

In recent years, research on the cultural and creative industries has focused on the qualitative analysis of the connotation and categories of CCI, as well as the empirical study of individual cases. Daubaraite and Startiene [11] clarified the impact of creative industries on the national economy and conducted a systematic evaluation of the subsectors of creative industries. Pappalesore [12] found that the agglomeration of creative industry space provided opportunities for consumption and cultural capital accumulation, and promoted the development of creative tourism. Yu and Liu [13] used the TOPSIS comprehensive evaluation method to build the quality index system of cultural and creative industries, and point out that the improvement of marketization may aid the efficiency of cultural and creative industries. Wang et al. [14] used the Malmquist index to measure the CCI development efficiency and regional differences between provinces in terms of dynamic development, index decomposition, and provincial efficiency. Pan [15] pointed out that cultural innovation, when represented by cultural creative production, causes the agglomeration and diffusion of economic innovation. Agglomeration is the process of cultural creativity's self-multiplication, ultimately forming the cultural creativity class. Diffusion is the process of blending the two dimensions of communication and economy. Liao and Li [16] adopted the CiteSpace research method to conduct data visualization analysis on the integration of China's tourism industry and CCI. These authors found that research in China pertained to local economic benefits and mainly focused on specific cases, and that the smaller body of macro policy research on the overall development of CCI mainly focused on qualitative analysis. Wang [17] pointed out that "cultural products" mainly carry certain concepts and content that are traditionally recognized, while "cultural creativity" should be suitable for bearing certain social effects of "enlightened politics, ideology, customs, and aesthetic guidance". At present, the research on cultural and creative industries ranges from the theoretical category to regional development and the industrial economy. However, deficiencies include the inconsistent statistical caliber and the isolated consideration of economic indicators.

This paper analyses the co-citation of literature in the core database of the Web of Science from 2013 to 2022. The following two main thematic trend paths have been identified: citing region "Economics, Economic, Political" to cited region "Psychology, Education, Social"; and citing region "Psychology, Education, Health" to cited region "Psychology, Education, Social" (Figure 2).

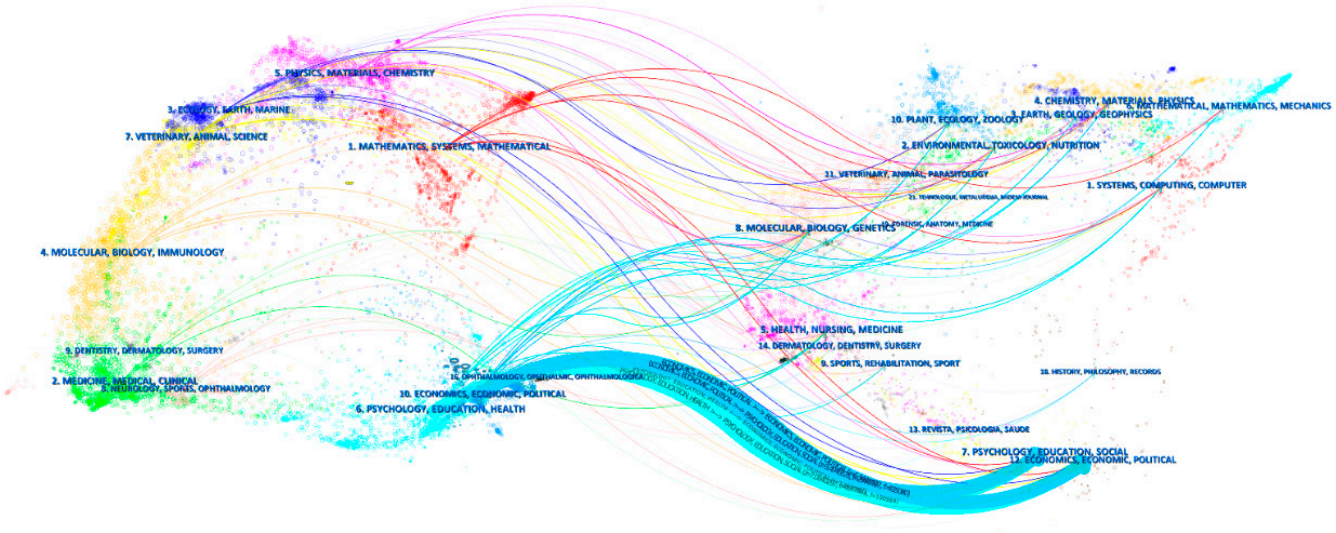


Figure 2. Domain-level citation patterns in CCI research (2013–2022, in Web of Science): The cluster on the left indicates the retrieved research frontier, while the cluster on the right indicates the location of their references; Citation tracks and reference tracks are distinguished by the color of the reference area; The thickness of these tracks is proportional to the reference frequency of the z-score.

2.2. Cultural Development Indicators

As with other developing countries, the key performance indicators widely used by the Chinese government are not entirely suitable for measuring the development of culture. Therefore, the country's presentation of cultural changes and assessments of the effectiveness of cultural policies should establish an evaluation system and investigation method that may observe cultural development over an extended time frame. In addition to the basic cultural indicators based on the current situation of cultural development, we should also refer to UNESCO's CDIS to propose standards suitable for a developing country as a test benchmark for policy implementation. Different countries and international organizsations present different situations when surveying cultural values and constructing national cultural indicators (Table 1).

Table 1. Cultural indicators and cultural value survey.

Cultural Indicator	Report
Reflective individuals, Civic engagement, The self, Communities, Regeneration, Space, Economy, Health, aging, Wellbeing, Arts in education	Understanding the Value of Arts & Culture: The AHRC Cultural Value Project (2016) [8]
Economy: GDP, Employment, Household expenditure Education: Inclusive education, Multilingual education, Arts education, Professional training Governance: Standard-setting framework, Policy and institutional framework, Arts education, Professional training Social: Going-out participation, Identity-building participation, Intercultural trust, Interpersonal trust, Self-determination Gender: Gender equality outputs, Perception of gender equality Communication: Freedom of expression, Internet use, Diversity of media content Heritage: Heritage sustainability	UNESCO. Culture for development indicators: methodology manual (2014) [18]
Arm's-length governance: Delegated models at the national level Multistakeholder governance: Civil society, Non-government actors, and the Private sector Interministerial governance: Cross-portfolio engagement Multilevel governance: Decentralized models at all government tiers	UNESCO. Building resilient and sustainable cultural and creative sectors (2022) [19]

Table 1. *Cont.*

Cultural Indicator	Report
Citizenship, Equalities, Education, Innovation, Local government, Justice	BOP. Cultural and Creative Industries in the Face of COVID-19: An Economic Impact Outlook (2021) [20]
Professional and formal cultural and creative sectors; Education and training: retaining talent; Arts education	UNESCO. Culture and sustainable development: a still untapped potential (2022) [21]
Economic development: Cultural employment, Government support for culture, Voluntary work in arts and culture, Economic contribution of cultural industries Cultural value: Cultural assets, Talent (human capital), Cultural identity, Innovation (new work/companies), Global reach Engagement and social impact: Cultural attendance, Cultural participation, Access, Education in arts and culture	Vital Signs: cultural indicators for Australia (2011) [22]
Cultural vitality: the presence of opportunities for cultural participation, cultural participation itself, and support for arts and cultural activities.	Cultural Vitality in Communities: Interpretation and Indicators (2006) [23]
Engagement: Cultural employment, Heritage protection, Access to arts, culture, and heritage activities and events Cultural Identity: Local Content on television, The importance of culture to national identity Diversity: Cultural grants to minority ethnic groups, Attendance at and participation in ethnic cultural activities, Minority cultural activities Social Cohesion: Other-ethnicities attendance, Community cultural experiences Economic development: Income of the cultural industries, Value-added contributed by the creative industries, The creative industries' proportion of total industry value-added	Cultural indicators for New Zealand (2009) [24]
Self-expression values, Survival values, Secular-rational values, Traditional values	World values survey. Values change the world (2008) [25]
Deeply cultivate cultural "sense of history", Shaping the "international sense" of culture, Cultural diversity and freedom as a "sense of value" Stimulate "cultural creativity"	TAICCA. 2021 Taiwan Cultural & Creative industries Annual Report (2021) [26]
Cultural democracy: Promoting cultural governance reform and organizational reengineering Cultural creativity: Support the freedom of artistic creation and cultivate aesthetic cultivation Cultural vitality: Cultural preservation and rooting, linking land and people's historical memory Cultural sustainability: The sustainability of the cultural economy and the ecosystem "cultural and creative industries" Cultural inclusiveness: Promoting the development and exchange of cultural diversity Cultural transcendence: Carry out cultural future, Create cultural science and technology, Cross-domain co-creation and sharing	Ministry of culture. 2018 culture policy the white paper (2018) [27]
Place and identity, Engagement, Identity, Social cohesion, Diversity	Carol Scott (2014) [28]
Cultural consistency, Diversity, Justice, Inclusive perception bias	PWC. Global Culture Survey 2021 (2021) [29]

The contents of the above-mentioned cultural surveys may be divided into two distinct measurement methods: the measurement of cultural indicators and the measurement of cultural values. The reports on cultural indicators in Australia, New Zealand, and Taiwan mainly focus on the measurement of statistics. Numerical values, such as those of population, output value, and the number of activities involved, are taken as benefit analysis. The systems may be regarded as assessment tools for the allocation of national resources. The evaluation of cultural indicators in these countries and regions, although committed to the quantification of social environments, may highlight the significance of cultural values. However, from the setting of its evaluation indicators, it also brings to light social integration, cultural diversity, and identity attribution, and emphasizess the

value of cultural identity. Economic development is listed as the final consideration of several evaluation indicators. However, culture valuation cannot rely solely on quantitative values such as cultural surveys and statistics. Relevant cultural value surveys show that the top five cultural values shared by the world are "democracy and civic awareness (71.3%), inclusion and diversity (69.5%), human rights and the rule of law (58.8%), fairness and justice (42.7%), and care and public welfare (42.7%)" [9]. Varying opinions regarding the connotation of cultural values in various societies exist. Therefore, ensuring the continuous and open dialogue of the core cultural values of a country is currently an indispensable cultural policy mechanism for all countries.

2.3. Study Design

CiteSpace (abbreviation of Citation Space) is a visual citation analysis tool used to analyze the potential knowledge contained in the scientific literature [30]. CiteSpace is used to draw visual "Mapping Knowledge Domains" (MKD), which may present the structure, rules, and distribution of scientific knowledge in multiple, time-sharing, and dynamic manners. Since the relevant research on cultural and creative industries is biased towards economic research, MKD was used in the first stage of this paper to draw the trend map of CCI development research over the past 10 year, and to collect hot keywords.

The structural equation model is a statistical technique to test the fitness of a theoretical or hypothetical model, which can simultaneously handle multiple variables in the causal model [31]. In order to propose cultural impact indicators with flexible characteristics, we sieved the variables collected in the first stage and added them to the questionnaire of the cultural and creative consumption market in the second stage. The data analysis of the questionnaire was aided by SPSS factor analysis technology and was constructed according to the AMOS model (Figure 3).

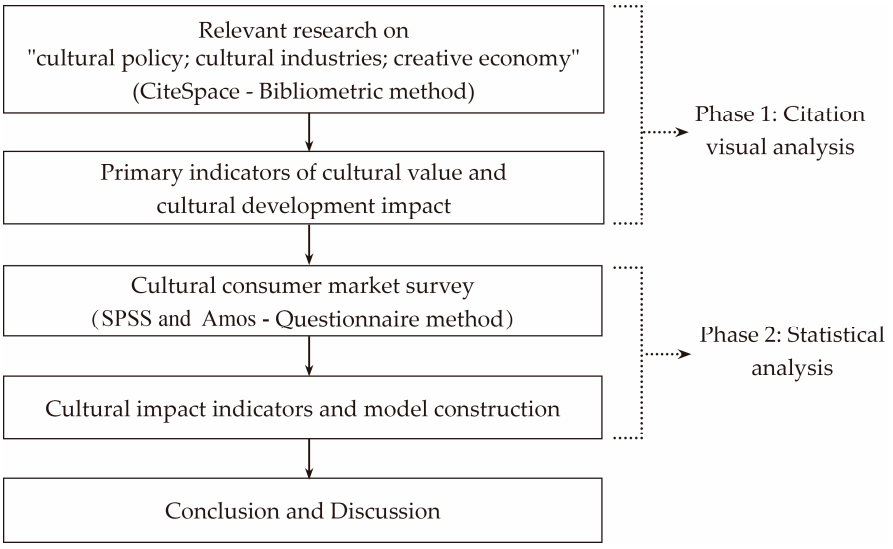


Figure 3. Research Process and Design.

3. Materials and Methods

3.1. Science Mapping

3.1.1. Data Collection

In this article, the scientific literature used may be found in the Web of Science Core Collection. The terms to the query are "(((TS = (cultural industry)) AND TS = (creative industry)) AND TS = (creative economy)) AND TS = (cultural heritage)". This query retrieved 5443 bibliographical records. The timespan is from January 2013 to December 2022. The document type is "article". The number of articles related to CCI increased from 404 to 731 between 2013 and 2019, and then remained stable. Between 2021 and 2022, the number of articles fell to a nadir of 290 (Table 2).

Table 2. The distribution of the bibliographic records in the dataset.

Time	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Records	404	427	489	515	556	642	731	692	697	290

Thirty-one top words featured the strongest citation bursts (Table 3). These highly cited keywords are creative cla, cultural industry, economic geography, music, enterprise, value creation, amenity, university, creative field, contextual factor, work environment, film industry, service innovation, search, cultural diversity, United States, creative process, workplace, creative practice, smart city, history, globalization perception, student, law, care, video game, creative self-efficacy, digital economy, social innovation, and entrepreneurial orientation. A comparison of cluster words and keywords shows that most of these words are related to humanity, value and co-creation. This indicates that the development of CCI has shifted from an instrumental to a humanistic rationality.

Table 3. Keywords with the Strongest Citation Bursts during (2013–2022).

Keywords	**Year**	**Strength**	**Begin**	**End**	**2013–2022**
creative cla	2013	12.95	2013	2015	
cultural industry	2013	5.88	2013	2015	
economic geography	2013	4.66	2013	2016	
music	2013	4.44	2013	2015	
enterprise	2013	3.3	2013	2015	
value creation	2013	2.9	2013	2015	
amenity	2014	4.18	2014	2017	
university	2014	3.95	2014	2018	
creative field	2014	3.65	2014	2016	
contextual factor	2014	3.16	2014	2017	
work environment	2014	2.8	2014	2017	
film industry	2015	2.93	2015	2017	
service innovation	2015	2.64	2015	2017	
search	2016	4.03	2016	2018	
cultural diversity	2016	2.93	2016	2018	
united states	2017	4.22	2017	2019	
creative proce	2017	3.01	2017	2019	
workplace	2017	2.71	2017	2019	
creative practice	2017	2.41	2017	2019	
smart city	2018	6.53	2018	2020	
history	2018	2.99	2018	2020	
globalisation	2013	2.51	2018	2020	
perception	2014	2.48	2018	2020	
student	2019	5.25	2019	2022	
law	2019	4.14	2019	2022	
precarity	2019	3.59	2019	2022	
video game	2019	3.59	2019	2022	

Table 3. *Cont.*

Keywords	Year	Strength	Begin	End	2013–2022
creative self-efficacy	2019	3.23	2019	2022	
digital economy	2018	3.17	2019	2022	
social innovation	2019	2.76	2019	2022	
entrepreneurial orientation	2018	2.62	2019	2022	

Note: Colors (light blue-blue-red) represent the strength of keyword bursts (low-medium-high).

3.1.2. Visualization and Analysis

In this study, CiteSpace was used to create a co-citation network of selected files in the CCI research area. CiteSpace was chosen due to its visual flexibility, advanced filtering capabilities, and several built-in network analysis toolkits. The co-citation network of 5443 references is shown in Figure 4. One node represents a keyword, and the larger node represents a higher citation frequency.

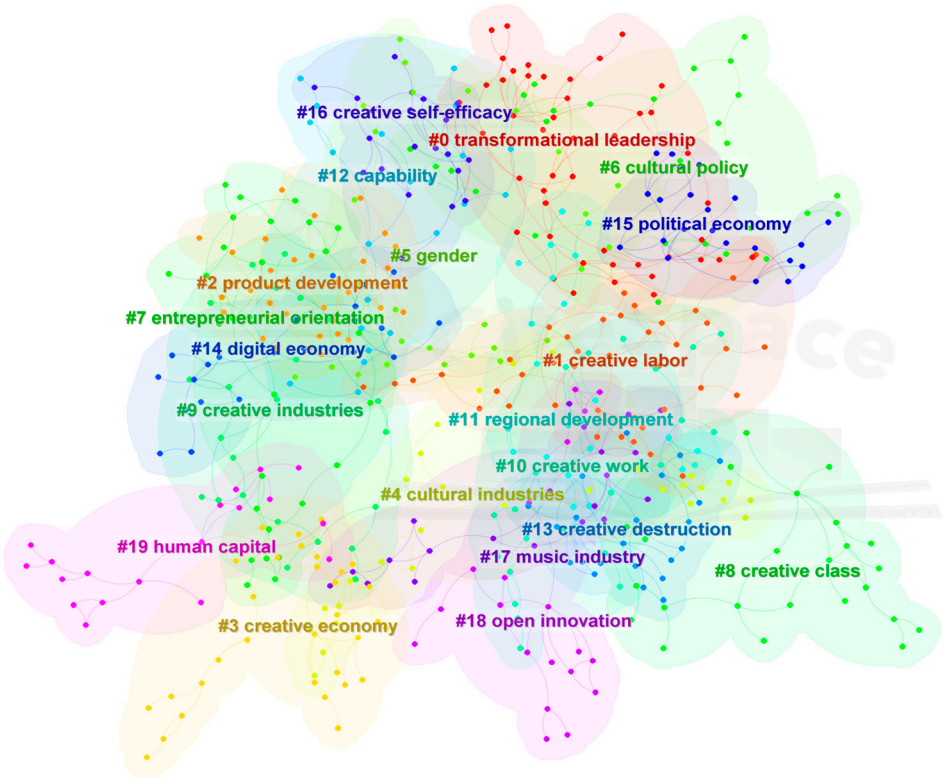


Figure 4. A landscape view of the co-citation network. (LRF = 3, LBY = 5, and e = 1.0; Timespan: 2013–2022; Slice Length = 1).

The co-citation network is clustered by means of a modular approach, and the clustering is marked by LSI (Latent Semantic Indexing) and log-likelihood ratio techniques. Through the clustering analysis of keywords, 20 clusters are obtained (Table 4). The keywords cluster includes political economy, creative performance, creative economy, social networks, creative industries, human resource management, creative construction, product development, transformation leadership, impact, gender new economy, creative tourism, creative firms, cultural production, knowledge economy, value co-creation, creative labor, cultural policy, and human capital. (Complete data in Appendix A)

Table 4. The 20 LLR clusters sorted by size (2013–2022).

Cluster ID	Size	Silhouette	Mean (Year)	Label by LLR (Log-Likelihood Ratio, p = 0.0001)
0	46	0.882	2016	(79.42, 0.0001) Transformational leadership (58.65, 0.0001Employee creativity (38.48, 0.0001) Knowledge sharing (35.7, 0.0001) Creative self-efficacy (30.06, 0.0001) Creativity
1	41	0.915	2015	(50.44, 0.0001) Creative labor (17.58, 0.0001) Creative thinking (17.58, 0.0001) Precariat (16.58, 0.0001) Work (16, 0.0001) Digital media
2	36	0.823	2016	(28.82, 0.0001) Product development (24.53, 0.0001) Design thinking (21.04, 0.0001) Competitive advantage (20.31, 0.0001) Information technology (20.31, 0.0001) Absorptive capacity
3	32	0.965	2015	(103.54, 0.0001) Creative economy (50.42, 0.0001) Creative city (42.06, 0.0001) Economic development (29.49, 0.0001) Higher education (28.79, 0.0001) Creative cities
4	29	0.87	2016	(38.85, 0.0001) Cultural industries (34.49, 0.0001) Urban development (27.63, 0.0001) Cultural industry (22.2, 0.0001) Urban (19.17, 0.0001) City
5	28	0.964	2016	(21.88, 0.0001) Gender (13.05, 0.001) Gender inequality; (13.05, 0.001) Production; (13.05, 0.001) Intersectionality; (13.05, 0.001) Feminism
6	27	0.933	2014	(42.41, 0.0001) Cultural policy (31.1, 0.0001) South Africa (30.16, 0.0001) Cultural production (21.9, 0.0001) Policy mobilities (18.94, 0.0001) Politics
7	27	0.878	2017	(33.34, 0.0001) Entrepreneurial orientation (29.32, 0.0001) Creative performance (22.58, 0.0001) Business performance (22.56, 0.0001) Social media (21.26, 0.0001) Big data
8	24	0.957	2016	(32.5, 0.0001) Creative class (19.82, 0.0001) Creative workers (19.82, 0.0001) Social networks (14.39, 0.001) Digital transformation (12.74, 0.001) Multivariate linear regression
9	24	0.864	2014	(188.43, 0.0001) Creative industries (53.14, 0.0001) Cultural and creative industries (27.55, 0.0001) Creative industry (27.21, 0.0001) Sustainable development (20.04, 0.0001) Fashion
10	23	0.938	2015	(34.82, 0.0001) Creative work (25.81, 0.0001) Cultural work (17.8, 0.0001) Energy transition (16.35, 0.0001) Research and development (11.86, 0.001) O31
11	23	0.904	2015	(36.59, 0.0001) Regional development (20.38, 0.0001) Creative tourism (19.36, 0.0001) System (19.29, 0.0001) Cultural tourism (16.5, 0.0001) Cultural heritage

Table 4. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label by LLR (Log-Likelihood Ratio, p = 0.0001)
12	23	0.953	2014	(17.53, 0.0001) Capability (12.48, 0.001) Product (12.48, 0.001) Everyday life (12.48, 0.001) Technology transfer (12.48, 0.001) Tradition
13	22	0.905	2016	(58.11, 0.0001) Creative destruction (22.38, 0.0001) Sharing economy (22.38, 0.0001) Disruptive innovation (19.62, 0.0001) Law (19.62, 0.0001) Intellectual property
14	22	0.86	2016	(26.56, 0.0001) Digital economy (25.71, 0.0001) Knowledge economy (25.15, 0.0001) Knowledge-based urban development (22.79, 0.0001) Artificial intelligence (22.64, 0.0001) Industry 4.0
15	22	0.934	2014	(85.98, 0.0001) Political economy (13.35, 0.001) Climate change (13.27, 0.001) Firm (13.17, 0.001) New media (13.17, 0.001) Outsourcing
16	21	0.929	2017	(37.78, 0.0001) Creative self-efficacy (27.32, 0.0001) Creative industries (14.51, 0.001) Human resource management (14.08, 0.001) Phenomenology (14.08, 0.001) Servant leadership
17	21	0.865	2014	(64.67, 0.0001) Music industry (29.39, 0.0001) Popular music (26.78, 0.0001) New economy (18.8, 0.0001) Music industries (13.37, 0.001) Digital technology
18	20	0.94	2017	(20.99, 0.0001) Open innovation (19.41, 0.0001) Value co-creation (14.97, 0.001) Service design (14.39, 0.001) Tourist experience (13.81, 0.001) Creative industries
19	20	0.883	2015	(43.32, 0.0001) Human capital (17.14, 0.0001) Economic growth (15.51, 0.0001) 21st-century skills (13.76, 0.001) Creative industries (13.36, 0.001) Intellectual capital

Figure 5 presents a co-citation network clustering view of CCI research in 2013, 2021, and 2022. The ranking of clusters is based on their size, which represents the number of cited publications in a cluster. The two largest clusters (#0 and #1) are Transformational Leadership and Creative Labor. These are followed by three similar clusters, namely Product Development (#2), Creative Economy (#3), and Cultural Industries (#4). The clustering path in 2013 clearly shows that the clusters established by keywords are related to each other (Figure 5a). The fragmentation between clusters begins in 2021. By 2023, there are also links between the following clusters: Political Economy (#15), Creative Self-Efficacy (#16), Creative Destruction (#13), and Digital Economy (#14). Therefore, the keywords of 2021 and 2022 are focused on the field of cultural policy (#13, #14, #15, #16), and are seen to represent the main factor affecting the development of CCI.

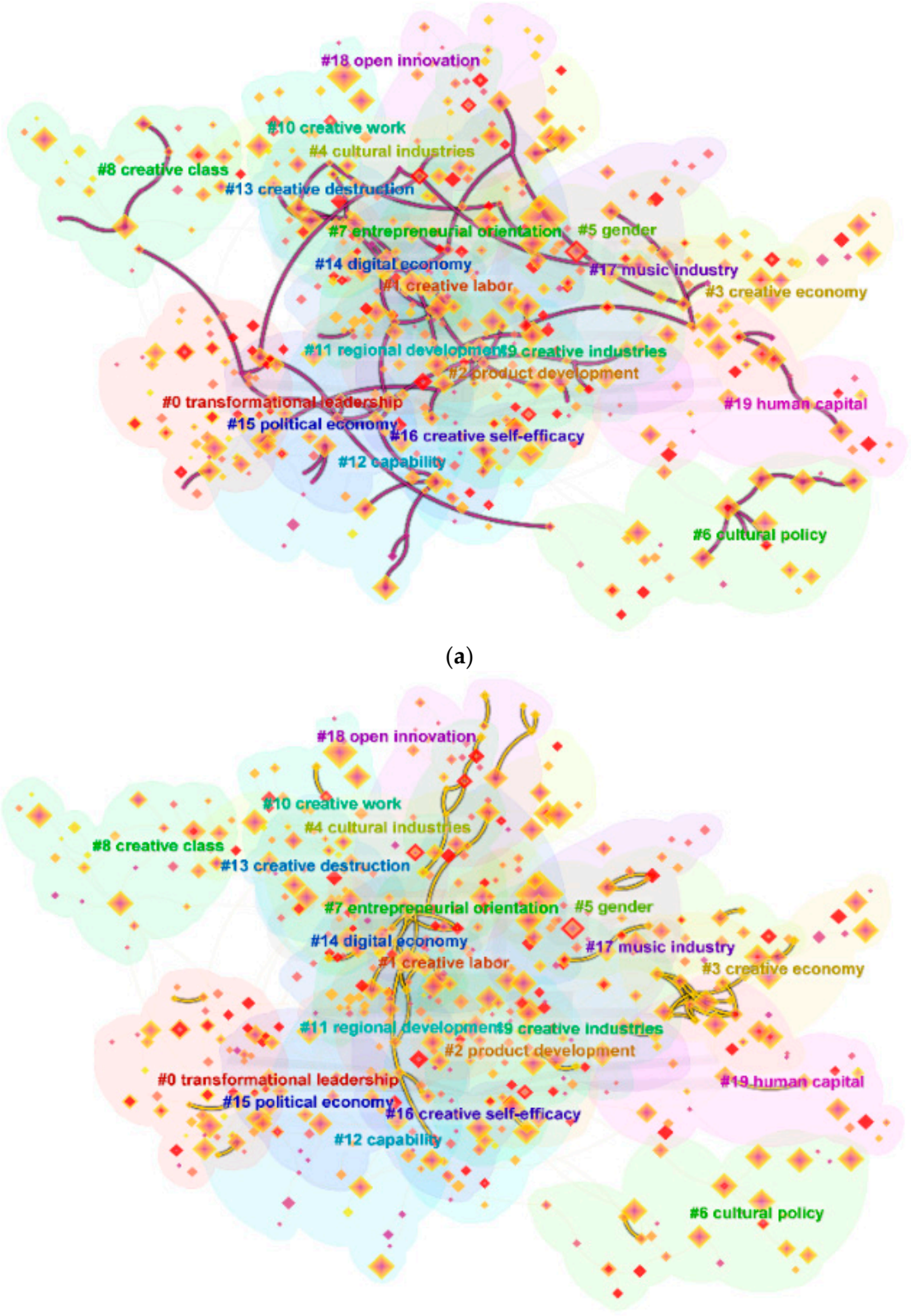
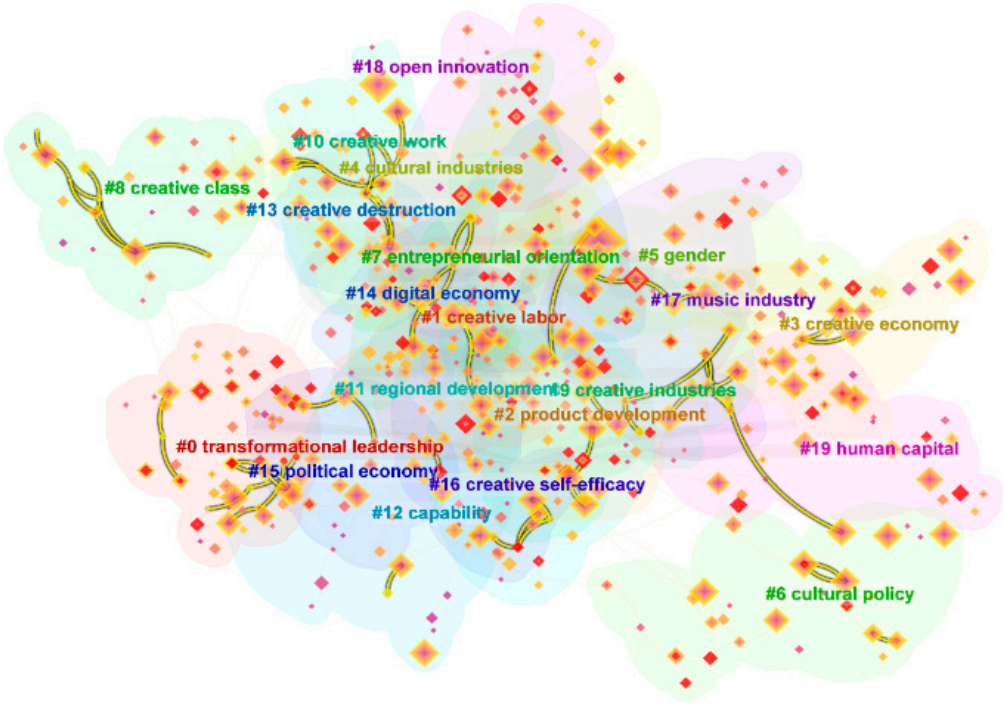


Figure 5. *Cont*.



(**c**)

Figure 5. A landscape view of the co-citation network: (**a**) Timespan: 2013; (**b**) Timespan: 2022; (**c**) Timespan: 2023.

3.1.3. Timeline View

The timeline visualization in CiteSpace depicts clusters along horizontal timelines (Figure 6). Each cluster is arranged vertically according to its size, with the largest cluster displayed at the top of the view. Color curves represent the co-reference links added in the corresponding color years. Large nodes, or nodes with red tree rings, are highly referenced. Under each timeline, the keywords with the highest frequency in a specific year are displayed. The most referenced tags are located at the lowest position of the timeline. The clusters are numbered from 0, with cluster #0 being the largest cluster, cluster #1 is the second-largest, and so forth. Some clusters last more than 10 years, whereas others are relatively short. The largest cluster lasted for 10 years and remains active. Clusters #8, #9, #12, and #13 span 10 years and are still active. In contrast, Cultural Policy (#6) ends in 2020, indicating that relevant research has found its own direction in new professional fields.

3.2. Cultural Values and Cultural Consumption Market Survey

3.2.1. Data Collection

The questionnaire covers cultural identity, cultural diversity, the preservation of cultural assets, cultural interaction and participation, cultural and economic development, and cultural policy evaluation. This research questionnaire is divided into two parts. The first part investigates the attitude of cultural and creative consumption, the intention of cultural heritage protection, and the perception of cultural policy. The second part pertains to basic information of the research object, such as gender, age, and occupation. The questionnaire variables used the Likert 7-point scale, with options ranging from "completely disagree" (1 point) to "completely agree" (5 points). The latent and observation variables of the questionnaire refer to the research of relevant scholars and are modified according to this study. The specific scale settings are shown in Table 5.

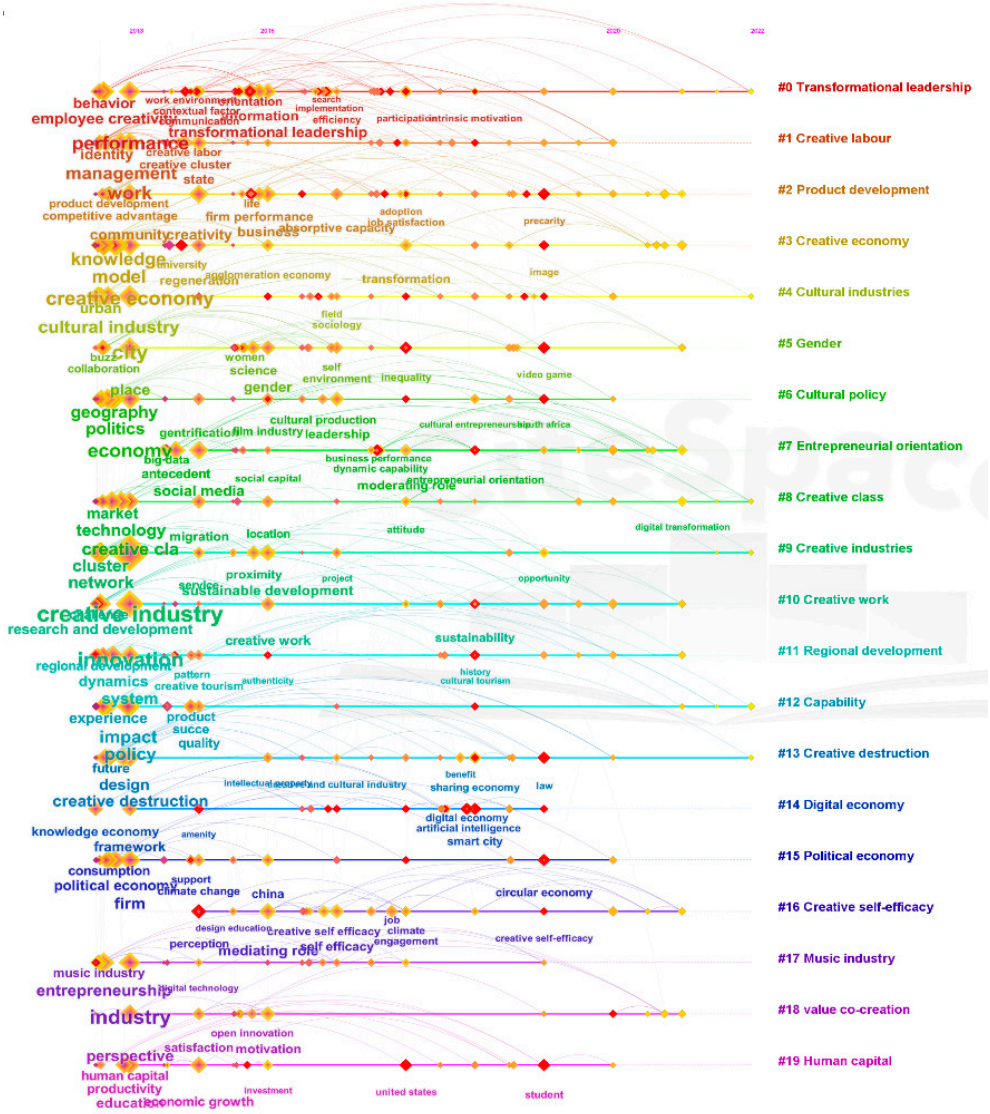


Figure 6. A timeline visualisation of 20 clusters.

Table 5. Measurement items and sources.

Measuring Items	Sources
The role of cultural heritage as a cultural intermediary.	[22,24]
The role of CCI in local, regional, national, and supranational economies.	[20]
Cultural governance strategy.	[19,26,28]
Art education and professional training.	[18]
Cultural assets preservation strategy.	[18,22,24]
Sustainable development strategy of the cultural economy and the CCI ecosystem.	[28]
Policies to promote the development and exchange of cultural diversity.	[23]
Creating culture, technology, cross-regional co-creation and sharing, and cultural governance strategies.	[18,22,24]
Ways to participate in the protection of cultural heritage.	[19,20,22]
Cultural consumption attitudes towards intangible cultural heritage and cultural and creative products.	[23,24]

The subjects of this survey are mainly young and middle-aged groups in China, and questionnaires are distributed through the Credamo platform. The formal questionnaire was distributed using the Credamo data mart between 12 and 14 December 2022. A total of 635 questionnaires were collected, with 500 rated as valid. There were 308 female respondents and 192 male respondents. All responses to the questionnaire were anonymous, and participants were required to be over 18 years old. In terms of data quality control, the questionnaire restricted repeated answers from the same IP address; only one person per five-kilometres range could respond. Users who had already answered were filtered out, and the author was required to authorize each IP location. Table 6 records the time and quantity of questionnaires.

Table 6. Time and quantity of questionnaires.

No.	Date	Name of Questionnaire	Distribution Channels	Number of Releases	Total Answers
1	12 December 2022	Formal questionnaire	Credamo data mart	100	130
2	13 December 2022	Formal questionnaire	Credamo data mart	100	126
3	13 December 2022	Formal questionnaire	Credamo data mart	100	130
4	14 December 2022	Formal questionnaire	Credamo data mart	200	249
Number of questionnaires answered					635
Number of valid questionnaires				500	
Female				308	61.6%
Male				192	38.4%

3.2.2. Descriptive Statistics and Analysis

In the effective proportion sample, women accounted for 61.6%, which is consistent with the fact that women form the main user group in cultural and creative consumption [10]. The age range is mainly between 21 and 40 years old, accounting for 86.4% in total (Table 7). This shows that the young and middle-aged group is the most important group pertaining to cultural and creative consumption. From the perspective of occupational distribution, private enterprise practitioners account for more than half of the total, and students account for 22.2%. The composition of these groups is similar to that of Chinese netizens. From the perspective of the urban heat map (Figure 7), the average distribution of respondents among cities is mainly as follows: Shandong (15.4%), Guangdong (15%), Hebei (7.4%), Jiangsu (6.8%), and Shanxi (5.4%).

Table 7. Frequency of response statistics by age and occupation type.

Items	Category	Number of Responses	Percentage
Age group	18–20	21	4.2%
	21–30	243	48.6%
	31–40	189	37.8%
	41–50	29	5.8%
	51–60	17	3.4%
	Over 60	1	0.2%
Occupation type	Student	67	13.4%
	state-owned enterprise	111	22.2%
	government-affiliated institutions	32	6.4%
	civil servant	10	2%
	private enterprise	264	52.8%
	foreign enterprise	16	3.2%

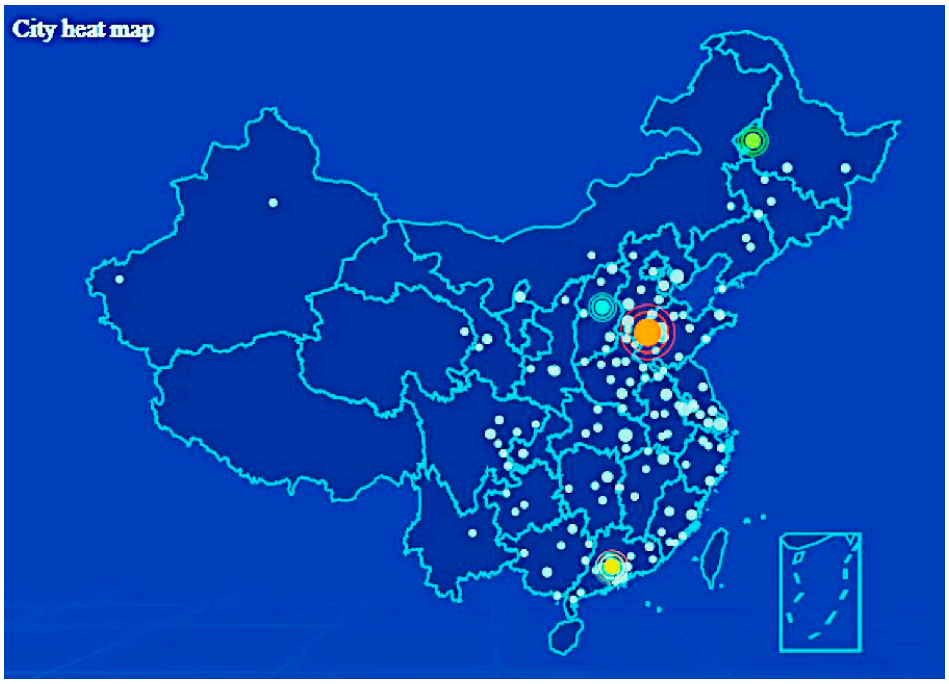


Figure 7. City heat map.

The validity of the questionnaire should generally be tested by reliability and validity analyses. A reliability analysis is mainly used to test the internal stability and consistency of the questionnaire scale, which is judged by Cronbach's α coefficient and composite reliability (CR). Cronbach's $\alpha \geq 0.7$ and $CR > 0.7$ were considered good reliability. Tables 8 and 9 show that Cronbach's α coefficient in this study's questionnaire is greater than 0.7, and the CR value is above 0.7, indicating that the reliability of the questionnaire is good. A validity analysis is mainly used to test the reliability of the scale, observe the degree of latent variables reflected in the scale, and use aggregation validity and discriminant validity to judge. The aggregation validity was assessed by average variance extracted (AVE) and factor loading. Table 9 demonstrates that the factor loading value of each item is greater than 0.6 (higher than the threshold value of 0.5), and the AVE values are all greater than 0.7 (higher than the threshold value of 0.5), indicating that the aggregation validity of the scale is good.

Table 8. Reliability Statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.905	0.887	51

Table 9. Reliability Statistics.

Variance	Item	Factor Loadings	Cronbach's Alpha	AVE	CR
CS	CS1	0.800	0.865	0.559	0.835
	CS2	0.756			
	CS3	0.735			
	CS4	0.697			
CD	CD1	0.799	0.859	0.527	0.816
	CD2	0.716			
	CD3	0.707			
	CD4	0.678			

Table 9. *Cont.*

Variance	Item	Factor Loadings	Cronbach's Alpha	AVE	CR
CCI	CCI1	0.795	0.832	0.582	0.806
	CCI2	0.768			
	CCI3	0.724			
CI	CI1	0.844	0.824	0.576	0.802
	CI2	0.727			
	CI3	0.700			
CV	CV1	0.790	0.830	0.566	0.796
	CV2	0.737			
	CV3	0.730			
CP	CP1	0.817	0.811	0.563	0.794
	CP2	0.731			
	CP3	0.699			

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. Rotation converged in six iterations.

This paper was adjusted using the Varimax with Kaiser Normalization method of factor analysis, with factor rotation excluding factor coefficients less than or equal to 0.4. The Kaiser–Meyer–Olkin (KMO) value was 0.942 (Table 10), and the significance index was 0.000. As this was less than 0.05, the questionnaire was found to be suitable for factor analysis.

Table 10. KMO and Bartlett's Test.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		0.942
Bartlett's Test of Sphericity	Approx. Chi-Square	5504.622
	df	190
	Sig.	0.000

Through multiple-factor convergences, a total of 6 dimensions and 20 indicators were obtained after 6 factor rotations. The overall explained variation was found to be 73.361% (Table 11).

Table 11. Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.214	46.070	46.070	9.214	46.070	46.070	2.907	14.537	14.537
2	1.282	6.411	52.482	1.282	6.411	52.482	2.766	13.828	28.365
3	1.156	5.780	58.262	1.156	5.780	58.262	2.339	11.696	40.060
4	1.118	5.589	63.851	1.118	5.589	63.851	2.236	11.181	51.242
5	0.952	4.761	68.612	0.952	4.761	68.612	2.222	11.110	62.351
6	0.950	4.748	73.361	0.950	4.748	73.361	2.202	11.009	73.361

Extraction Method: Principal Component Analysis.

3.2.3. AMOS Fitness Analysis

This study used AMOS software to verify the theoretical model and tested whether the hypothesis is tenable by means of the path coefficient and significance level. The path coefficient mainly shows the relationship between various variables and the significance of the impact. The Bootstrapping sampling method was repeated 5000 times and was used to solve the path coefficient and test the significance level of the model path. The results are shown in Table 12. The standardized path coefficient values of H1, H2, H3, H4, H6, and H7 were 0.679, 0.340, 0.450, and 0.499, respectively, with a value of about 0.5. Considering that the *p*-value was less than 0.05, it may be concluded that the research hypothesis had

statistical differences. The normalized path coefficient values of H5, H8, and H9 were 0.405, 0.334, and 0.488, respectively, which are close to 0.5. Considering that their *p*-values were all less than 0.01, the research hypothesis has significant statistical differences.

Table 12. Results of structural equation modelling analysis.

Hypothesis	Standardized Path Coefficient	Standard Error	Bias-Corrected 95%CI		*p* Value	Support
			Lower	Upper		
H1: CI ← CV	0.679	0.052	0.594	0.752	0.012	Yes
H2: CP ← CI	0.340	0.068	0.193	0.440	0.020	Yes
H3: CP ← CV	0.450	0.064	0.318	0.580	0.011	Yes
H4: CD ← CP	0.499	0.069	0.349	0.618	0.016	Yes
H5: CD ← CI	0.405	0.066	0.277	0.575	0.004	Yes
H6: CCI ← CP	0.396	0.094	0.205	0.626	0.012	Yes
H7: CCI ← CD	0.370	0.081	0.105	0.535	0.050	Yes
H8:CS ← CCI	0.334	0.057	0.190	0.463	0.009	Yes
H9:CS ← CD	0.488	0.060	0.373	0.621	0.008	Yes

Note: The data listed are standard coefficients.

Table 12 shows a positive initial model data fit; all evaluation indicators were within an acceptable range, so there was no need to modify the MI index. The model fitness test results are shown in Table 13. The CN value = 320.177 > 200, meeting the model adaptation standard. From other overall fitness indexes, the chi-square degree of freedom ratio was 1.989 < 3.00, and the root mean square error of approximation (RMSEA) value was 0.045 < 0.05. The GFI value was 0.943, the NFI value was 0.943, the RFI value was 0.932, the IFI value was 0.971, the TLI value was 0.965, and the CFI value was 0.971. These were all greater than 0.09. The fitness of the overall model was therefore ideal. The Consistent Akaike's Information Criterion (CAIC) value of the theoretical model was equal to 673.693, less than that of the independent model value (1515.068), and less than the Expected Cross-Validation Index value of the saturated model (5732.911), indicating that the model is acceptable. The relationship and path coefficient values of each dimension in the model are shown in Figure 8.

Table 13. Model fit summary.

Statistical Test Quantity	Criterion or Threshold for Adaptation	Test Result Data	Model Fit Judgement
Absolute Fit Measures			
RMSEA (Root Mean Square Residual)	<0.05	0.045	√
GFI (Goodness-of-Fit Index)	>0.90	0.943	√
Baseline Comparisons			
NFI (Normed Fit Index)	>0.90	0.943	√
RFI (Relative Fit Index)	>0.90	0.932	√
IFI (Incremental Fit Index)	>0.90	0.971	√
TLI (Tucker–Lewis Coefficient)	>0.90	0.965	√
CFI (Comparative Fit Index)	>0.90	0.971	√
Parsimony-Adjusted			
PGFI (Parsimony Goodness-of-Fit Index)	>0.50	0.723	√
PNFI (Parsimony-Adjusted NFI)	>0.50	0.799	√
PCFI (Parsimony-Adjusted CFI)	>0.50	0.822	√
CN (Critical N)	>200	320.177	√
CMIN/DF (Chi-Square/Degrees of Freedom)	<3.00	1.989	√
CAIC (Consistent Akaike's Information Criterion)	The theoretical model value is less than the independent model value, and at the same time less than the saturated model value.	673.693 < 1515.068 673.693 < 5732.911	√

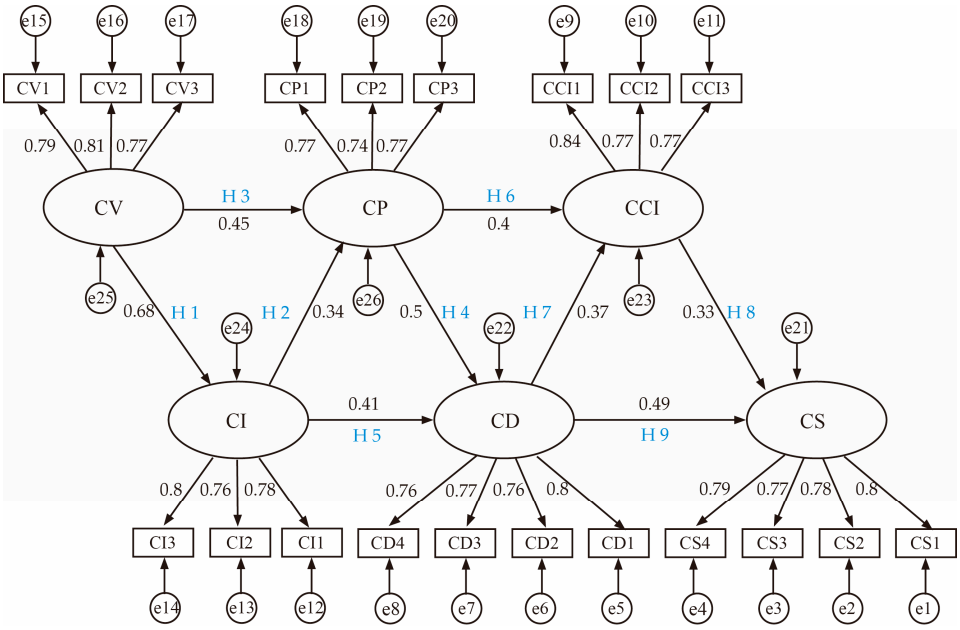


Figure 8. Research model.

4. Results

4.1. The Mediating Effect of Cultural Innovation on Cultural Sustainability

In this study, the Bootstrap method was used to repeatedly sample the original data, forming a new sample with a capacity of 500 in order to evaluate the relationship between the paths. The test results may be seen below.

From Table 14, it can be concluded that:

1. The total effect value of CCI on CP was 0.396, the direct effect value was 0.396, the indirect effect value was 0.185, the mediating interval [0.205,0.626] did not include 0, and the *p*-value was 0.012. CCI ← CP had a complete mediating effect;
2. The total effect value of CCI on CD was 0.37, the direct effect value was 0.37, the mediating interval [0.105,0.535] did not include 0, and the *p*-value was 0.05. CCI ← CD had a partial mediating effect;
3. The total effect value of CD on CP was 0.499, the direct effect value was 0.05, the mediating interval [0.349,0.618] did not include 0, and the *p*-value was 0.016. CD ← CP had a partial mediating effect. The mediating effect of CCI ← CD ← CP was established;
4. The direct effect value of CI on CP was 0.34, and the direct effect value of CV on CI was 0.679. The indirect effect value of CV on CP was 0.45, and the indirect effect value of CI on CP was 0.34. The mediating effect of CP ← CI ← CV was established.

Table 14. Summary table of mediation effects.

		95% Confidence Interval		
	Estimate	**BC/PC *p* Value**	**BC**	**PC**
Total Effect				
CI ← CV	0.679	0.012/0.010	0.594~0.752	0.596~0.756
CP ← CI	0.340	0.020/0.010	0.193~0.440	0.198~0.469
CP ← CV	0.450	0.015/0.010	0.612~0.749	0.614~0.759
CD ← CP	0.499	0.016/0.010	0.349~0.618	0.362~0.626
CD ← CI	0.405	0.009/0.010	0.466~0.704	0.198~0.697
CCI ← CD	0.370	0.050/0.042	0.105~0.535	0.123~0.538
CCI ← CP	0.396	0.006/0.010	0.473~0.741	0.459~0.722
CS ← CCI	0.334	0.009/0.010	0.190~0.463	0.189~0.457
CS ← CD	0.488	0.012/0.010	0.471~0.709	0.478~0.713

Table 14. *Cont.*

		95% Confidence Interval		
	Estimate	**BC/PC *p* Value**	**BC**	**PC**
Direct Effect				
CI ← CV	0.679	0.012/0.010	0.594~0.752	0.596~0.756
CP ← CI	0.340	0.020/0.010	0.193~0.440	0.198~0.469
CP ← CV	0.450	0.015/0.010	0.612~0.749	0.614~0.759
CD ← CP	0.499	0.016/0.010	0.349~0.618	0.362~0.626
CD ← CI	0.405	0.009/0.010	0.466~0.704	0.198~0.697
CCI ← CD	0.370	0.050/0.042	0.105~0.535	0.123~0.538
CCI ← CP	0.396	0.006/0.010	0.473~0.741	0.459~0.722
CS ← CCI	0.334	0.009/0.010	0.190~0.463	0.189~0.457
CS ← CD	0.488	0.012/0.010	0.471~0.709	0.478~0.713
Indirect Effect				
CP ← CV	0.231	0.007/0.010	0.146~0.343	0.138~0.323
CD ← CI	0.170	0.011/0.010	0.093~0.248	0.094~0.251
CD ← CV	0.616	0.025/0.010	0.543~0.671	0.551~0.681
CCI ← CP	0.185	0.021/0.043	0.101~0.297	0.071~0.282
CCI ← CI	0.347	0.007/0.010	0.256~0.455	0.247~0.452
CCI ← CV	0.497	0.014/0.010	0.433~0.571	0.436~0.580
CS ← CD	0.123	0.018/0.042	0.061~0.207	0.038~0.193
CS ← CP	0.437	0.016/0.010	0.330~0.530	0.349~0.541
CS ← CI	0.396	0.009/0.010	0.310~0.506	0.303~0.506
CS ← CV	0.466	0.007/0.010	0.411~0.545	0.406~0.543

4.2. Flexible Cultural Development Impact Indicators

The 6 dimensions and 20 indicators proposed by the research institute were designed by combining the bibliometric analysis and cultural development indicators of various countries. The six dimensions are named according to the content, as shown in Table 15. The complete cultural governance model of the creative economy may be divided into four separate models to adapt to different situations (Figure 9). These models are self-management-oriented (Figure 10a), legality-oriented (Figure 10b), policy-oriented (Figure 10c), and democracy-oriented (Figure 10d). Cultural validity (CV) was an independent variable. The variables of CS, CI, CCI, CP, and CD were both dependent and independent. The distribution of variable scores shows that the relationship between them is parallel and almost equally important (Figure 11). The basic logic of cultural governance points to different cultural governance models under specific historical conditions, and these different cultural governance models have their own political and economic dimensions [32]. Liu [33] proposed to analyze the possibility of cultural governance from three perspectives: cultural governance as the regulation of the system of public culture, cultural governance as self-regulation and self-reflection of rulers and ruled, and cultural governance regarded as governance by culture.

Cultural pluralism or diversity has almost become the contemporary universal value. In the practice of cultural policy, what is important may not be the single or diverse form itself, but rather the value concept and means behind the realization of single and diverse forms. This also shows the importance of seeking a problem consciousness and a method of rethinking contemporary cultural policy and governance. Between the value tradition of the cultural economy and the modernity of cultural policy governance, a local, unique, reflexive, autonomous, and dynamic cultural governance and cultural self-management model should be sought.

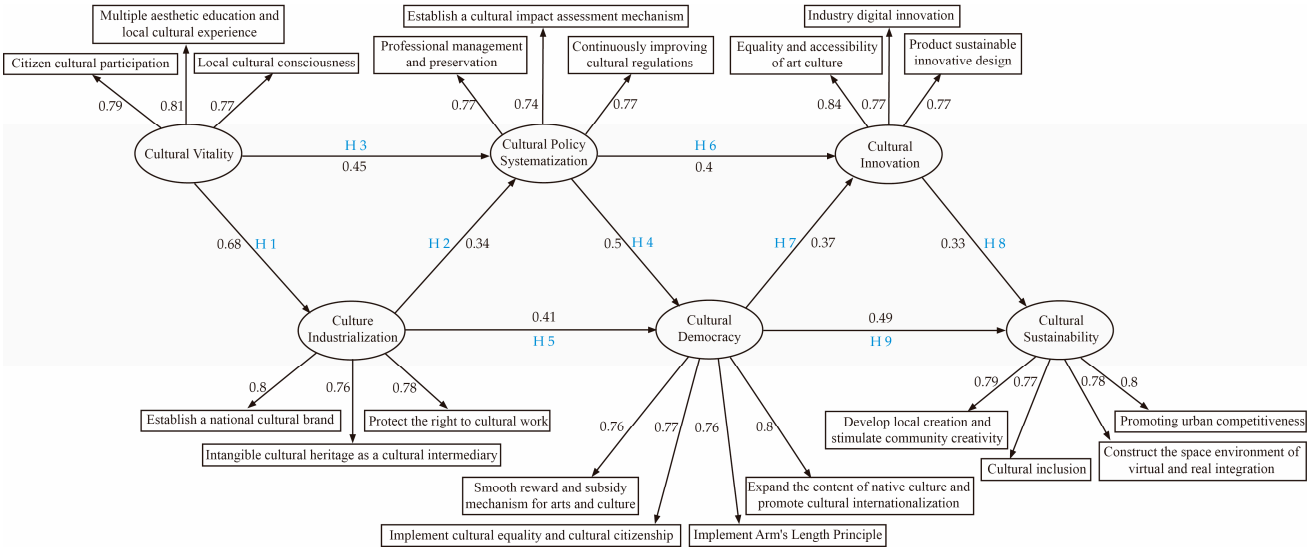


Figure 9. Cultural governance model of a creative economy.

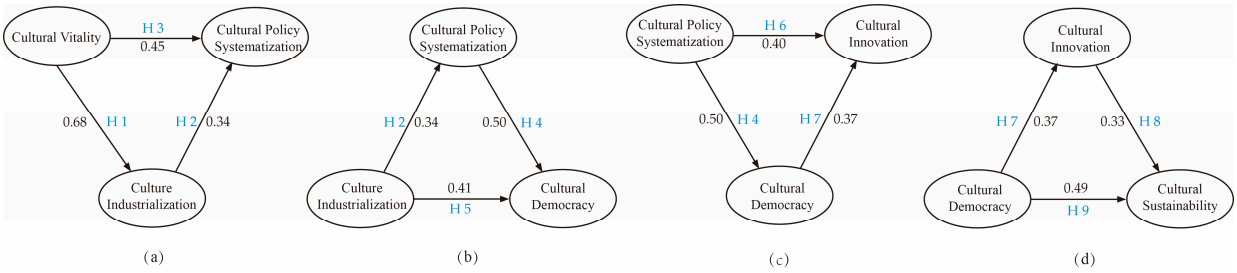


Figure 10. Flexible cultural governance model of creative economy: (**a**) self-management; (**b**) legality; (**c**) policy; (**d**) democracy.

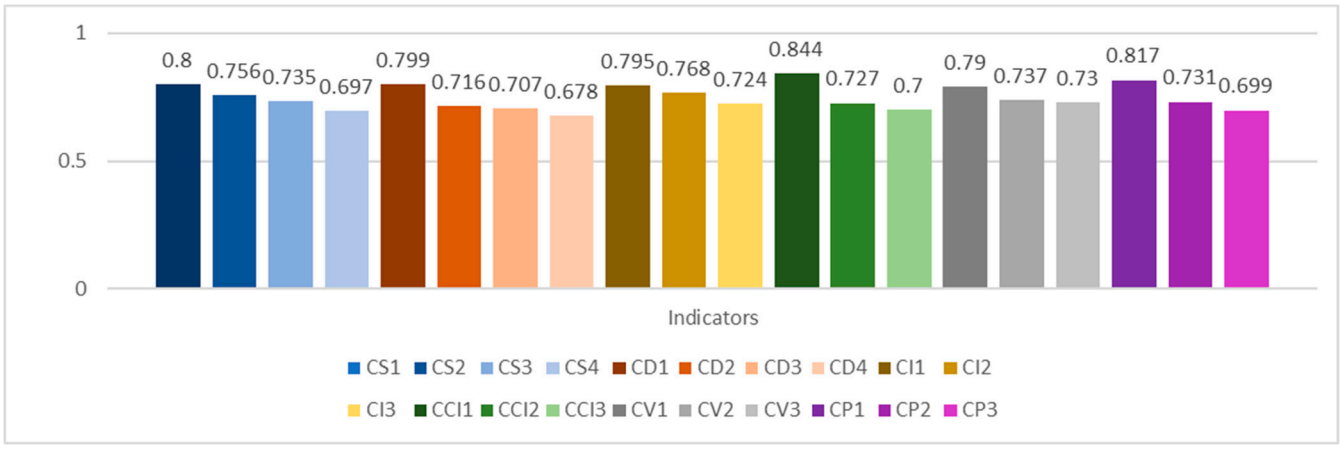


Figure 11. Path coefficient values of 20 indicators.

Table 15. Variable and dimension naming.

Dimension	Variable	Content
Cultural Sustainability (CS)	CS1	Promoting urban competitiveness
	CS2	Construct the space environment of virtual and real integration
	CS3	Cultural inclusion
	CS4	Stimulate community vitality and develop local creation

Table 15. *Cont.*

Dimension	Variable	Content
Cultural Democracy (CD)	CD1	Expand the content of native culture and promote cultural internationalization
	CD2	Implement Arm's-Length governance
	CD3	Implement cultural equality and cultural citizenship
	CD4	Smooth reward and grants mechanism for arts and culture
Cultural Innovation (CCI)	CCI1	Equality and accessibility of art culture
	CCI2	Industry digital innovation
	CCI3	Product sustainable innovation design
Culture Industrialization (CI)	CI1	Protect the right to cultural work
	CI2	Intangible cultural heritage as a cultural intermediary
	CI3	Establish a national cultural brand
Cultural Vitality (CV)	CV1	Citizen cultural participation
	CV2	Multiple aesthetic education and local cultural experience
	CV3	Local cultural consciousness
Cultural Policy Systematisation (CP)	CP1	Professional management and preservation
	CP2	Establish a cultural impact assessment mechanism
	CP3	Continuously improving cultural regulations

4.3. Comparison of Cultural Impact Indicators under the Framework of Cultural Governance

The white paper on cultural policy issued by Taiwan in 2018 still affects the strategy and direction of its cultural governance. The six proposed cultural forces (cultural sustainability, cultural democracy, cultural innovation, cultural vitality, cultural tolerance, and cultural transcendence) cover the family and policy direction of cultural policy. These six forces also respond to the diversified development of social groups, the trend of cultural ecological diversification, the change of cultural science and technology, and the demand of cultural democracy. It is of great help for this paper to explore the cultural value impact indicators of CCI. This study integrates the six aspects proposed by TAICCA into four aspects while adding two new aspects ("culture industrialisation" and "cultural policy systematization") (Table 16). Although the language used is the same, the geographical and social environment is different. Therefore, Taiwan's cultural values are not entirely applicable to all Chinese-speaking areas. China's mainland should develop more flexible, applicable, and local value impact indicators to implement the democratization of cultural resources, discourse, and participation rights. The scope of this study is limited to the field of CCI development and aims to "fully integrate and culture creativity into local development", as proposed in the mission statement of the Creative Cities Network [6].

Table 16. Cultural value index design (compared with Taiwan, China).

	Taicca [27]	This Study
Cultural Sustainability	Cultural economy and the sustainability of cultural and creative industry ecosystem	• Promoting urban competitiveness • Construct the space environment of virtual and real integration • Cultural inclusion • Stimulate community vitality and develop local creation
Cultural Democracy	Promote cultural governance reform and organizational restructuring	• Expand the content of native culture and promote cultural internationalization • Implement Arm's-Length governance • Implement cultural equality and cultural citizenship • Smooth reward and grants mechanism for arts and culture

Table 16. *Cont.*

	Taicca [27]	This Study
Cultural Innovation	Support the freedom of artistic and literary creation and cultivate the sense of beauty	• Equality and accessibility of art culture • Industry digital innovation • Product sustainable innovation design
Cultural Vitality	Cultural preservation and rooting, linking land and people's historical memory	• Citizen cultural participation • Multiple aesthetic education and local cultural experience • Local cultural consciousness
Cultural Tolerance	Promote the development and exchange of cultural diversity:	
Cultural Transcendence	Carry out cultural future, create cultural technology, and create and share across regions	
Culture Industrialisation	-	• Protect the right to cultural work • Intangible cultural heritage as a cultural intermediary • Establish a national cultural brand
Cultural Policy Systematisation	-	• Professional management and preservation • Establish a cultural impact assessment mechanism • Continuously improving cultural regulations

5. Conclusions and Discussion

5.1. The Sustainability of a Cultural Economic Ecosystem

The presence of CCI enables individuals to rethink culture and industry. Culture and creativity improve the quality of the industry, while in turn, industrial development stimulates the accumulation of culture. The existence of cultural and creative industries has established the practical legitimacy of cultural industrialization and industrial culture [3]. However, the cultural field and industry often fall into the opposing categories of cultural connotation and economic development. The ecosystem of the cultural economy may be more compatible with the values and behaviors of various agents, so different agents in the ecosystem may find the position of symbiosis, co-prosperity, coexistence, interdependence, and cooperation, as well as the direction of mutual nourishment and value cycle. This means going beyond the current instrumental logic regarding mainstream cultural administration, government bureaucracy, market rules, and economic values, and rather emphasizing human rationality, such as cooperation, coordination, and symbiosis between different actors and ecological chains in the natural and human ecosystems [34,35].

With the consideration of a cultural, economic ecosystem in contemporary cultural governance (Figure 12), important implications include (1) evaluating cultural value to move beyond the narrow perspective of economic output; (2) measuring cultural value according to a framework that is beyond the management perspective of political and economic bureaucracy; and (3) maintaining close interaction between different departments and organizations within the culture to maintain diversity and preserve the vitality of the sustainable development of cultural values.

5.2. Research Contribution

A flexible cultural impact assessment framework is conducive to the realization of diversified CCI development. In terms of research methods, this study consisted of a hybrid quantitative analysis (the combination of bibliometric analysis and a questionnaire survey) to obtain indicators that affect the evaluation of cultural and creative consumption and cultural value. Regarding academic theory, the contribution of this study is its proposal of a flexible CCI cultural governance framework that may be aggregated or split. The indicators in the framework may be transformed into operational definitions and applied to both policy and cultural governance.

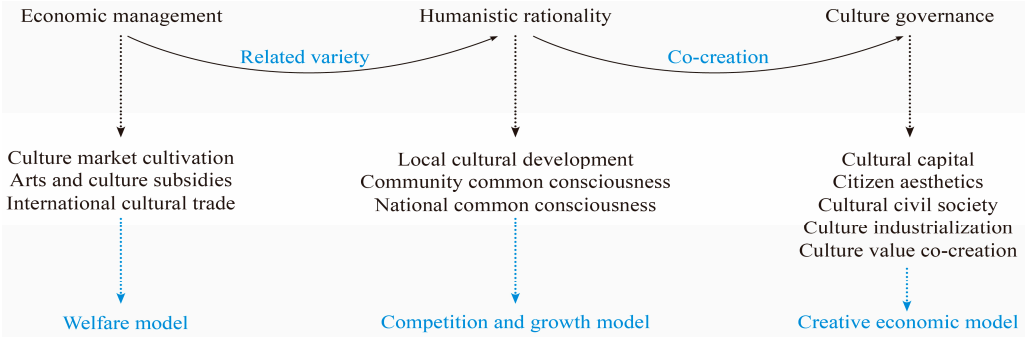


Figure 12. Sustainable cultural and economic ecological system.

To balance art and the cultural ecosystem, as well as to safeguard basic cultural human rights and national sustainable development, ideal cultural governance requires a more flexible framework from which to measure the vitality and value of culture. The government should actively absorb the wisdom of scholars, experts, and civil society, refer to the research results of cultural statistics and cultural indicators, reintroduce the methods and ideas of art and humanities into the economic and social science assessment model of cultural value, incorporate the qualitative and quantitative cultural value assessment and overall cultural impact assessment systems into planning, and gradually promote the practical operation. Society should recognize the current trend of international cultural policy, transcend the myth that the cultural economy is focused on output value and GDP growth, and move towards a new direction of cultural value evaluation.

5.3. Research Limitations and Future Work

In terms of research methods, this paper lacks qualitative investigation and analysis. Since the survey of cultural values is only collected through the quantitative questionnaire, it would be ideal to add qualitative interview data. In order to remedy this defect, co-citation analysis technology was used to capture the trend of research topics from specific time spans. This co-citation analysis method is based on the existing literature and can predict the trend of future CCI research within a certain range.

Another limitation of the article is that the questionnaire survey in the second stage of the research process was not used to carry out a comparative analysis of the population in different countries. The questionnaire was only distributed in China, and there is no sample survey of regions outside China, such as Taiwan and Macao. In order to improve the sample quality of the collected questionnaire, we manually rejected non-standard questionnaire answers. The proportion of questionnaire aggregation was 27%. In order to further reduce the impact of the unstable quality of questionnaire data recovery. In terms of the questionnaire setting, this paper sets the quality control of the corresponding sample requirements that include limiting the number of times the subjects answered to be greater than or equal to 50 (the subjects have less experience); the subject's credit score is greater than or equal to 80 (the higher the sample's credit score, the higher the quality of the questionnaire); the historical adoption rate of the subjects is greater than or equal to 80 (historical adoption rate = the number of questionnaires adopted/total number of questionnaires answered); intelligent behavioral verification (intelligent human-machine verification is carried out before answering to greatly improve data quality and safety); and the scope of the answering area is limited (only one person is allowed to answer in this area). A sample feature setting is limited education (undergraduate or above).

Future research may add questionnaires from different countries or conduct mixed comparative analyses of single or multiple cities. Countries with the same language or similar cultural backgrounds may also be grouped for comparative analysis. With the continuous integration, collision, and change of culture through the cross-border migration of citizens, citizens' perception of cultural rights has become more detailed. According

to the knowledge map analysis of this study, the educational and social dimensions may direct future research on CCI.

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Institutional Review Board Statement: Ethical review and approval were waived for this study, due to all the interviewees being older than 20 years old and the questionnaires being anonymous.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. The 20 LLR clusters sorted by size (2013–2022).

Cluster ID	Size	Silhouette	Mean (Year)	Label by LSI (Latent Semantic Indexing)	Label by LLR (Log-Likelihood Ratio, $p = 0.0001$)
0	46	0.882	2016	transformational leadership; transactional leadership; dialectical thinking; leadership comparison; green process innovation | employee creativity; hindrance-related stress; challenge-related stress; supervisory task feedback; voice theory	(79.42, 0.0001) transformational leadership (58.65, 0.0001) employee creativity (38.48, 0.0001) knowledge sharing (35.7, 0.0001 creative self-efficacy (30.06, 0.0001) creativity
1	41	0.915	2015	creative industries; creative city; city branding; tourism labour migrant; pharmaceutical industry | creative labor; creative city policy; tourism labour migrant; pharmaceutical industry; creative cluster	(50.44, 0.0001) creative labour (17.58, 0.0001) creative thinking (17.58, 0.0001) precariat (16.58, 0.0001) work (16, 0.0001) digital media
2	36	0.823	2016	creative industries; manufacturing industries; developing country; information technology; cultural diversity | design thinking; product development; stakeholders engagement; green innovation; medium size enterprises	(28.82, 0.0001) product development (24.53, 0.0001) design thinking (21.04, 0.0001) competitive advantage (20.31, 0.0001) information technology (20.31, 0.0001) absorptive capacity
3	32	0.965	2015	creative economy; human capital; regression analysis; intellectual activity; adaptive resilience | creative industries; creative city; city branding; adaptive resilience; night-time economy	(103.54, 0.0001) creative economy (50.42, 0.0001) creative city (42.06, 0.0001) economic development (29.49, 0.0001) higher education (28.79, 0.0001) creative cities

Table A1. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label by LSI (Latent Semantic Indexing)	Label by LLR (Log-Likelihood Ratio, p = 0.0001)
4	29	0.87	2016	creative industries; entertainment industries; urban growth machine; text analysis; planning culture ∣ creative economy; creative city; cultural economy; economic development; cultural policy	(38.85, 0.0001) cultural industries (34.49, 0.0001) urban development (27.63, 0.0001) cultural industry (22.2, 0.0001) urban (19.17, 0.0001) city
5	28	0.964	2016	creative industries; social networks; informal economy; radical innovation; creativity method ∣ city; place; economy; geography; neighborhood	(21.88, 0.0001) gender (13.05, 0.001) gender inequality; (13.05, 0.001) production; (13.05, 0.001) intersectionality; (13.05, 0.001) feminism
6	27	0.933	2014	creative industries; emotional labour; urban growth machine; night-time economy; pink accounts ∣ cultural policy; creative ecosystem; developing countries; digital industries; inter-organizational learning	(42.41, 0.0001) cultural policy (31.1, 0.0001) south Africa (30.16, 0.0001) Cultural production (21.9, 0.0001) policy mobilities (18.94, 0.0001) politics
7	27	0.878	2017	creative performance; gender difference; innovation speed; sensing capability; organizational resources ∣ social media; dynamic capabilities; advertising agency; innovation speed; sensing capability	(33.34, 0.0001) entrepreneurial orientation (29.32, 0.0001) creative performance (22.58, 0.0001) business performance (22.56, 0.0001) social media (21.26, 0.0001) big data
8	24	0.957	2016	creative class; public policy; location factors; tourism labour migrant; management model ∣ creative industries; labour precarity; primary school age; knowledge-based development; knowledge-intensive businesses	(32.5, 0.0001) creative class (19.82, 0.0001) creative workers (19.82, 0.0001) social networks (14.39, 0.001) digital transformation (12.74, 0.001) multivariate linear regression
9	24	0.864	2014	creative industries; social networks; informal economy; firm characteristics; techno-creative innovation ∣ creative industry; creative class; creative clusters; creative spaces; mental maps	(188.43, 0.0001) creative industries (53.14, 0.0001) cultural and creative industries (27.55, 0.0001) creative industry (27.21, 0.0001) sustainable development (20.04, 0.0001) Fashion
10	23	0.938	2015	creative industries; creative work; career management; arts management; team composition ∣ innovation; ecosystem; disruption; strategy; technology	(34.82, 0.0001) creative work (25.81, 0.0001) cultural work (17.8, 0.0001) energy transition (16.35, 0.0001) research and development (11.86, 0.001) O31

Table A1. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label by LSI (Latent Semantic Indexing)	Label by LLR (Log-Likelihood Ratio, p = 0.0001)
11	23	0.904	2015	creative industries; cultural tourism; cultural heritage; historical centre; network ∣ regional development; creative class; regional policy; high-growth firms; knowledge base	(36.59, 0.0001) regional development (20.38, 0.0001) creative tourism (19.36, 0.0001) system (19.29, 0.0001) cultural tourism (16.5, 0.0001) cultural heritage
12	23	0.953	2014	creative industries; information technology; manufacturing industries; developing country; cultural regeneration model ∣ creative economy; policy; city; rethinking; entrepreneurship	(17.53, 0.0001) capability (12.48, 0.001) product (12.48, 0.001) everyday life (12.48, 0.001) technology transfer (12.48, 0.001) tradition
13	22	0.905	2016	creative destruction; factor reallocation; digital delivery; news production; magazine revenue ∣ business model; digital distribution; decorative marks; symbolic production; process innovations	(58.11, 0.0001) creative destruction (22.38, 0.0001) sharing economy (22.38, 0.0001) disruptive innovation (19.62, 0.0001) law (19.62, 0.0001) intellectual property
14	22	0.86	2016	knowledge economy; innovation district; place quality; delphi method; artificial neural network ∣ knowledge-based urban development; knowledge industry; knowledge worker; urban competitiveness; artificial neural network	(26.56, 0.0001) digital economy (25.71, 0.0001) knowledge economy (25.15, 0.0001) knowledge-based urban development (22.79, 1.0×10^{-4}) artificial intelligence (22.64, 1.0×10^{-4}) industry 4.0
15	22	0.934	2014	political economy; climate change; emissions trading; instrument choice; environmental economics ∣ creative industries; cultural industries; cultural economics; innovation policy; soft innovation	(85.98, 0.0001) political economy (13.35, 0.001) climate change (13.27, 0.001) firm (13.17, 0.001) new media (13.17, 0.001) outsourcing
16	21	0.929	2017	creative self-efficacy; job satisfaction; hotel industry; organizational support; knowledge transfer ∣ innovative behavior; task interdependence; resources theory; in-role behavior; three-way interaction	(37.78, 0.0001) creative self-efficacy (27.32, 0.0001) creative industries (14.51, 0.001) human resource management (14.08, 0.001) phenomenology (14.08, 0.001) servant leadership
17	21	0.865	2014	creative industries; creative work; music journalism; unpaid work; survie des nouvelles entreprises ∣ music industry; social network service; music journalism; unpaid work; survie des nouvelles entreprises	(64.67, 0.0001) music industry (29.39, 0.0001) popular music (26.78, 0.0001) new economy (18.8, 0.0001) music industries (13.37, 0.001) digital technology

Table A1. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label by LSI (Latent Semantic Indexing)	Label by LLR (Log-Likelihood Ratio, $p = 0.0001$)
18	20	0.94	2017	open innovation; knowledge-based engineering; manufacturing process innovation; knowledge management; collective intelligence ∣ satisfaction; performance; mediating role; physical environment; innovation	(20.99, 0.0001) open innovation (19.41, 0.0001) value co-creation (14.97, 0.001) service design (14.39, 0.001) tourist experience (13.81, 0.001) creative industries
19	20	0.883	2015	human capital; creative class; regional economics; labour market; entrepreneurial discovery process ∣ economic growth; reflexive capitalism; smart specialisation; entrepreneurial discovery process; secular stagnation	(43.32, 0.0001) human capital (17.14, 0.0001) economic growth (15.51, 0.0001) 21st-century skills (13.76, 0.001) creative industries (13.36, 0.001) intellectual capital

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The Quintuple Bottom Line: A Framework for Place-Based Sustainable Enterprise in the Craft Industry

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Abstract: This study proposes to extend the sustainable business framework of the Quadruple Bottom Line into the Quintuple Bottom Line. The five Ps of the Quintuple Bottom Line support purpose-driven businesses to consider economic profitability alongside social responsibility and environmental sustainability, rooted in place (purpose, profit, people, planet and place), and are based on reflections from the craft industry. Case studies from material-based creative businesses as found in the traditional handicraft and design-innovation communities in Nepal, and a designer-making community in Scotland, both explored circular-economy principles. The importance of localised supply chains and regenerative design enabled the development of the five-Ps framework so as to be more reflective of circular-economy models as operated by craft businesses. This qualitative research project took a case-studies approach, supported by primary research through workshops and interviews, and using the expansion of the Craft Toolkit of Applied Arts Scotland to embed the five Ps. The craft sector, with creative practices rooted in traditional manufacturing, material knowledge and yet a contemporary approach to design, can thus provide a useful model for other creative businesses that support purposeful, holistic sustainability and that engage with financial, environmental, and social sustainability that is rooted in place.

Keywords: Triple Bottom Line; Quintuple Bottom Line; five Ps; creative industries; circular economy; doughnut economics; craft; design; sustainability; Anthropocene

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1. Introduction

This study looks at two correlated approaches to climate change: a net-zero economy will require both a fundamental culture shift and a radically new means of doing business. The term net zero has been internationally agreed on as the target to achieve a net-zero-emissions budget by reducing greenhouse gas emissions and/or to ensure that any ongoing emissions are balanced by removal. The study reports on case studies from craft businesses in Scotland and Nepal and their efforts to embed sustainable business practices. The Scottish Government [1] and Nepali Government [2] have both agreed to a 2045 net-zero target. This will mean changed priorities, new legislation, and new funding strategies for citizens and businesses. Crafts businesses rely on supply chains of material resources with associated embodied carbon and a carbon footprint. The study reports on case studies from craft businesses in Scotland and Nepal which were originally viewed through the lens of the Quadruple Bottom Line or 4Ps: purpose-driven businesses which place economic profitability alongside social responsibility and environmental sustainability (purpose, profit, people and planet), but which highlighted the importance of local ecosystems and therefore the proposal to include a fifth P to reflect not only purpose, profit, people and planet, but also place.

Orthodox linear business models of indefinite growth have fuelled climate change exponentially since the 1950s [3], as is embodied in the idea of the Anthropocene [3–5]. Challenges to the indefinite-growth model, initially raised by Meadows et al. [6], Schumacher [7] and the U.N.'s *Our Common Future*—also known as the Brundlandt Report [8]

argued for sustainable development (growth) that 'meets the needs of the present without compromising the ability of future generations to meet their own needs' and called governments, civic society and businesses to action. The Brundlandt Report laid the groundwork for the Earth Summit in 1992, which led to the establishment of the U.N. Convention on Climate Change (UNFCC), which established the Convention of the Parties (CoP) as the decision-making arm. In 2015, the same year as the seminal Cop21 in Paris, the U.N. also released the U.N. Global Sustainable Development Goals (SDGs), which followed on from the Millennium Development Goals. The SDGs were ratified by 193 signatories in 2015, and are effectively the world's largest corporate sustainability initiative.

Heterodox economic models such as the circular economy and doughnut economics contend that the current economic model of indefinite growth is not compatible with 21st century needs [9,10], and that metrics such as GDP are no longer fit for purpose [11]. This in turn has led to the call for 'prosperity without growth' [12], with the 'case for the new green deal' [13] where 'less is more' [14] and where design plays a critical part [9,15]. A circular-economy model considers the life cycle of material goods and examines its journey from cradle to cradle, which 'tries to put human beings in the same 'species' picture as other living things' ([9], p. 1). It argues that resources are precious and finite, and should be treated as such. It puts design (products, processes, and systems) at the heart of solutions, with materials carefully chosen for their nearly infinite capacity to be re-used, and a design ethos of easy disassembly and re-use. Furthermore, it also asks that, when materials are replaced by alternatives, those alternatives do not inadvertently introduce other problems down the line, but instead take a whole-system approach. The concept of circular economies, as described by the Ellen Macarthur Foundation (launched in 2010) [16] as looking 'beyond the current take-make-waste extractive industrial model', offer an alternative framework based on three principles:

1. Design out waste and pollution;
2. Keep products and materials in use;
3. Regenerate natural systems.

Furthermore, the circular-economy model, which tends to focus on design to encourage a circular model, has clear economic imperatives [9,15,16]. The Ellen Macarthur Foundation [16] argued that circular economies benefit not only from substantial net material savings, but also mitigate price volatility and supply risk, with a reduced risk of externalities. Furthermore, it argues that circularity as a 're-thinking device' to create a 'user-centric economy' leads to innovation, employment, and productivity increase, which in turn supports a more resilient economy. Emerging economies, such as Nepal, can leapfrog into establishing circular systems more easily than advanced economies, and can 'therefore expect even greater savings from circular business models' ([16], p. 10). The report noted that circular businesses gained not only from reduced material bills, with less product complexity and more-manageable life cycles, but also increased customer interaction and loyalty and reduced externalities. These models in turn offer benefits to consumers by eliminating premature obsolescence and through an increased offer of consumer choice where access is preferable to ownership, as reflected in different contractual options (e.g., loans, rental, shared-ownership, buy-to-return, outright purchase . . .).

The circular-economy model tends to focus on design of materials and systems. Doughnut economics expands this to include the safe space for humanity to operate, which safeguards social foundation and ecological limits [17]. Its simplistic model belies complicated planetary yardsticks: ecological limits that, once exceeded, put ecosystems and thus human life in the danger zone. These biophysical metrics (on climate change, ocean acidification, chemical pollution, nitrogen and phosphorous loading, freshwater withdrawal, land conversion, biodiversity loss, air pollution and ozone-layer depletion) indicate an ecological threshold which must not be exceeded if planetary ecosystems are to remain stable. This is founded on a social foundation that avoids critical human deprivation, and aligns closely with the UN SDGs. There is now a large body of empirical research that finds diminishing returns in social performance as resource use increases across indicators

such as life satisfaction and life expectancy. Despite improved social thresholds over time, this is generally counterbalanced by an overshoot of ecological boundaries. Countries such as Nepal, for example, have capacity to increase their resource use and not cross their biophysical boundaries, but there 'is an urgent need to accelerate improvements in social performance to avoid critical human deprivation' ([18], p. 31). In short, no country has yet met the safe space for human development that operates between ecological ceilings and social boundaries. The doughnut model thus clearly indicates the scale of the task ahead.

These heterodox economic models require alternative business models. Hybrid business models [19] have emerged, in the UK most notably under the social-enterprise label, internationally known as Fair Trade, often working with emerging economies, and in corporate terms designated as B-corp. Regenerative systems, through their implicit design, recover, restore, and regenerate. Regenerative capitalism expresses the potential of 'business as an agent for world benefit': "It has percolated in the hearts of those who gathered at World Summits on Sustainability and Conferences of Parties on climate change and UN sessions to save the planet" [20]. The U.N. noted that no matter how large or small, and regardless of their industry, all companies can contribute to the SDGs. The U.N Global Impact asks companies to first do business responsibly and then pursue opportunities to solve societal challenges through business innovation and collaboration [21]. Whilst this is not as radical of some the models discussed earlier, it indicates a significant culture shift. Purpose-driven business has a rich body of research in business studies (including corporate social responsibility (CSR), and environmental legislation).

One of the most extensively used definitions of sustainability in business has been the Triple-Bottom-Line (TBL) approach. Attributed to entrepreneur John Elkington [22] it posits that businesses addressing sustainability by paying attention not only to the economic prosperity of a business (profit), but also social justice (people) and environmental responsibility (planet), are more likely to thrive. He argues that these businesses are sustainable in the longer term in a market-driven closed-loop economy, where shifting values demand increased transparency and where collaboration is key and long-term thinking is critical. Elkington argued that TBL is a catalyst to move beyond the paradigm, towards a more pluralistic world, in which—critically—different types of corporates would require different responses from government and civil society. This if often referred to as sustainable entrepreneurship (SE). Critiques of the shortcomings of the TBL concept have argued that it needs to include contextual factors. The TBL concept expanded to the Quadruple Bottom Line (QBL), to include 'purpose'. This initially referred to spirituality [23], community and country [24] or to businesses' culture or corporate governance [25,26], or to the broader cultural context in which businesses operate [27], and, latterly, to purpose and passion ([28], p. 148). In the Quadruple Bottom Line, the culture and ethics of a business should permeate its financial, social, and environmental bottom line [29]. It is for this reason that the fourth bottom line is often referred to as purpose or the fourth P. It is notable that Poon differentiated between 'purpose' and 'passion, and as such argued for the Quintuple Bottom Line. In this paper we argue that the Quintuple Bottom Line should instead account for the importance of 'place' as informed by this study on local craft businesses. In other words, we argue for the four Ps of profit, people, planet and purpose to be expanded, with a fifth P of place, as was supported by our work with craft businesses.

2. Materials and Methods

This study reflects on a two-year period (2020–2022) of the Closing the Loop group of makers from Applied Arts Scotland and two British-Council-supported projects in Nepal with artisan communities through the Road to COP26 Innovation Grant Programme in 2021 and the In Our Hands programme in 2022. The case studies are drawn from a small sample: six young entrepreneurs from the Road to COP26 Innovation Grant Programme and seven from the In Our Hands programme who are working with traditional craft communities in Nepal and eight mid-career designer-makers from Applied Arts Scotland's Closing the Loop group in Scotland, but included discussions and engagements with a

wider group of makers. As such, these case studies are from small creative businesses who have already self-identified as being engaged with issues of sustainability. Both creative communities participated in workshops to help them articulate existing and future considerations around sustainability. These case studies relate to the issues encountered when addressing sustainability in small creative-craft businesses. The participants in this study used (1) the Quadruple-Bottom-Line framework to explore sustainability in their craft business and (2) the circular-economy framework as outlined by the Ellen Macarthur Foundation to investigate their supply-chain and design responsibilities in their craft businesses, as explained in the Ellen-Macarthur-Foundation butterfly diagram ([30], p. 24). The following tools were used to encourage participants to work through the practicalities of this, by using:

1. A questionnaire adapted from the ReSOLVE framework developed by McKinsey in collaboration with the Ellen Macarthur Foundation ([30], p. 26), which addresses the following questions:
    (a) REGENERATE: shifting to renewable energy and materials, reclaiming and restoring ecosystems;
    (b) SHARE: sharing or re-use of assets, re-use or second-hand sourcing;
    (c) OPTIMISE: increase efficiency, remove waste in production, use (big) data or automation:
    (d) LOOP: remanufacture products or components, recycle materials, digest anaerobically, extract biochemicals from waste;
    (e) VIRTUALISE: books, music, travel, sourcing;
    (f) EXCHANGE: replace old with advanced technology and/or deploy technology to be more efficient (e.g., 3D printing).
2. The Sustainable Business Model Canvas (2018), as devised by Dr. Robert Gerlach [31].
3. The revised Applied Arts Scotland Craft Toolkit [32], which embeds sustainability in business planning for craft businesses.

As there are different interpretations of what constitutes craft, dependent on the cultural and historical contexts to which it might refer, we are using Glenn Adamson's open-ended definition of 'the application of skill and material-based knowledge to relatively small-scale production' ([33], pp. 2–3,) by which definition the scope of craft making extends beyond ceramics, textiles, glass, metal and woodwork to include bookbinding, boatbuilding, brickmaking, architecture, maintenance and repair, gardening and cooking . . . It is in fact an inclusive definition which can be related to the Cultural Ecosystem Services definition of cultural practices informed by locale and geography, more of which later. Throughout this paper craft business owners are referred to as 'makers'.

A multiple-case-study approach has been taken [34]. Multiple data types were collected, including notes and observations taken during group discussions and transcripts from semi-structured interviews, and these were thematically analysed using the Quadruple Bottom Line as a framework.

3. Results

The craft industry in Scotland is one which consists of predominantly sole traders (85.6%) and SMEs ([35], p. 24) who deploy traditional crafting techniques with either contemporary or traditional designs. Of 361 Scottish craft businesses surveyed in 2012, 31% had already made significant changes to their business practice to support environmentally responsible business practices. Unlike the Nepali case studies, the participants in this group were established makers who had been running their craft businesses for several years, some even several decades. As such, this group had a different demographic and background from the Nepali case studies.

3.1. Scotland

The Closing the Loop maker-led research group explores gaps in current-materials knowledge and the application of sustainability tools and practices in the studio, and is a partnership between Applied Arts Scotland and Edinburgh Napier University. An inaugural event with 66 attendees and a workshop with 33 attendees in February 2020 explored the role of data to support 'green making'. In the workshop session, participants were encouraged to work through the questionnaire adapted from the ReSOLVE framework ([30], p. 25). Subsequently, a committed group of between 15 and 20 regular attendees met online for monthly group discussions. These discussions generated the data on which the case studies are based. These are supplemented with in-depth interviews of between 45 and 90 min with eight volunteer participants, in autumn 2021. Below are the findings of the Scottish case studies as analysed using the Quadruple-Bottom-Line framework.

3.1.1. Planet

There was an inherent embedded practice of re-using, recycling and being economical with materials. This relates both to an appreciation of materials and not wanting to waste them, but also relates to the precarity of maker's practices, where materials hold financial value which they do not want to waste.

> *"I don't waste, or I try not to waste, so it's been quite interesting, actually unravelling that aspect of my work, that I try not to throw things away or chuck things. I prefer to give things to somebody else to use if I can't use it or look at how something can be reused." (maker, interview 15 October 2021)*

The makers often reclaim materials from existing waste streams (from the building trade, from litter picking, beach combing, charity shops . . .) to use in their products. Materials are sourced, collected, cleaned, cut, shredded, pressed, welded or simply put together. The labour involved in this process is laborious and time-consuming. This time is not easily compensated for financially: when purchasing new materials, there is straightforward financial transaction. However, it is acknowledged that often the environmental and social bottom lines are not accounted for in linear business models:

> *"So, I painstakingly work away at [cleaning it without chemicals] over months, sometimes years, to remove the bitumen from the back of the copper." (maker, interview 15 October 2021)*

There was also a common theme in attributing value to non-precious materials by adding value to these materials through the above processing but also by attributing an emotional value. This was particularly notable in the jewellers' cases, where traditionally precious materials such as gold and silver and diamonds increasingly come with an ethical provenance, but one which is often lacking in the cases of other materials.

Several of the makers had investigated their own carbon footprint as part of their assessment of their business sustainability credentials. It was clear that this exercise threw up two related issues. Firstly, for materials-based craft practices, there is a lack of clear and easy to find information on the supply chain. The supply-chain information pertained to two data points: the environmental impact, usually reported in the carbon footprint of materials, and the social impact, as reported in the ethical accountability of materials. There were some key industry standards established, for example for precious materials, such as gold, silver and diamonds, with standards for ethical sourcing. When using recycled, reclaimed or found materials, this origin story cannot be verified. Similarly, environmental reporting often translated to the carbon footprint of materials. Whilst there are good sources out there to track carbon footprints of office-based activities, this information is much less available for manufacturing-based activities. The lack of transparency in the supply chain makes it difficult to find out not only precisely where materials originate from, but also what components and ingredients may make up certain materials. It is also difficult to ascertain what the carbon footprint is of transporting the material to the studio door, as this information is generally not supplied by suppliers. Even for locally sourced materials, it was not always clear how to ascertain the origins. Whilst there might have been some

information on standard products, when materials were re-used, recycled and found, this made the issue of traceability and carbon reporting almost impossible. Secondly, it was easy for the makers to become lost in the minutiae of carbon footprinting, and spend a disproportionate amount of time sourcing this information. It is clear that it is not viable at this moment for any SME to be able to do this with any degree of confidence, unless materials were grown or sourced and used very locally. Furthermore, the footprint of these sole traders is negligible, in the scale of emissions. However, there was a clear desire to be able to track and report on this information, not only for their own satisfaction but in respect of customer trust and transparency.

> *"But I just slowly imploded over time. And I realised, actually, that our electric [use] is minimal here. I source so much ethically, I travel very little, I don't really go abroad." (maker, interview 15 October 2021)*

There was also some considerable material-innovation notable, in both material composition and technique. In the desire to either use materials which were perceived to be less damaging to the environment, e.g., plastics—although that proved not straightforward—alternatives were often sought. In one case, this led to a collaboration with a material scientist in the pursuit of plant-based plastics. Although this speculative material turned out to be more costly than gold per gramme, due to the lack of scale and production capacity at this stage of the research and development, these material experiments did highlight the perceived problem in sourcing materials sustainably that are financially viable.

3.1.2. People

A connecting thread was how the work produced, whether exhibited, sold at trade fairs or commissioned, became conversation pieces: 'a vehicle with which to start conversations with'

> *"I realised that actually in the sea of destruction and the pursuit of it, it actually became of subversive act to pursue happiness. So that in itself is a political statement" (maker, interview 15 October 2021)*

It was clear that for many makers, the idea of self-care had become a critical part of their social responsibility and that any social responsibility needed to address the precarity of their business towards themselves as much as to others in the supply chain. However, there is an acknowledged contribution to the process of making:

> *"it's meditative"—"I think there is definitely a class divide. So, if you are in the middle classes I know you are definitely more likely to be aware of climate change and the need to be more sustainable. But if you're in a working-class environment where you are living a subsistence living, it's not really high on the agenda." (maker, interview 15 October 2021)*

3.1.3. Profit

The impact of COVD-19 had been keenly felt in this cohort, and had clearly had a financial repercussion, with diminished opportunities. However, there was an increased speed at which a digital pivot happened, opening up other opportunities, hitherto not readily available. Whether it was delivering online-teaching sessions, and developing makeshift equipment to do so, or connecting with others remotely, the digital pivot had become a key survival strategy for makers. However, for some this meant poor wi-fi connection, often in rural or remote locations, made isolation and disconnection worse, and prevented some financial opportunities from being pursued. Similarly, if makers were reliant on customers, clients or students for whom the Wi-Fi connection was poor or who had limited internet skills—e.g., the elderly or disadvantaged—this also proved an obstacle.

As materials are often reclaimed with concomitant hours of sourcing and cleaning, the labour contributing to these processes is often not included or accounted for in the financial value attributed to the final work. Instead, the value attribution was accrued in the other bottom lines.

> *"So, it's really difficult to apportion cost, most of it is time, rummaging in skips for the right materials. I don't know how to price that." (maker, interview, 15 October 2021)*

3.1.4. Purpose

Although the Scottish makers are all set up as profit-making sole traders/or limited company, social benefit and environmental concerns are important aspects of their creative and business drives. For many makers this is a political act. It was clear that the general 'culture' embodied in the ReSOLVE framework helped the makers to implement the Quadruple Bottom Line in practice. By thinking through this, using the worksheet and questionnaire, makers were able to implement changes not only to their working practices, but also to how they profiled themselves outwardly in communications and arguably in their own governance, even when operating as sole traders. It was clear that sustainable thinking was imbuing their operational affairs.

3.1.5. Place

Critically, it became clear that the importance of place, of the locality where materials come from, and how they might relate to particular ecosystems, was a recurring theme.

> *"Being sensitive to the materials we use, where they're from, where they go, their afterlife, and inviting the kind of the buyer's input really and offer a slightly more bespoke service in that I suppose welcoming the kind of purchaser's input. [ ] Everything we do is made to order, so let's work with your space. And then I work with the clients so that gets the right product for them which results in less waste for us." (maker, interview, 15 October 2021)*

However, in comparison with Nepal, Scotland has lost much of its connection to tradition and location in terms of material provenance and community of practice. This makes choosing materials much more difficult, as most materials are not necessarily grown or manufactured locally. This meant reconnecting with a sense of place. Walking, as an act of connecting to a place, surfaced in at least two practitioners' work as a key feature of exploring local environments and connecting with its ecosystems:

> *"Just from the act of walking, that sense of place develops. Because you're interacting not just the lower plant life, in the flora and fauna but you're connecting with the canopies and everything in that mid-range. So it's almost like a landscape that unfolds as you walk." (maker, interview, 15 October 2021)*

Repurposing waste adds localization and place-based sourcing. The importance of place, of localized supply chains and local materials, was an aspect of the Quadruple-Bottom-Line approach which was not acknowledged. Based on the findings in this project, the fifth P of place was added to the Quadruple-Bottom-Line framework to support the Nepali case studies outlined below.

It is worth noting that the Quintuple-Bottom-Line approach was subsequently adopted in the expansion of the existing Craft Toolkit developed by Applied Arts Scotland for the British Council. The Craft Toolkit [32] uses the five Ps as underlying principles, helping businesses to articulate their purpose, their relational networks and impacts (people), their business plan (profit) and their environmental impact (planet and place). The addition of the sustainability module was to make the five Ps much more explicit, to celebrate existing good practice and encourage new ways of working. It uses the five Ps to systematically reflect on business goals and ambitions, to encourage more holistic thinking and demonstrate how business and environmental sustainability are inextricably linked. The revised Toolkit is now translated into twelve languages, with a focus on the countries where the crafts sector is still deeply embedded in community such as India, Afghanistan and South America.

3.2. Nepal

In contrast to the Scottish case studies, the Nepali case studies engaged with young entrepreneurs, some of whom have set up as social enterprises, to work and support communities outside of their own practice. Unlike the U.K., Nepal still has a very rich

ecology of indigenous craft-making communities: wood workers, potters, weavers, brick makers, rope makers, gilders, embroiders ... which often have strong heritage- rather than design-focused products. These indigenous communities have been recognised as still possessing traditional making practices and knowledge bases which informed their nature-inspired climate solutions [36]. Through the affiliation with Kathmandu University and the Department of Design as well as Engineering, applicants to the two programmes outlined below came predominantly with a design-and-engineering perspective rather than a designer–maker approach, as might be customary in the UK. These young entrepreneurs worked closely with these traditional artisan communities.

The Road to CoP26 Innovation Grant Programme (R2COP26) (2021) and In Our Hands (IOH) project (2022) supported over 50 freelancers and SMEs, and funded 11 to start up their sustainable-business ideas. These projects form part of the long-standing British Council Crafting Futures programme, active throughout Asia, Latin America and Europe, supporting local craft communities to create prosperity and tackle global challenges. The R2COP26 programme delivered an online incubator programme to 38 aspiring entrepreneurs, in partnership with Kathmandu University, the National Innovation Centre Nepal, Applied Arts Scotland and Edinburgh Napier University. The R2COP26 focused on a circular-economy model, which placed nature-inspired climate solutions using design at the heart of product and service development. The Quintuple Bottom Line was used as a framing device to encourage participants to think through the financial-, social- and environmental-sustainability aspects of their business ideas by foregrounding local ecosystems to highlight nature-inspired climate solutions. Six finalists were funded to develop their sustainable-craft business. The IOH programme supported twenty entrepreneurs and funded seven to progress with their business ideas. The Nepali case studies used the Sustainable Business Canvas [31] and the In Our Hands cohort also used the adapted Craft Toolkit [32], both adapted by the team to reflect on the Quintuple-Bottom-Line approach. As the emphasis on circularity was made more upfront in these case studies, the reporting of the Quintuple Bottom Line is thus in a different order to the Scottish case studies, to reflect the priorities emerging from these case studies.

The impact of the global pandemic on the research prevented local field work from taking place. Instead, case studies relied on online notes and reflections from the online incubator sessions in April 2021 and November 2022 and in-depth interviews of between 45 and 90 min with the R2COP26 grantees and mentors. The input of the mentors (from Kathmandu University and Applied Arts Scotland) was critical to ensuring that these businesses were thinking through all the aspects of the closed-loop principles; from sourcing the right materials, to production, packaging and end of life. This research thus only reflects the designer/entrepreneur perspectives. The focus here, then, is on the business concepts explored through the QBL.

3.2.1. Planet

As the focus of these business ideas was material based, a circular-economy approach was a key consideration. This meant investigating the supply chain of the raw materials. This included looking at existing material streams and re-purposing waste streams into higher-value items, such as, for example, the recycling of discarded furniture into handlooms to enable a more ergonomic and faster production of artisanal-woven-textile production. For several, this meant examining the source and life cycle of natural resources such as timber, yak hair, bamboo and banana leaves. Whilst two business considered using existing waste streams (discarded wooden furniture and banana agri-waste), which would work well on a micro scale, there were long-term implications of using potentially finite waste streams when scaling up.

> *"In Nepal there are a lot of community forests managed by farmers and local people. At a larger scale I can work with these communities to resource from [these] community forests." (grantee)*

Banana leaves are considered agri-waste, and currently hold little-to-no value. One business proposed to use this waste product to address another waste problem: 18.9 million tonnes of menstrual waste created in Nepal alone takes 600 to 800 years to degrade, but are currently mostly incinerated, creating carbon emissions. This business proposal uses natural and renewable materials to create a biodegradable and chemical-free product which biodegrades in three to six weeks. Based on previous experience of this social enterprise of working with biowaste from the hospitality sector, there are tentative plans to investigate the creation of biodigesters to create additional value. Banana farming takes place in 66 districts of Nepal, and once banana trees fruit, they are cut down, so there is a ready supply of waste material to tap into. This creates added value for the farmers, for whom this now becomes an additional commodity. This makes this a scalable business proposal: working on small-scale localised production, but in multiple locations. The banana leaves are initially shredded and cut into smaller fibres, and encased in a polymer bioplastic. This process was initially carried out by hand by a local workforce of women, but this production process is currently being semi-automated, developing compact, low-energy-intensive machines to make it less labour intensive but thereby more inclusive for workers who currently are not able to fully take part in the marketplace. The local workforce is also the local market.

> *"This is a social enterprise. Whoever is producing our product, we tell them that the products that we make will be benefiting the community itself. The first benefitting are the women directly because they are getting employment. Second is the environment because agro-waste has been used. Thirdly, the profit which is generated of the selling of the products, we carry on different donating and carry out different awareness programmes. We have already carried out three sanitary-pad awareness campaigns where we talk about menstruation, health and hygiene and we distribute re-usable sanitary pads in the community." (interviewee)*

3.2.2. Place

Considering the locale of where these materials grow, and which communities of craft makers already had the necessary skills and knowledge to use these materials, were key factors. Yak wool, for example, is sourced from herds tended to a by the nomadic Drokpa community in the Mustang district, bordering Tibet. However, the enduring pandemic made access to this community difficult. Yak hair, although traditionally processed, now has little use or value for this traditional community, so this proposition would enable a waste product to be given value and the community to be able to raise additional income through the sale and processing of the yak hair. Similarly, the 'pyan' or bamboo containers come from a particular area in the Godawari municipality in the Kailali district, where the bamboo grows and a skilled crafts community resides. Thus, the locale of the region is critical to the source of material and for skilled crafts people. These young entrepreneurs are keenly aware that many of these traditional skills and knowledge bases are at risk of disappearing:

> *"The craft is slowly disappearing. Today there are only two artisans left who do the craft [of bamboo container making]. We are trying to revive dying traditions and bring it to the market." (interviewee)*

In the case of the bamboo containers, the project incorporates the entire process. As the bamboo is currently supplied from external sources rather than from local supplies, the plan includes a future local bamboo plantation, with the processing of the raw material as well as production. This makes the business less prone to outside supply chains, an advantage outlined in the Ellen Macarthur Foundation report [16]. The 'hapa' is made from fired bamboo, cut into sheets and hand stitched together into a container, without glue. The lid has been designed with either an open-weave or closed construction, and with or without a lock, to enable different contents to be stored. The afterlife of the product is also carefully considered. The inclusion of a 'secret seed,' for example, in the corrugated-card

packaging can germinate if composted. Thus, the closed-loop approach to the product becomes an integral part of the business.

3.2.3. People

The active engagement of the craft practitioner and their wider communities resonated in several projects, and was arguably the key to those poised for longer-term success. Integral to this community engagement was a long-term vision and a willingness to actively listen and take the 'slow' [37] approach to building up relationships and trust.

> *"Actually, it is more than an agreement, but rather expectations for them as well as us, that we are partners rather than buyers and sellers. It is a partnership." (interviewee)*

One business incorporated the ethos of partnership into their name, meaning collaboration and harmony. Their engagement with the mountain communities came from personal connections, which saw first-hand the impact of climate change on the nomadic community, who rely directly on the environment for their livelihood: less grazing for their cattle, and erratic weather, such as unexpected snowfall. The business helped them to diversify and reconsider the value of existing resources:

> *"They were rich in so [much] indigenous knowledge. They had been using animal products for so many years, centuries . . . That is how the idea was born; to help them diversify their livelihood. Since they are so dependent on the yak milk, the yak dung and the inner wool. But the outer wool had become obsolete. Traditionally this was used for making tents and sacks. But now their tents and sacks are made from synthetic materials from China that can be bought easily for very cheap rates at the market. So the outer hair was not being used much. So we wanted to revitalise, and re-use the outer hair." (interviewee)*

The wool is bought from the herders direct, whilst the intention is to work longer term with that same community on creating extra value, by separating the fibres (outer from inner), cleaning, carding and spinning the wool into yarn (carried out by men) and finally, woven into fabric for rugs (by women). This is currently done by former herders now living a settled urban life, but who still have the necessary skills. In the longer term, the yak-wool fabric will be turned into higher-value products such as wooden furniture. The traditional tents made from outer yak hair are built to last, and are handed down the generations. This expectation for longevity and durability is a key selling point for the new, contemporary products created from the yak hair.

Another business offered training in toolmaking and mentorship to the bamboo-crafts community, with a particular focus on women and young people. Likewise, the business using banana waste to produce sanitary products worked closely with women. This is of particular relevance in Nepal, as research by the UNFPA [38] indicated that women, and indigenous women in particular, were more vulnerable to the impacts of climate change on their communities. This was also a key objective of the British Council funding strategy for this project. The training offered through these enterprises then, enables this particularly vulnerable group to build up skills and, expand their knowledge, and can be a useful tool in the process of adaptation and resilience of local communities to climate change. Here, then, the craft product becomes a vehicle for community engagement. In the case of the bamboo business, the training offered set out to enhance the craft skills already present with other skills, such as toolmaking, finishing skills, design and presentation skills (drawing, measurement, record keeping), and marketing. Arguably the approach to design is an imported Western approach, and contemporary design training is modelled on Western schooling. Its approach is 'modern' in the sense that the tools are those of a modern (capitalist) market model, where design and marketability are critical. This was evident too in the application of engineering solutions to increase the production of handlooms by semi-automation. Another business approach was tailored to increase productivity and thus profitability of artisan production, particularly affecting women handweavers. By improving the design and construction of the vertical and horizontal looms to 'be more

ergonomic' and 'user-friendly', paying particular attention to differently abled bodies, these looms constructed from old furniture could offer employment to women. Even though the process of weaving with natural fibres and using recycled timber furniture ensured a sustainable-business model in terms of profit and planet, this approach did not specifically embrace a local community of weavers or incorporate nature-inspired climate solutions, but rather proposed increased productivity through increased efficiency. This lack of engagement with community arguably impacted on the long-term viability of this business. Important here, then, is the framing of the lo-TEK [36] approach, where design is applied to and enhances existing traditional ecological knowledge. It is striking that the entrepreneurs are actively trying to save some of this traditional knowledge through their enterprises. The workshops and training sessions also enabled trust to be built between the entrepreneurs and the crafts community, and for communication skills to be developed.

> *"After the workshop we had better interaction and we were able to build a better relationship. [ ] They had never had such a workshop before. People just came and went. So they focussed on it, believing it was for their own development. Then they started communicating better, and we even went on outings together. They invited us on family gatherings. After we started communicating better, the product improved too." (interviewee)*

Whilst these crafted products originate from specific regions and localities, the lo-TEK approach—with the input of creative design, applied to natural materials and made with traditional skills— has an analogy with the food industry, which has borrowed the term 'craft', often to denote fusion products which marry tradition and authenticity with contemporary flair and taste. For example, European-beer traditions exported to North America were re-imagined by small American-beer producers, and re-imported as a 'craft beer' tradition into Europe. Here too, the local artisanal traditions are re-vitalised by a fusion approach of external factors (design), which re-position traditional artefacts within a new tradition. It was noteworthy that the entrepreneurs' approaches were often deferential to these traditions but able to reference them with difference. In addition to a long-term commitment to the communities with whom they were working, there was also a clear engagement to support the survival of skills on the verge of being lost. The pandemic, too, has impacted these crafts communities adversely, as many of them relied heavily on tourism.

> *"We want to have a museum and an outlet. People suggested that we do that in the Kupondole area for good market prospects. That is a possibility, but we want our first outlet to be in Pyan Gaun so that people come there not just for the product but also for the culture and tradition." (interviewee)*

In the long term, this may have to change, as international long-haul travel becomes socially and environmentally unacceptable. Instead, a more-local market may need to be created.

A key communication strategy to capitalise on this local richness was evident, and critical to several of the businesses. The emerging partnerships thus often shared skills, where the designers contributed not only design skills, but also marketing and branding skills. This was particularly evident in one business, which put the ethical consumer at the heart of its business whilst fully integrating local producers of yoghurt. This local speciality was given a systematic overhaul, to revive the local yoghurt-making culture, reviving century old recipes which use honey instead of refined sugar for example, and reviving traditional craft production too, by integrating traditions into the packaging process. The ceramic pots are made from local terracotta, which in turn imparts a unique flavour to the yoghurt, packed tightly with a wooden lid and fastened with locally made twine.

> *"It's not only about the yoghurt, it's about the pottery makers, it's about the weavers, it's about the woodworkers who make the lid, and the yoghurt makers themselves. There is about four communities of craft practitioners who work to bring this one product to life. [ ] Packaging is part of the product itself." (interviewee)*

Here too, the decline and demise of local-craft traditions and livelihoods and observed plastic pollution were the impetus for this business. The producers operate within a two-mile radius, thus making this a very localised production. The business actively connected a previously disconnected ecosystem of production centres. The business here thus built a social structure as much as a production infrastructure, by re-invigorating local producers:

> *"[the crafts communities] were losing like the society itself, they were abandoning their cultural thing, their craft because there is no more work. So when I went to the pottery, they were doing knock-off work, they were seeing some kind of design, they were copying it . . . they was no kind of personal thing coming out of them, and I think the project actually gave them something to actually proud of: ok, this actually came from us." (interviewee)*

The clay used for the yoghurt pots is of a better quality, to ensure that they can be used for longer than normal practice and can be upcycled and used in other contexts, as stackable kitchen containers, for example. When at the end of life, the ceramics can be ground up and recycled as a construction material. The commitment to engaging the community in the long term requires a build-up of trust.

> *"Actually, it is more than an agreement, but rather expectations for them as well as us, that we are partners rather than buyers and sellers. It is a partnership." (interviewee)*

As was noted by the mentors in this project, identity played a critical part in the majority of these projects: local connections to regions and communities helped embed these projects, but were not a prerequisite for these businesses in order to consider place.

> *"We are figuring out how to save our own uniqueness, and still collaborate with others and still create a market for an entire community." (interview mentor)*

3.2.4. Profit

Thus, this longer-term investment in the community is envisioned to generate financial sustainability for both business and community. The majority of the money flows back to the community through payments to local producers.

> *"When we asked how much would you want for the product, they won't tell us directly. They just smile, ad say give whatever. And because this outer hair is not being traded as much now, there is no market price for it. So, it has been a challenge for us to pay fairly. We don't want to overpay either, because it is a business after all. So, communication wise it has been a challenge, regarding pricing and all that.' (interviewee)*

> *"We are not creating the yoghurt, we are not creating the pots but we are creating the systems." (interviewee)*

The value here, then, is the system design which distributes value across the five Ps. As was noted by the business mentor, this system has the capacity to be applied and its process replicated in other contexts:

> *"You work not just on one aspect but on the whole cycle. It includes responsibilities, starting point, ending point. You have to think of everything before you start working. [ ] The important part is the community can work independently. The community needs to be gathered. And if a second party shows an interest, they too can work independently and responsibly with the same community [of crafts people]. If you are a little bit irresponsible it impacts your benefits as well." (interview mentor)*

However, critical to the success is financial sustainability as the cornerstone of any of these businesses: without financial sustainability, the social, environmental, and local sustainability are untenable. On reflection then, these businesses are aligned to the QBL. They challenge linear-growth models, where only financial sustainability is counted. By considering sustainability of these purpose-driven business in terms of planet, people and place, its profitability is enhanced.

> *"He was talking not just of replacing plastic. He wasn't working on the surface but in depth. I was able to make that reflection.: that he is working with understanding and is*

able to make people understand. This is the reason that he is selling the products at a 60% higher rate than market rate." (interview mentor)

3.2.5. Purpose

This approach then, is about enabling. It is about mutual support and regenerative design, an ethos which is transferrable. These businesses embed their purpose from the outset: to 'find value in materials', re-use and re-purpose packaging materials, and to do so with the intention of behavioural change:

"To bring people back to this idea of re-use then that would be the greatest value to us at this moment." (interviewee)

The value lies not in the material products produced, but rather in the ethos and approach to making, to creating value, questioning supply chains, re-organising and creating local value systems. Much like the export of craft-beer making, its re-imagination created new appraisal—and value—of old techniques and methods and materials. These ideas can be exported and applied locally.

"Just because a product it itself is better, people might not buy it. You need to have a certain kind of value sharing with your consumers, with your manufactures, with your producers, with the farmers, so that this can become a product that people buy and use for the long run." (interview mentor)

These young entrepreneurs highlighted possible nature-inspired climate solutions as viable business propositions. This community of budding entrepreneurs was introduced to the Scottish crafts community, enabled through a Royal-Society-of-Edinburgh (RSE) grant.

4. Discussion

Braungart and McDonough re-imagine the Law of Return—adopted by early agriculturalists, and which accepted that the farmer had to try and 'repay the earth for what he took from it' ([9], p. 2)—for materials which support the biosphere, rather than pollute or destroy. We posit that this critical acknowledgement can be conceptualised by the cultural-ecosystem-services approach [39–41], which argues that natural-ecosystem services (provisioning, regulating, supporting and cultural services) are critical systems for human dependence on the Earth's systems. Cultural-ecosystem services are defined here as 'the individual or shared human benefits to human well-being that arise from the interactions between environmental spaces (e.g., gardens, parks, beaches and landscapes) and cultural practices (e.g., gardening, walking, painting and watching wildlife)' ([41], p. 5). The report goes on to say that culture is not a property of the ecosystem per se, but develops over time, through interaction between people, their values and the environment in which they operate. Cultural-ecosystem services (CES) in particular 'give rise to a range of material and non-material benefits to human well-being but are frequently overlooked in decision-making' ([41], p. 5). The importance of context—spatial, temporal and socio-cultural—is seen as fundamental in the shaping and articulation of human values ([42], p. 4). Culture and nature are conceptualised as inseparable.

Inayatullah [23] and Walters and Takamura [43] both argue that the role of culture, and indigenous culture in particular, is a critical factor too in the Triple-Bottom-Line framework. Walters and Takamura argue for 'the decolonisation of the Western view of economic development, innovation, and entrepreneurship' and rather for re-imagining it as a model in which culture is a 'wellspring of innovation and entrepreneurship' ([43], p. 78) which does not mean a rejection of Western knowledge per se, but rather a re-centring of local knowledge bases and world views, as is argued also by Garoutte [44] and Watson [36] in terms of material knowledge and solutions to climate change. Walter and Takumaru's argument for culture to be acknowledged as a key factor can thus be found in the CES approach. This is arguably also reflected in the fourth P (purpose), as outlined earlier, as it reflects the general cultural and contextual setting in which a sustainable business operates. However, this paper proposes that the role of the local ecosystems and of locally

available resources is the fifth and final critical part which has not been made explicit in the Quadruple-Bottom-Line approach. As such, we propose to differentiate between the cultural and anthropocentric aspect embodied in purpose, but propose to add a final fifth 'P' to represent 'place' and the local ecosystems which support the CES outlined above. What are the natural resources and materials which can be sourced locally, thus shortening the supply chain, supporting local economies and local communities, and which are informed by local customs, traditions, and cultures? As such, we propose the Quintuple Bottom Line of the five Ps: purpose-driven businesses which place economic profitability alongside social responsibility and environmental sustainability, and which are rooted in place: purpose, profit, people, planet and place. The Quintuple Bottom Line abbreviates to QBL which is the same as that used for the Quadruple Bottom Line hence the use of the five Ps as shorthand for the Quintuple Bottom Line. As purpose applies across the Triple Bottom Line of profit, people and plant, it is argued that so does place.

The Quintuple Bottom Line proposed here reflects the increased shift towards a more localised economy, with reduced carbon miles, and benefiting local communities; this is arguably an embodiment of E. F. Schumacher's [7] 'study of economics as if people mattered', which trailblazed the essence of purpose-driven, decentralised economies. The premise of the five Ps or Quintuple Bottom Line is thus taken as a framing device here, to consider how craft businesses frame values which are beyond the economic (financial) ones, and which include social, environmental and local values, and purpose-driven businesses. Critically, craft businesses built around fully sustainable principles embodied in the five Ps have the capacity to support a regenerative economy through regenerative design. The small scale of the craft businesses in this study enabled a questioning of supply chains, the experimenting with materials to explore alternatives, and a social engagement with local suppliers, communities and infrastructure. Conversely, the human-resource capacity of these SMEs meant that a dipropionate amount of time was invested in sourcing alternative supply chains, calculating carbon footprints and experimenting with alternative materials, for which processes larger corporations might have dedicated staff and resources.

As outlined above, the importance of place is already well established in the ecosystem-services approach, and applies particularly well to culture, as outlined in cultural-ecosystem Services. However, this paper posits that the Quintuple-Bottom-Line framework, supported by evidence from the craft industry, highlights the importance of place for sustainable entrepreneurship and business, thus extending beyond the framing of culture alone. This paper contends that the framing of place can be generalised within the context of sustainable entrepreneurship in the creative industries, which are rooted in material applications. It is clear this may not apply to those creative businesses which are not material-based, or which rely on a globalized-supply-chain or market. The five Ps can thus be applied to other creative businesses which have a significant material footprint, such as design and architecture. However, this paper puts forward the idea that thinking through the importance of locality through the five-Ps framework might support broader reflections on the importance of place to other creative businesses beyond craft, design or architecture, such as music, film, gaming and others.

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Live Music in the Time of Corona: On the Resilience and Impact of a Philharmonic Orchestra on the Urban Economy

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Abstract: During the COVID-19 pandemic, many governments enforced epidemic policies of social distancing, restrictions of professional practice, and the prohibition of cultural live performances. Because such policies dried up important sources of income in the cultural and tourism industries, this paper examines how cultural institutions coped with this crisis. Drawing on the case of the Mannheim Philharmonic Orchestra in Germany, we collected original data and employed a regional economic impact analysis to determine both the financial resilience of the Orchestra and its impact on the urban economy. Because the Orchestra could not reduce costs during the COVID-19 pandemic, public subsidies were crucial to fill the income gap of missed live concerts. In turn, the regional impact analysis suggests that the Orchestra maintained its positive effect on the economic demand for goods and services in the urban economy. When balancing the city's subsidies with the rental (city concert halls) and tax incomes generated by the Orchestra's local impact, the Orchestra managed to induce surplus revenue for the city's treasury.

Keywords: creative industries; cultural industries; philharmonic orchestra; regional economic impact; urban economy; economic geography; Germany

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1. Introduction

In the public perception, cultural performances primarily contribute to creating an educational and entertainment offering that enriches the city and its inhabitants, contributing to their overall quality of life. For a long time, research and planning therefore recognized culture as a soft location factor [1], i.e., as having only an indirect economic effect, such as attracting highly qualified workers. Current studies which have looked at the appeals of the creative class [2,3] and the importance of arts and culture to urban innovation, have focused on the direct economic impact of culture on the economic development of cities.

The cultural and creative industries [4–7] not only comprise a large number of economic sectors that generate jobs and create value through their commercial offerings, they also compose a disproportionate share of the creative work in cities, which supports creativity and innovativeness and has an impact on other economic sectors [8].

An outstanding example of this in Europe is the construction of the Guggenheim Museum in the Basque Country, which stimulated the economic development of Basque in significant ways. Known as the 'Bilbao Effect', initial investments of more than USD 180 million were already amortized after seven years of construction and led to an overnight boost in tourism in Bilbao [9]. Similarly, the new opera house in Oslo attracted additional visitors, making Oslo a tourist destination [10]. Therefore, it is hardly surprising that, e.g., the New Leipzig Charter on Sustainable European Cities sees culture as the center of sustainable urban development [11,12].

Economic crises, and the COVID-19 crisis in particular, have shown that the consumption of cultural goods such as music is strongly affected by economic development and economic outlook [13]. During recessions, private households reduce their spending on leisure and culture to secure the basic goods needed for daily life. In turn, the regional

economic benefit of cultural service providers declines, and many cultural organizations and workers run the risk of insolvency and failure. An underlying question based on this observation is how the positive regional economic impact of cultural service providers might be stabilized in times of crisis. In particular, in social market economies such as Germany, state interventions are often seen as a solution to prevent providers of cultural goods from market extinction. Given the federal system of the German state, there are different types of public subsidies at different regional levels.

This paper pursues the two following research goals to contribute to the current debate on cultural industries and a post-COVID-19 economy: first, we aim to trace how the COVID-19 crisis has affected the Philharmonic Orchestra as well as the Orchestra's impact on the urban economy. To assess these effects, we employ a regional economic impact modeling approach to calculate the effects the Orchestra has on local demand, employment, value-added and local tax revenues in the period between 2018 and 2022. Second, we examine the effect of public subsidies on the survival of the Orchestra. We found evidence that the public subsidies not only helped sustain the Orchestra and spurred its continued growth, but, at the same time, the city earned higher returns than the initial subsidies given.

2. Theoretical Background

2.1. COVID-19 and the Live Music Industry

Over the last decades, digitization and the shift to consuming music via streaming services has led to declining revenues in the music industry. As a solution for musicians to compensate these losses in income, the use of digital services was proposed to raise popularity, and then transform that popularity into income from live events [14,15].

Compared with previous economic crises (e.g., the financial crisis of 2007/2008), which had reduced the demand for music services, the COVID-19 pandemic has been an exception. Due to anti-COVID-19 regulations, live music performances became practically forbidden. In other words, the single most important income for orchestras across Germany dried up, and digital solutions could hardly compensate for those losses. Live Nation, a world-leading ticket provider and event agency, promoted approximately 40,237 live events in 2019, whereas this number sunk to only 8117 (2020) and 17,234 (2021) events during the pandemic [16].

The global revenues generated by live events in the music industry dropped by 75 percent in 2020 when compared with the revenues in the year before COVID-19 [17]. Forecasts showed that in 2021 the revenues were estimated to be 50 percent below revenues in 2019. While the revenues of live performances had dropped, the revenues for digital streaming remained stable, with a slight growth in 2020 [17].

During COVID-19 the situation was even worse for classical orchestras, for which live events rather than revenues from recordings have always been a major source of income [13]. Further, the continuous rise in overall revenues from live events until 2019 was driven by large-scale events performed by national and international reputable artists [18]. Yet, at the same time, revenues had been declining for small-scale theaters, music halls, and music clubs, which offered platforms for young talent and newcomers, and represent a vibrant part of the urban night-time economy [19,20]. The term night-time economy alludes to the necessity for visiting urban areas at night to understand the potential of culture for the economic growth of cities [20]. The urban night-time economy has long been the subject of strategies to improve a city's competitiveness in the globalized economy [19,21]. Since the 1990s, many cities have adopted public policies as part of creative city approaches to attract tourists, investors, and highly skilled workers [21,22] while addressing problems such as the dying of music clubs with supportive policies [20]. Indeed, studies provide evidence that cities that operate symphony orchestras, opera houses, etc. are more successful at attracting and retaining highly skilled labor [23]. In other words, cultural service providers of live acts offer long-term benefits for urban economies. However, following the uno actu principle, live acts cannot be preproduced, nor can they be caught at a later date [24].

Consequently, it is challenging for cultural service providers to compensate for losses before or after an economic crisis.

2.2. Regional Economic Impact Assessment

Cultural work serves the public interest by securing and expanding cultural education and entertainment in a variety of ways. However, even in times of economic prosperity, a large part of the cultural economy often fails to achieve economic viability from the proceeds of admission fees alone. Instead, contributions are required from the private sector, through sponsorship and donations from companies, foundations or charities held by the civil sector [25], and from the public sector as part of cultural policy funding. Many theaters and concert halls as well as drama and orchestra ensembles would not be able to sustain themselves without this support. The COVID-19 crisis has increased the importance of such funding to compensate for the revenues gained from live events. In addition, public funding supports security planning and the professionalization of funded institutions, which often contributes to the attraction of additional funding and more efficient structures.

Due to the high level of competition for public funding, the public sector must consider the distribution and use of its subsidies appropriately and needs to justify them accordingly. In addition to the political struggle, there has been increased focus on the question of what economic effect can be achieved with the help of the funds used. In order to measure the direct economic effects of public funding for a specific geographic area of impact, regional impact analyses are particularly suitable [26,27]. Researchers have investigated the economic impact of both cultural institutions, such as the Lucerne Theater [11] or British theaters [28], and of cultural events, such as the Jazz Festival in Perugia [29], individual rock concerts [30], or a folk music festival in Finland [31].

In contrast, the present study is dedicated to the task of measuring the direct economic impact of a musical ensemble in a geographic area of influence, namely the impact of the Mannheim Philharmonic Orchestra in the city of Mannheim. The city of Mannheim, the case of interest in this analysis, has been a 'City of Music' member of the global UNESCO network of Creative Cities since 2014. It has committed itself to supporting its cultural and creative economy with numerous initiatives in cultural policy and economic development. The UNESCO Creative City Network connects cities that have made a special contribution to music and want to exchange experiences, concepts, and model practices in the field of contemporary art and culture. Other German cities, including Berlin, Heidelberg, Karlsruhe, Hanover, and Potsdam are also part of this network. As part of the Mannheim Model for the Promotion of the Music Industry, founded in 1999, the city created the position of a representative for music and pop culture, founded the subsidiary 'Start Up Mannheim' for the promotion of the creative industry, and established the 'Mannheim Music and Pop Culture' initiative.

Both spatial incidence analyses, which use cost-benefit considerations to balance subsidies used against regional revenues, and more complex multiplier analyses, which include the stimulation of demand in related economic sectors through intermediate inputs, are used to evaluate the economic impact of cultural institutions. Regarding the Mannheim Philharmonic Orchestra, the present study evaluates both aspects, i.e., the cost-benefit balance for the local government as well as the economic impact on the entire urban economy of Mannheim.

3. The Mannheim Philharmonic Orchestra

The Mannheim Philharmonic Orchestra was founded in 2009 as a unique organizational concept in Europe to build a bridge between the training of orchestral musicians at the State Music Academies on the one hand, and their professional employment in orchestras and philharmonic orchestras on the other [32]. The Orchestra pursues three main goals: first, to provide excellent support for young musicians at the highest artistic level; second, to make an important contribution to the cultural offerings of the city of Mannheim; and third, to promote the musical education of children and young people.

Since its founding, over 500 young musicians from more than 40 countries have performed at over 60 concerts in the city of Mannheim. In the 2021/2022 season, more than 5000 guests attended the concerts. In addition, the Orchestra has reached more than half a million people annually in 105 nations to date through live broadcasts of its concerts on the Internet. Video views have already more than doubled since 2019 [32].

In addition to the local concerts held in the city of Mannheim and the live broadcasts around the world, the Mannheim Philharmonic Orchestra has toured and guest-performed extensively at major concert venues in Europe, including, for example, in Antwerp, Hamburg, Madrid, Milan, and Munich. The Orchestra's growing international reputation is reflected, among other things, in the fact that various world-class soloists regularly give guest performances at Philharmonic concerts in Mannheim.

As a non-profit organization under private law, the Orchestra does not pursue any economic interests in making a profit; instead, it focuses its activities solely on qualifying musicians and making a cultural contribution to the city of Mannheim. Since ticket revenues cannot cover the operating costs of the society or the musicians' stipends, the Orchestra relies on financial support from public, private, and civil society sponsors. Since its founding, the Orchestra has not only generated increasing concert revenues—with the exception of the concert break during the COVID-19 pandemic in the 2020/2021 season—but the Orchestra has also received increasing support from donations from civil society and sponsorship from private actors. These funds have financed a significant portion of the scholarships for musicians, as well as the concert performances.

On a smaller scale, the City of Mannheim has in the past sponsored individual concerts and events for the Mannheim Philharmonic Orchestra. This project-related funding has usually had a direct regional economic effect. For each of the 2019/2020 and 2020/2021 seasons, the City of Mannheim provided an operating subsidy of EUR 50,000, which made a basic contribution to the necessary operating and personnel expenses of the organization (at the time this report was prepared, the 2021/2022 season had almost been completed. Because six out of seven orchestra concerts had already taken place, the majority of expenses and income had become regionally effective). Furthermore, the Orchestra was able to attract additional public funding in the following season and professionalize its concert operations beyond the musical ensemble in management and fundraising, contributing to its viability. Since the operating grants were provided in tranches, they primarily affected the expenditure structures of the following seasons.

In 2022, however, the city's cultural funding was not renewed [33]. The withdrawal of financial support from the city of Mannheim has threatened the continued existence of the Mannheim Philharmonic Orchestra. This is because municipal funding is also a necessary prerequisite for eligibility for funding through other public funding programs, such as the institutional cultural funding of the State Ministry of Science, Research, and the Arts. Due to the demands of different social areas on public funding, there is a well-founded interest in determining the effect of public funding on the regional economy. In this way, it can be shown, for example, how much targeted public funding affects the urban economy and whether these effects, in turn, generate urban revenues that can compensate for the funding.

4. Methods

This study uses regional multiplier analysis to determine a detailed model of the economic impact of the cultural work of the Mannheim Philharmonic Orchestra and to evaluate it in terms of the subsidies used by the city. The methodological basis for the analysis is a regional economic impact model, which the authors have further developed to assess the regional impact of universities as public research and educational institutions [26,27,34–36].

The data basis for conducting the regional multiplier analysis is a primary data set collected by the Mannheim Philharmonic Orchestra [32], which was systematically analyzed in collaboration with the authors. The data set includes information on expenditures and funding for various years. Missing data, which were not within the influence of the Orchestra's reporting, were supplemented either via official statistics or via justified esti-

mates based on equivalent studies. Overall, the comprehensive and differentiated primary survey contributes to the fact that the present study achieves a high validity and relies to a lesser extent on estimates and assumptions when compared to similar studies. The regional multiplier analysis is used to model the periodic economic effect of the expenditures associated with a facility on increasing demand, value-added, income, and jobs and tax revenues. The total effect is the sum of three individual effects [34]:

1. *Direct effect*. The sum of the demand and regional effects of the Orchestra's operations, its musicians, and out-of-town audience constitutes the direct effect. (a) The demand effect takes into account which part of the expenditures is actually spent on consumption. These are the material and investment expenditures of the Orchestra as well as the expenditures of the scholarship holders excluding taxes, social security contributions, and other deductions, such as those for saving purposes. (b) The regional effect is the share of consumption-related expenditures that are spent on procurement, investment, and consumption in the city of Mannheim [37].
2. *Indirect effect*. As a result of the direct demand for goods and services by the Orchestra, its musicians, and out-of-town concertgoers, there is an increase in the production of corresponding goods. In order to meet this increased demand, an increased quantity of intermediate inputs is also necessary, so that the additional production is passed on to the upstream sectors as demand. The calculation of this intersectoral multiplier effect is based on the interdependencies between the economic sectors in Mannheim. The nationwide input–output table [38] maps these relationships nationwide. Based on established estimation methods [39,40], this study models the regional interdependencies in the City of Mannheim.
3. *Induced effect*. In order to provide for the additional production, the demand for labor grows simultaneously in the affected economic sectors. The additional economic effect resulting from this increased employment describes the induced effect. As a result of the increased employment, the sum of wages and salaries paid out in the upstream sectors rises. Part of this income flows back into the regional economy as consumer demand and in turn generates regional economic effects. The increase in employment in the upstream sectors runs simultaneously with the increase in production. Indirect and induced effects can therefore be determined jointly based on regional economic linkages using a combined multiplicator [26,41,42].

The regional economic impact of the Orchestra can be modeled for various economic indicators. The demand effect captures the total demand of the Orchestra and its members and visitors in Mannheim, as well as the indirect and induced demand effects arising from this. The value-added effect describes the shared value of a good that is added to the economic sector. The direct value-added effect of the Orchestra is therefore to be understood as the cultural work performed there, and includes the sum of personnel compensation and stipends [43]. The direct, indirect, and induced employment income generated regionally as a result of the demands of the Orchestra and its members define the income effect. To determine the employment effect, these incomes can be translated into concrete employment figures using industry-specific job coefficients. Finally, the tax effect takes into account the payments of income or sales tax in the state of Baden–Württemberg associated with consumer demand and additional income, some of which are passed on to the municipalities via apportionments (most of the tax revenue of the state of Baden–Württemberg is attributable to income tax and sales tax. Other types of taxes are not taken into account in this study due to their low revenues). Since these types of taxes are joint taxes, the revenues accrue jointly to the federal and state governments, with a certain share being passed on to the municipalities via apportionment. The present analysis only takes into account the municipal share that accrues to the independent city of Mannheim.

5. Results: Resilience and Local Economic Impact of the Orchestra

5.1. Deveopment of Costs and Income during COVID-19

The financial reporting of the Mannheim Philharmonic Orchestra follows the orchestra season starting and ending in the middle of the year. As COVID-19 reached Germany in March 2020, and the majority of the concerts of the season 2019/2020 had already been performed, this season technically represents the last pre-COVID-19 season. During the pandemic, the economic consequences of anti-COVID-19 regulations were drastic. Bans on live performances hit the Mannheim Philharmonic Orchestra during the 2020/2021 season, and concerts could only take place in the new 2021/2022 season.

Due to contracts negotiated before the COVID-19 crisis, it was difficult to reduce costs during the COVID-19 season. The overall expenditures of the Mannheim Philharmonic Orchestra only dropped slightly from EUR 580,000 in 2019/2020 to EUR 567,000 in 2020/2021. Expenses could only be reduced for the rental costs of concert halls, services for hospitality, sound and music technology, and stipends. Against the trend, the Mannheim Philharmonic Orchestra started hiring additional employees for management and support services in 2020/2021 to prepare for the post-COVID-19 2021/2022 season. Apart from planning the current and upcoming season, these employees concentrated on raising additional funds from the public, civic, and private sectors. These efforts led to donations being raised and subsidies of EUR 306,000 in 2019/2020 to EUR 471,000 in 2020/2021, and up to EUR 670,000 in 2021/2022. The main sources of subsidies were public COVID-19 aids paid for by the federal state of Baden–Württemberg and by the central government. In 2020/2021, these subsidies added up to EUR 270,000, and up to EUR 200,000 in 2021/2022. Additionally, subsidies from the City of Mannheim of EUR 50,000 in 2019/2020 and in 2020/2021, as well as specific funding that required previous investments by the local municipality of EUR 65,000 in 2019/2020 and EUR 50,000 in 2020/2021 and 2021/2022, secured financial income during the COVID-19 crisis and helped to compensate for the missing income from concerts. Income from concerts amounted to EUR 197,000 in 2019/2020, whereas it dropped to EUR 46,000 in 2020/2021, before the situation normalized again in 2021/2022 with concert revenues growing to up to EUR 260,000.

5.2. Attraction of Out-of-Town Concert Guests

It is due to the preparations in 2020/2021 that the Orchestra was able to bear total expenditures of EUR 1.782 million in 2021/2022. These expenditures comprised of EUR 1.366 million for investments, materials, and services, as well as EUR 416,000 for the remuneration of the staff and the scholarships for the musicians. In addition, the Orchestra attracted over 5000 concert guests from all over Germany and abroad. During the COVID-19 season of 2020/2021 only 500 guests attended the concerts, whereas there were around 4200 visitors in 2019/2020 (see Table 1).

Based on the counterfactual assumption that without the Orchestra's cultural offerings, a large proportion of the guests would attend classical music concerts elsewhere, the guests' expenditures must also be included in the impact calculation. Without the Orchestra, the city of Mannheim would attract less purchasing power from other regions and a certain part of the existing demand for music concerts would flow away. For this reason, the Orchestra can be viewed as the reason that out-of-town concert guests trigger additional demand in Mannheim during their stay.

This additional demand is directed towards the consumption of goods and services in the retail trade (e.g., experience shopping), private and public transport (e.g., parking fees, tickets), gastronomy (e.g., restaurants, cafés), and the hotel industry (overnight stays). Here, the expenditures of residents are to be excluded, since their expenditures were already being incurred and have no additional effect on the city's value added [29]. Instead, the calculation is limited to out-of-town visitors who come to Mannheim in large part due to the concert event.

Table 1. Empirical and estimation parameters of the regional multiplier model.

	2016/2017 [a]	**2018/2019**	**2019/2020**	**2020/2021**	**2021/2022**
Expenditures by the Orchestra in EUR	257,187	452,114	498,429	437,102	1,366,553
On rents in EUR [b]	22,747	32,154	57,438	23,043	253,052
On hospitality in EUR	27,923	52,666	68,776	42,014	141,695
On sound and music technology in EUR	4349	6335	20,698	-	2100
On logistics in EUR	7180	6200	4120	1586	13,333
On video in EUR	10,147	14,782	14,488	-	12,600
On music services and advertising in EUR	110,905	203,987	199,746	222,276	566,264
Other expenses in EUR	73,936	135,991	133,164	148,184	377,509
Share of expenses in the city in % [c]	67	80	90	70	90
Stipends for musicians in EUR	35,248	68,714	35,020	18,500	184,065
Number of stipends	196	196	177	74	413
Share of musicians living in city in % [d]	15	25	30	35	20
Expenditures by employees in EUR	6103	40,912	46,761	111,480	231,708
Number of other employees	1	3	3	6	7
Employer contribution social security in EUR	703	4589	5271	12,036	26,517
Total gross wages in EUR	5400	36,323	41,490	99,444	205,191
Share of employees in the city in % [d]	100	100	100	67	71
Expenditures by concert visitors in EUR	99,299	178,849	231,587	27,583	280,575
Concert visitors [e]	1800	3242	4198	500	5086
Share of visitors living in the city in %					31
Share of external visitors (day) in %					38
Share of external visitors (overnight) in %					31
Consumption (excluding the concert)					
Per external visitor in EUR [f]					26.8
Per external overnight visitor in EUR [f]					147
Share of Value Added Tax in %					14.76

Notes: [a] To assess the impact of COVID-19 on the Orchestra as well as the regional economic impact of the Orchestra on the city of Manheim, we focus on a comparison of the four seasons between 2018/2019 and 2021/2022. Since 2018/2019 the Orchestra has been managed by full-time employees and has been treated as a professional project orchestra. In addition, we report data for the 2016/2017 season to exemplify the differential impact of a volunteer project orchestra managed by part-time employees. Since the Orchestra transitioned from a volunteer to a professional orchestra during the 2017/2018 season, we excluded it from our analysis. [b] corresponds to the values exclude expenditures for municipal operations, 100% of which was local demand; [c] corresponds to the proportion of material and capital expenditure in the city of Mannheim excluding hall rentals, as these go 100% to Mannheim's municipal operations; [d] corresponds to the regional share of expenditure; [e] corresponds to the number and origin of guests that could be precisely determined from the digital booking system for the 2021/2022 reporting year, but not for previous seasons. Therefore, the values for the year under review were taken on a pro rata basis for the other years; and [f] corresponds to the expenditure per visitor and is taken from the Report on Tourism as an Economic Factor of the Rhine–Neckar Region (2019): https://issuu.com/rhein-neckar/docs/wirtschaftsfaktor_tourismus_neu_s (accessed on 27 May 2022).

Since the geographic origin, the motive for the journey, the duration of the stay, and the amount of consumption accompanying the concert by non-resident concertgoers are not precisely recorded statistically and could only be approximated even by guest surveys, the relevant parameters must be realistically estimated on the basis of existing knowledge of the Orchestra and via comparable studies. Problems in estimating the number of visitors also arise when cultural services are provided free of charge or when, for example, several concerts are held per day or even simultaneously as part of a festival [29]. The number of concert visits per visitor varies considerably, depending on the nature of the festival and what it offers [44]. Based on realistic reference data, total consumption expenditures of out-of-town concertgoers amount to EUR 281,000 in the city of Mannheim. These expenditures exclude admission fees for the concerts, as these are already included in the Orchestra's expenditures and should not be counted twice [44].

The primary expenditures recorded above do not have a full effect on the urban economy. Since only a part of the expenditure has a regional impact on demand, a regional ratio must first be determined in order to calculate the direct effect. The regionally effective expenditures are then determined in their multiplier effect for the other economic sectors

in the urban economy as indirect and induced effects. The sum of the three effects forms the total effect, which can be represented for various economic indicators (see Table 2).

Table 2. Regional economic impact of the Philharmonic Orchestra in the city of Mannheim 2020.

		2016/2017 [a] (Volunteer Orchestra)	2018/2019	2019/2020	2020/2021 (COVID 19)	2021/2022
Demand in EUR	Direct	285,422	575,621	685,138	112,603	1,625,467
	Indirect	25,068	39,389	48,336	45,823	141,047
	Induced	27,409	38,405	46,793	49,669	167,953
	Total	337,900	653,415	780,267	208,095	1,934,468
Value added in EUR	Direct	41,350	109,627	81,781€	129,981	415,773
	Indirect	156,325	216,909	264,609€	288,515	955,073
	Induced	16,642	23,318	28,411€	30,156	101,973
	Total	214,316	349,854	374,801€	448,652	1,472,819
Employment	Direct	1	3	3	4	5
	Indirect	2	3	3	4	14
	Induced	0	0	1	1	2
	Total	4	6	7	9	21
Income in EUR	Direct	10,687	53,502	51,996€	105,919	242,004
	Indirect	79,271	111,073	135,334€	143,650	485,747
	Induced	9288	13,014	15,856€	16,831	56,912
	Total	99,246	177,589	203,186€	266,400	784,663
Local taxes and public incomes in EUR	Direct	24,203	35,418	36,011€	25,475	263,260
	Indirect	2527	3586	4342€	4620	15,590
	Induced	294	412	502€	533	1802
	Total	27,024	39,416	40,855€	30,628	280,652

Notes: [a] To assess the impact of COVID-19 on the Orchestra as well as the regional economic impact of the Orchestra on the city of Manheim, we focus on a comparison of the four seasons between 2018/2019 and 2021/2022. Since 2018/2019 the Orchestra has been managed by full-time employees and has been treated as a professional project orchestra. In addition, we report data for the 2016/2017 season to exemplify the differential impact of a volunteer project orchestra managed by part-time employees. Since the Orchestra transitioned from a volunteer to a professional orchestra during the 2017/2018 season, we excluded it from our analysis.

5.3. Regional Economic Impact on Demand, Value-Added, Employment, Income and Tax

Demand effect. Before the COVID-19 crisis in 2019/2020 the primary expenditures of the Orchestra, its members, and concert guests (EUR 812,000) generated a direct demand effect in the city of Mannheim of EUR 685,000. Based on the methodology of the regional multiplier analysis, this results in a total demand effect of EUR 780,000 via preliminary economic links. During the COVID-19 season of 2020/2021 the direct effect dropped to EUR 113,000, and the total demand effect has been reduced by 73 percent to the level of EUR 208,000. However, already in 2021/2022, the direct effect rose up to EUR 1.625 million and the total effect up to EUR 1.934 million. This effect is 148 percent higher than the total demand effect before the COVID-19 crisis.

Value added effect. In 2019/2020, the total effect of gross value added (GVA) by the Orchestra amounted to EUR 375,000. This includes a direct effect of EUR 82,000, an indirect effect of EUR 265,000, and an induced effect of EUR 28,000. Comparing these numbers with the COVID-19 season of 2020/2021 reveals an increase in all value-added effects. Due to public subsidies, the Mannheim Philharmonic Orchestra followed its growth path by hiring new people and by extending job contracts. These expenditures increased the direct effect up to EUR 130,000. Adding the indirect effect of EUR 289,000 and the induced effect of EUR 30,000 led to a 19 percent higher total effect on urban GVA of EUR 449,000 in comparison to the 2019/2020 season. In 2021/2022 the effects increased again, ending with a total effect of EUR 1.473 million.

Employment effect. The Mannheim Philharmonic Orchestra managed to grow continuously between the 2016/2017 and 2021/2022 seasons. While in 2016/2017 the Orchestra employed a part-time employee, in 2018/2019 and 2019/2020 there were three employees, including someone in a full-time position. In 2020/2021, the number of employees

increased to six employees and in 2021/2022 to seven employees. Of these employees, three in 2019/2020, four in 2020/2021, and five in 2021/2022 were registered residents of Mannheim. In addition to this direct effect, the Orchestra generated indirect and induced employment effects, which can be derived from the income effect using sector-specific job coefficients and add up to a total employment effect of seven jobs in 2019/2020, nine jobs in 2020/2021 and twenty-one jobs in the post-COVID-19 season of 2021/2022.

Income effect. We observed related effects on regional incomes. The Orchestra paid gross salaries and stipends of EUR 82,000 before the COVID-19 crisis in 2019/2020 and EUR 130,000 during the COVID-19 2020/2021 season and EUR 389,000 in 2021/2022 to staff and musicians. In 2019/2020 EUR 52,000 went to staff and musicians residing in the city of Mannheim. Against usual expectations, this effect increased in 2020/2021, up to EUR 106,000. During the post-COVID-19 season, this effect appears to have more than doubled. Spending these incomes in Mannheim generated indirect and induced income effects, which, including the direct effect, add up to a total income effect of EUR 203,000 in 2019/2020, EUR 266,000 in 2020/2021, and up to EUR 785,000 in 2021/2022.

Local tax and public income effect. The Orchestra not only achieves a multiplier effect for the city economy but it also induces direct revenues for the public sector, in this case the local government of the city of Mannheim, in the form of fees, contributions, and taxes. The direct, indirect, and induced impact of the Orchestra, its members, and out-of-town guests on demand is accompanied by increased income and sales tax revenues, which are passed on directly to the municipalities on a pro rata basis via the municipal levy. In 2019/2020, the City of Mannheim earned EUR 9000 from income and sales tax that were earned by the Mannheim Philharmonic Orchestra and EUR 32,000 from the Orchestra's rentals of public orchestra halls, which adds up to EUR 41,000. During the COVID-19 season of 2020/2021, the total effect dropped to EUR 31,000, consisting of EUR 8000 in tax revenues and EUR 23,000 from rentals. In 2021/2022, EUR 21,000 in wage and income tax and EUR 7000 in sales tax were incurred in this context (in 2016, the city received revenues from the allocation of sales tax in the amount of EUR 110,110 and income tax in the amount of EUR 486,620 (source: https://www.haushaltssteuerung.de/steuer-daten-stadt-mannheim.html, last accessed on 27 May 2022)). In addition, the municipal operations recorded approximately EUR 253,000 in revenue for hall rentals by the Mannheim Philharmonic Orchestra. In total, the city treasury thus generated additional and direct revenue of EUR 281,000 as a result of the Orchestra's activities.

6. Appraisal of the Regional Impact during COVID-19

6.1. Funding Efficiency

In addition to calculating the regional economic impact, it is necessary to evaluate the magnitude of this effect in comparison to the funding provided [26]. In the case of the Mannheim Philharmonic Orchestra, it can be shown that ongoing business operations, scholarships, and the expenditures of concertgoers generated a gross value added of EUR 1.473 million within the Mannheim city district in 2021/2022. This corresponds to 29 times the municipal subsidy of EUR 50,000 in 2021. Even during the COVID-19 crisis in 2020/2021, the gross value added in the city of Mannheim of EUR 449,000 substantially overrides the municipal subsidy of EUR 50,000 (see Figure 1).

A large part of the gross value added is fed by indirect effects, which stimulate demand in related sectors of the economy via intermediate inputs and thus benefit the entire city economy. The additional income accruing to the city treasury each year as a result of the concerts offered by the Mannheim Philharmonic Orchestra can be compared to the municipal cultural subsidy. The City of Mannheim provided the Orchestra with an operating subsidy of EUR 50,000 in 2020 and 2021. Subtracting the direct tax and rental income of the municipality generated by the Orchestra's activities in 2020/2021 (EUR 31,000) and 2021/2022 (EUR 280,000), this results in a revenue surplus of EUR 211,000 during the two seasons. This finding is in line with other studies on cultural institutions and events, which show that the additional tax revenue generated by the economic impact

compensates for the amount of public funding, as in the case of the theater in Lucerne [11], or even exceeds it, as in the case of the Kaustinen Folk Music Festival in Finland [31]. In such cases, cultural promotion turns into a direct profit situation for the public sector. Nonetheless, it needs to be acknowledged that the Orchestra received a total of EUR 470,000 in public COVID-19 subsidies from the federal state and the central government (i.e., EUR 270,000 in 2020/2021, and EUR 200,000 in 2021/2022). The income and sales taxes generated by the activities of the Philharmonic Orchestra within the urban economy created revenues for the federal state of Baden–Württemberg and the German government of EUR 397,000, EUR 65,000 in 2020/2021 and EUR 332,000 in 2021/2022. As our regional multiplier model only accounts for demand and income within the urban economy of Mannheim, the full extent of tax incomes is widely underestimated. Hence, it is justified and reasonable to conclude that the subsidies were in full balance with the revenues earned from city income and taxes.

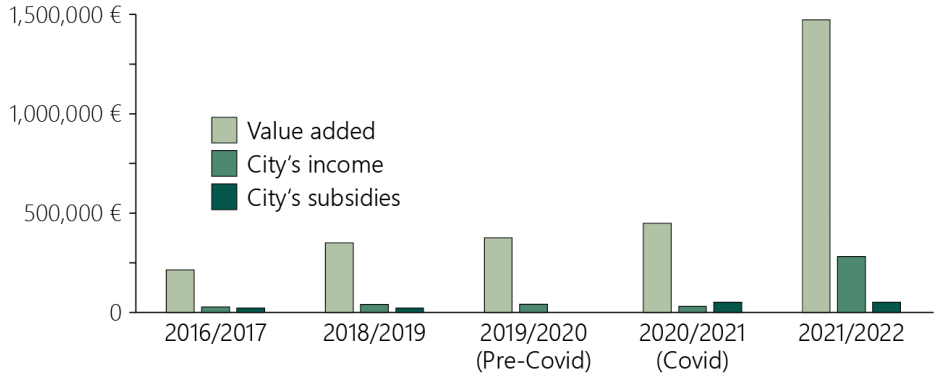

Figure 1. Ratio of city subsidies, orchestra-related revenues, and effect of the Philharmonic Orchestra on city gross value added over the course of several seasons.

6.2. Underestimation of the Real Impact

This analysis is based on a detailed primary survey by the Orchestra [32], supplementary analysis of official statistics, and a proven methodology for determining regional economic effects of educational institutions [26,27,34]. It therefore enjoys high validity. In addition, the calculation model requires several unavoidable assumptions. In order to not overestimate the regional economic impact of the Orchestra, this study models the effects according to a conservative strategy, which leads to an underestimation of the actual impact of the Orchestra in Mannheim.

Numerous factors influence the actual effect which must be disregarded in the analysis. The expenditures of the Orchestra, musicians, and guests also have an impact on the profits of companies located in Mannheim, which in turn lead to direct municipal revenues through trade tax. Since the trade tax revenue per business varies greatly in practice, the trade tax effect of the expenditures of the Orchestra and guests cannot be reliably estimated. In any case, the actual tax revenue generated by the Orchestra for the City of Mannheim is higher than calculated in the present model. Furthermore, the Mannheim Philharmonic Orchestra also provides free services, such as training courses and musical lessons for children and young people in the city of Mannheim. However, the users of these services are not precisely quantified and the origin and consumption behavior of the users and their families in the city of Mannheim are unknown. Therefore, it can be assumed that the training courses have further effects on attraction and demand in Mannheim, which are not taken into account in the present impact analysis.

6.3. Long-Term Impacts

Beyond the annual economic effects determined in the present analysis, the Mannheim Philharmonic Orchestra contributes to further medium- and long-term economic effects. For example, neighboring municipalities and districts in the Rhine–Neckar metropolitan

region also benefit from the influx of day and overnight visitors who come to the region solely because of the concerts held and who engage in additional consumption there. In addition, long-term effects can be expected via the following impact chains:

Tourist spillover effects. The Mannheim Philharmonic Orchestra broadcasts live concerts worldwide via the Internet to more than 100 nations. The number of digital users has more than doubled since 2018 and contributes to the international visibility and increase in tourism attractiveness. In 2019 alone, the number of overnight stays increased by 10 percent compared to the previous year (Data on the development of overnight stays were taken from Stadtmarketing Mannheim [45]). This puts Mannheim alongside Ravensburg and Heilbronn at the top of Baden–Württemberg in terms of attracting new tourists. This effect cannot be attributed solely to the Orchestra or any single other institution. Nevertheless, it can be seen that the growing number of concerts goes hand in hand with the increase in overnight stays in Mannheim.

Musical business foundations. During their time with the Mannheim Philharmonic, the musicians enjoy excellent support for young talent. Half of all the Orchestra's graduates are now employed on a permanent basis, mostly by orchestras or at music schools. The other half of the graduates are freelancers or work part-time with orchestras around the world. To the extent that graduates later found their own ensembles or music schools in the city of Mannheim, they contribute to the economic and cultural development of the city with the knowledge and qualifications they have acquired through the Mannheim Philharmonic Orchestra.

Synergy effects of the cultural offerings. The Mannheim Philharmonic Orchestra forms part of an attractive mosaic of musical offerings in Mannheim, which has been a UNESCO Creative City of Music since 2014. The Orchestra thus contributes to the diversity and attractiveness of the cultural location. However, the mutual reinforcement of the attraction of cultural guests and tourists through the diversity of cultural offerings is difficult to quantify. Nevertheless, it must be acknowledged that a lighthouse project such as the Mannheim Philharmonic Orchestra stimulates the settlement of further ensembles, organizers, music schools, and music teachers who have also settled in Mannheim or the metropolitan region as a consequence or pull effect of the Orchestra. These institutions generate further regional economic effects in the state through their expenditures, which are not included in the present model.

7. Discussion

Due to its high quality and international visibility, and thanks to its basic public funding, the Orchestra succeeded in attracting additional funding from private, public, and civil society sources to sustain its operations. The concept of a talent orchestra, which is unique in Europe, and the high quality of the music concerts, regularly bring top international soloists to Mannheim for guest performances, while the Philharmonic Orchestra is invited to perform on renowned European stages. On the one hand, free live broadcasts attract worldwide attention to the city of Mannheim, on the other hand, local concert offerings contribute directly to increasing the value added in the city's economy.

Drawing on a multiplier analysis we have offered evidence that cultural funding by a municipality or the state is not per se a money-losing investment. In fact, due to regional expenses and the attraction of concert guests from other regions, cultural ventures stimulate additional regional demand and economic growth.

Even during the COVID-19 season, the Orchestra managed to stimulate a regional value added of EUR 449,000, which is nine times higher than the subsidies of the City of Mannheim during this season. Already one year after the COVID-19 crisis, the Mannheim Philharmonic Orchestra's activities raised the value added in Mannheim by EUR 1.472 million. Measured against the gross funding of the city of Mannheim, this results in an impact of more than 29 euros of local gross value added per euro of cultural funding invested.

Accounting for tax incomes during the 2020/2021 and 2021/2022 seasons, the COVID-19 subsidies from the federal state and the central government are almost in balance. On

the municipal level, however, if one also takes into account that the music performances generate direct municipal income from taxes and rents amounting to EUR 311,000 in the 2020/2021 and 2021/2022 seasons, the additional income for the city treasury, including the municipal operations, corresponds to 3.1 times the funding invested.

8. Conclusions

Even if cultural and creative ventures depend on civic donations and public subsidies to secure their cultural and educational mission, their economic impact on the local and urban economy may still compensate or even outweigh the initial subsidies. The detailed impact assessment presented in this study has demonstrated that public support is especially helpful in times of crisis to retain the viability and sustainability of a music orchestra for at least two reasons. First, it provides for basic funding of employees necessary to actively engage in additional fundraising, and it secures the Orchestra's current operation to attain a positive future regional impact on the urban economy. Second, additional public funding opportunities at the federal or state level are often accessible only by demonstrating the receipt of public support by the municipality. This evidence suggests that public subsidies should be assessed in the light of the real regional economic impact of cultural and creative services and performances, which may overcompensate for initial funding and strengthen the resilience of cultural institutions during a global pandemic.

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Greening the Audiovisual Sector: Towards a New Understanding through Innovation Practices in Wales and Beyond

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Abstract: Despite efforts towards reducing the negative environmental impact of the audiovisual sector, sustainability remains challenging. In this paper we address environmental sustainability in the Welsh audiovisual sector through the lens of green innovation. The mixed method study combines quantitative research measuring the adoption levels of green innovation inside businesses with qualitative analysis of selected case studies of green innovation. In doing so, the paper explores the extent of developing green innovation, as well as how research and development (R&D) as a specific roadmap to innovation leads to different forms of innovative outcomes. Based on this evidence, we propose an extended framework for considering green innovation in the audiovisual sector, one that differentiates between solution-driven, content-driven and mindset-driven innovation. By providing evidence of the extent and nature of green innovation in the audiovisual sector, the paper makes an important contribution to the underexplored field of green innovation research.

Keywords: green innovation; Welsh audiovisual industry; green innovation frameworks

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1. Introduction

A gradual but growing awareness of the audiovisual sector's negative environmental impact has driven some studios, production houses and suppliers to consider practices for becoming more resource-efficient [1]. More recent developments include the emerging role of the eco-manager and the introduction of green consultant micro-credentials [2]. These are small but positive steps towards mitigating the sector's impact on the environment. On a more systemic level, trends like 'green shooting' [3] are beginning to encourage the industry towards more integrated approaches to sustainability, promoting environmental awareness and actions across all stages of audiovisual production (pre-production, production, and post-production). It aims to provide a systematic overview of how the use of technologies, the setup of production processes and the action and practices of staff on set can contribute to reducing the sector's negative environmental impact. These developments highlight the complexity behind a systemic shift towards a more environmentally aware sector [4].

Overall, however, research suggests that environmental practices remain challenging for an energy-intensive and hierarchical audiovisual sector [5]. In 2011 the worldwide audiovisual sector accounted for 1 m tonnes of CO_2, of which a quarter was directly related to filming (transport and electricity being among the two main causes) [6]. Despite its continuous efforts to reduce emissions [7], the audiovisual industry has remained among the most polluting sectors, driven first and foremost by unsustainable film production practices [8]. According to Eurostat data [9], in 2021, the audiovisual sector at European Union level has registered 2.3 m tonnes of greenhouse gases, representing an increase of 3.6% on a year-by-year basis. Considering that during 2020–2021, productions were drastically reduced if not completely halted due to COVID restrictions [10], the increase in emissions of the sector demonstrates the strong impact it continues to have on the environment. The situation in the British audiovisual sector is not much more encouraging either. Latest Eurostat data available (before Brexit) [11] confirms that the UK audiovisual

sector accounted for 9.2% of the total greenhouse gases produced at EU level (2019), which is slightly more than in 2018, when it accounted for 9% of EU-level emissions. CO_2 emissions also remain high. An hour of TV produced in the UK, for example, generates the equivalent of 5.7 tCO2e [12], which is more than a passenger vehicle generates over an entire year (4.6 tCO2e). To put it another way, an hour of TV is equivalent to an hour-long journey of thousands of cars. The carbon cost of blockbuster films is especially damaging, generating 150–250 times the level of an average hour of TV—the equivalent of the amount of CO_2 absorbed by 3700 acres of forest in a year [13]. Much of these emissions are attributed to energy consumption and transport (although the data here is limited—other areas of emissions production are more difficult to measure). On a broader level, despite its potential for carbon reduction, the audiovisual sector has long been criticized for a series of environmentally-unsustainable practices [14], from carbon-heavy location shooting to an embrace of built-in obsolescence in media and digital devices. New media technologies are rarely more energy-efficient than the devices they replace [15]. They are usually made with toxic (hard to recycle) minerals, creating global mountains of e-waste, while the sector's digital revolution is underpinned by vast banks of power-hungry data centres [16].

A series of measures are clearly needed to address the sector's negative environmental impact, ranging from reducing energy consumption and optimizing resources to encouraging green investment [17]. Innovation must play a key role here in shifting the industry away from business-as-usual [18]. In this article we discuss *green innovation*—now acknowledged as an increasingly important aspect of economics, accounting and strategic management as a specific type of innovation which aims to minimize environmental damage and degradation [19]. Shu et al. [20] show how green innovation can improve the quality of utilization or resources, enhance the level of productivity, and increase the affordability of media production. Green innovation can also have a positive impact on business creativity and green identity [21]. There is, however, only limited research around the levels of adoption of green innovation inside the audiovisual sector [22], where the concept remains ill-defined and poorly-captured by reliable data [23].

To bridge this gap, our article aims to better understand the extent and nature of green innovation in the audiovisual sector. In doing so, the study combines quantitative measurements—levels of adoption of green innovation in Wales—with case study analysis of identified green innovation best practices in Wales. The article is structured as follows. In the first part we draw on the emerging literature and initiatives around green innovation in the audiovisual sector, both at EU and UK/Wales level, that underline the efforts to deal with the complexity and limited understanding of green innovation. We then present our mixed method approach, aimed at a better assessment of forms and adoption levels of green innovation. In the next section, we present findings and draw upon this evidence to propose an extended framework for approaching green innovation in the audiovisual sector, which contributes to a more comprehensive analysis of green practices. In the final section, we highlight the positive impact of holistic approaches/frameworks on mapping green innovation in the audiovisual sector and make some recommendations for the future.

2. Materials and Methods

2.1. Research Context

Following the United Nations' Sustainable Development Goals and other calls for action to tackle climate change and preserve oceans and forests, private and public entities have developed an array of strategies, policies and initiatives to help audiovisual businesses reduce their environmental impact [24]. A set of measures has been put in place both at pan-European and local levels to encourage sustainability compliance in the audiovisual sector [25]. These include impact measurement tools/toolkits, training, and Research & Development funding [26]. Both top-down (green policies, strategies and initiatives) and bottom-up (green trends and initiatives) measures point to the efforts of the sector to gear towards green innovation.

2.1.1. Top-Down Measures for a Greener Audiovisual Sector

At a pan-European level, a series of policies, strategies and initiatives are in place to support the industry to reduce its environmental footprint and invest in green innovation. The European Commission's Green Deal [27], for example, is one of the most important pan-European policy instruments for tackling environmental compliance. It includes dedicated measures on the circular economy and enforces/expands existing regulation. It aims to set specific guidelines for industry actors to comply with more environmentally friendly measures. Many of these measures are relevant for the audiovisual sector (e.g., the EcoDesign Directive, the New Directive on Single-Use Plastic Products, etc.).

From a strategic perspective, European Union (EU) funding programmes (2014–2019) have encouraged investment in innovation as a way of making the sector more sustainable. Solutions such as hydrogen-powered gensets, automated scripts and Virtual Machines, machine-learning dispatchers and high-performance computing data centres, hybrid content delivery networks and solutions for storing electrical energy (e.g., Zero Emissions Generator) that have been developed by funded projects, testify to existing green innovation practices [28] along the entire value chain. The Creative Europe MEDIA programme (2022–2026) aims to continue this legacy of investment in green innovation practices through four specific funding strands which foster the greening of the industry and encourage inclusion, equality, diversity and participation.

Lastly, from the perspective of pan-European initiatives, we can mention two important networks which aim to support green transition through a variety of tools, services and actions created for audiovisual businesses: Green Regio and the European Film Commissions Network. Green Regio [29]—a sub-group of the Cine Regio network, comprising 43 regional film funds across Europe—aims to support audiovisual actors in their green transition. It represents a good example of collective efforts to raise awareness and share knowledge on sustainable film production practices, measures and policies. Its activity has fostered the emergence of a series of pan-European tools such as Green Film, Eureca and the ECOPROD Charter, which offer certification systems for film productions, carbon calculators, and access to green providers. The European Film Commissions Network [30] (EUFCN) is a non-profit association with a similar mission, sharing green protocols, tools and best practices developed within the network. The European Film Agency Directors association (EFAD), through its Sustainability working group, exchanges best practices and information on sustainable initiatives launched by national film funds and other partners. At a national level, agencies such as the Det Danske Filminstitut [31] (Danish Film Institute, DFI), Screen Ireland [32] (Fís Éireann), and Vlaams Audiovisueel Fonds [33] (Flanders Audiovisual Fund) have developed specific strategies and plans to encourage the industry to adopt more sustainable production levels. For example, Screen Ireland has recently launched its four-year strategy to increase the green footprint of the sector.

While the EU is moving towards a more cohesive and collaborative approach for greening the screen sector, the UK is putting responsibility and ambition at the heart of green policymaking. Within the UK, the Climate Change Act [34], as well as several policies on waste and recycling, require businesses to meet minimum standards to reduce their impact on the environment. It is fair to say, however, that there is a gap between these regulations and ambitious (but necessary) targets for moving towards net zero. Thus, for example, compliance varies across the size and type of businesses. Although public bodies have to use procurement activities that meet certain green standards (ISO 14001/registration under EMAS), private entities—who compose the majority of the audiovisual sector—do not fall under these rules.

A variety of other non- (or quasi-) governmental organisations in the UK have put measures in place to support a green transition of the audiovisual industry. The British Film Institute (BFI) requires any major production that receives BFI funding to provide mandatory carbon reporting and participation in carbon literacy training. The British Academy of Film and Television Arts (BAFTA) requires broadcasters and production companies to decide what level of compliance they want to adhere to—either Footprinting

(e.g., UKTV, Channel 4, Netflix UK and Channel 5) or full Certification (BBC, Sky, ITV). Albert, an environmental organisation aiming to encourage the TV and film production industry to reduce waste and its carbon footprint, has created the Albert calculator, a tool which is slowly becoming the standard for TV programme makers in the UK (Albert-compliant TV programmes are credited on screen). Digital Catapult, the UK authority on advanced digital technology, has entered a partnership with the UK Government to develop programmes for the UK's digital technology ecosystem. The collaboration resulted in the setup of the UK's first R&I studio for virtual production [35] aimed, at least in part, at reducing CO_2 emissions by minimizing the need for location shooting. The recognition that more needs to be done in this area has also led to the signature of the Climate Content Pledge [36] by some of the UK's major TV channels (BBC, ITV, Channel 4 and Sky). The pledge is a formal commitment to increasing the amount of and improving the quality of climate change storytelling. While the above-mentioned measures and initiatives show attempts to address the challenge of climate change that exceed formal regulatory requirements, they have yet to create the profound culture shift that meets the scale of the climate crisis.

On a regional level, the Welsh Government has recognized the need to drive the sustainability of the sector by enforcing green policies and commissioning tools (carbon reporting methodology) that can support public and private organisations to align with environmental legislation. To this end, it has put the Net Zero challenge at the heart of a new Welsh Government Innovation Strategy [37], while the Well-Being of Future Generations Act is a ground-breaking initiative that obliges all Welsh Government policies and practices to consider the impact on future generations—an obligation in which the need to address the climate emergency looms large. Film Cymru [38] is the main Welsh industry body supporting the greening of the audiovisual sector. It adopts a four-level approach that combines research (studies), innovation and collaboration (Screen New Deal, Greening the Screen), funding (Green Cymru Challenge) and training (building 'green' skills). Its future strategy focuses on strengthening green/skills funding and aligning to European initiatives (European Audiovisual Observatory).

2.1.2. Bottom-Up Measures for a Greener Audiovisual Sector

Despite being known for its powerful collective imagination, the audiovisual industry has, to date, struggled to rethink environmental sustainability [39]. This is partly because the audiovisual industry has a traditionally hierarchical structure with project-based and fluid workflows [40], which makes it slow in adopting systemic change [41]. It works to tight pre-production timeframes, with frequently-changing production teams and spontaneous decision-making processes [42]. Moreover, film and TV production companies are highly dependent on other polluting industries such as fashion, energy, transport, and media technology [43]. The sector's relationship with its supply chain therefore has to be built-in to greening initiatives.

Despite these structural and industrial challenges, there is industry consensus about the need for more sustainable practices and approaches in managing productions [44], leading to a series of new roles and initiatives. Green shooting [45], for example, involves establishing greener practices at pre-production, production, post-production and promotional stages. These practices can be both tangible (such as the use of sustainable solutions such as eco-vehicles, recycling bins, avoiding paper scripts, opting for vegan makeup and means on the set) and intangible (such as the team's concern for the environment and responsible behaviour on the set). This has led to the new role of the eco-manager/eco-supervisor/green production manager [46]. There is, however, a lack of understanding about the responsibilities of the eco-manager, their decision-making capacity, and how this role should work transversally within the company [47].

On the educational side, interest in driving change towards green practices has been manifested through initiatives such as the piloting of green micro-credentials as part of the latest push of universities to foster new skills [48]. Lusofona University has recently piloted

the first micro-credential course for green consultants in the audiovisual sector [49]. The course aims to form a new set of professionals, with skills geared towards the management of sustainable systems and processes. While these developments highlight an industry that is gradually moving towards sustainable production, it also highlights the numerous challenges [50] and the need for a more cohesive and coordinated approach to green sustainability that works across practice, education and politics [51].

The pan-European and UK context illustrate that policy measures and strategies work on disparate levels, with the notable absence of harmonised institutional and social frameworks. As a result, the adoption of green practices is more often a matter of personal conviction rather than a broader collective responsibility [52]. According to Sorensen et al. [53], the audiovisual sector is hampered by a series of structural, industrial and policy challenges. For example, isolating green policies from other audiovisual policies (e.g., training, employment, co-production) has led to a fragmented understanding of the concept of environmental sustainability. This adds to the lack of shared reporting and auditing systems, which has rendered the monitoring of environmental compliance difficult to implement. The willingness of the industry to respond to environmental challenges is thus hampered by both the structural practices of the sector (such as timescale pressures on content production and a commissioning process where environmental concerns play, at best, a secondary role in decision-making) and the deeply ingrained mindsets and habits that are difficult to change, as well as by the lack of clear mandates from public organisations. Moreover, while cost reduction is a key driver for green innovation [54], the general perception of green innovation is that in the short-term, they increase rather than decrease costs (by requiring, for example, time and resources to meet higher levels of compliance, or researching green suppliers) [55].

To overcome some of the structural and industrial challenges faced by the industry, green innovation needs to become the rule rather than the exception. This is currently not happening, as shown above. For example, identified innovations funded by EU projects can still be considered marginal solutions, due to low levels of adoption by the industry. Moreover, the lack of understanding of innovation processes and practices contributes to a failure to see their long-term benefits. To close the gap between policies, strategies and the adoption of green innovation by the industry, we first need to better understand how much and in which ways these companies create green innovation. The next section discusses the methodological approach of this study that is designed to address the identified gap.

2.2. Methodology

Green innovation has become a key tool for sustainable development [56]. One of the most well-deployed approaches comes from the fields of management and strategy [57], with a prevalence of studies covering the automotive, semiconductor, electronics and electricals, IT and pharmaceutic sectors. A broad diversity of theories and frameworks try to contextualise research around green innovation practices, meaning that the literature is fragmented and poorly-integrated in terms of conceptual frameworks [58]. Systematic review studies [59] highlight the need for developing mixed or even experimental methods able to progress our understanding of green innovation. These studies underline the fragmented nature of the research field, indicating that there is no agreed or overarching definition of green innovation [60]. While most definitions share the idea that green innovation encompasses products, services or processes with a reduced environmental impact, they adopt different approaches to its location and purview. Some focus on the application of innovation in technologies [61], some look at the aim of achieving sustainable development and the conservation of natural resources [62], and some focus on the adoption of environmentally-friendly raw materials during the manufacturing or design process [63].

Overall, we see a preponderance of technology-driven approaches, evidenced by studies differentiating between the capacity of high-tech industries and low-tech industries for engaging in innovation [63]. This is complicated by the broad terminology surrounding this type of innovation—green, ecological and environmental—that Schiederig et al. [64]

acknowledge as being used interchangeably and thus contributing to a lack of a unified vision [65]. Perhaps because much of its content is seen as ephemeral rather than material (and despite its dependence on carbon-hungry technologies), there is little research addressing green innovation practices in the creative industries, whose considerable carbon footprint is often overlooked [66].

To bridge this gap, we define green innovation as the adoption of production, services, and technologies that minimize environmental risks. In so doing, we expand on the technology-oriented definition of green innovation used by Kemp and Pearson [67] to make it more inclusive of the variety of innovation typologies—be they process-, product- or system-related. Building on this definition, we propose a mixed method approach that aims to measure the extent to which firms implement green practices and how these levels are shaped by different forms of research and development (R&D), leading to innovation. R&D is more broadly understood as the 'creative and systematic work undertaken in order to increase the stock of knowledge—including knowledge of humankind, culture and society—and to devise new applications of economic, cultural or social value of available knowledge' [68]. To measure adoption levels for green innovation, we first conducted a survey with Welsh creative businesses. Drawing on the findings of the quantitative analysis, which mainly indicated the problematic adoption of green innovation despite a fairly strong business value associated with such practices, we decided to conduct more in-depth analysis through case studies. To this end, we identified nine examples of green innovation in the Welsh screen sector and analysed their innovation process. This enabled us to better understand how the dynamics governing such practices condition adoption levels. The qualitative analysis also highlighted the way in which innovation approaches could be better organised based on specific criteria. This has ultimately led us to formulate a new framework for mapping green innovation in the audiovisual sector, the benefits of which we discuss in the closing section of this article.

3. Results and Discussion

In this section we present the design of our quantitative analysis, discuss its findings and establish how these shaped the next stage of the study. We then provide the results of our mixed method approach and how they informed the development of a framework that enables a more organised mapping of green practices in the audiovisual sector. For our analysis we focused on the audiovisual sector in Wales/Cardiff Capital region, which represents an important part of the creative economy, with a Gross Value Added estimated at £211 m for 2021 [69] and which contributes with around 3000 tonnes of greenhouse emissions [70] to environmental impact.

3.1. Quantitative Analysis: Measuring the Adoption of Green Innovation in the Welsh Audiovisual and Media Sector

Between March 2019 to December 2021, we surveyed 388 Welsh creative businesses (including companies and sole traders), asking them how they were innovating. The definition of sub-sectors was informed by the statistical classification of economic activities in the European Community (NACE codes). Overall, creative businesses were falling within four main sub-sectors:

- film, tv, radio and photography
- Music, performing and visual arts
- IT, software and computer services
- Publishing

We identified the 112 respondents falling within the NACE codes for film, TV, radio and photography (audiovisual sector), making up almost 30% of total surveyed businesses. We then compared the responses of this sub-sector with other 3 sub-sectors, to assess the differences in adoption levels for green innovation,

The survey was designed to assess three major categories of impacts for innovation: environmental, cultural and societal. This decision was driven by the acknowledgement

that innovation can have different outcomes and impacts [71]. Each of the three types of innovation impacts was measured using the likert scale system indicating if these were always, often, sometimes, rarely or never a result of the innovation process. This means that each business had to assess how often or rarely their innovations had an environmental, cultural or societal impact. A fourth variable was introduced in the survey to measure the business value of innovations. By asking respondents to say how often or not their innovations create business value, we looked at how quickly research and development processes lead to commercial outputs rather than to non-commercial ones. This is an important indicator of the business efficiency/performance for innovations [72] and thus proved fundamental for measuring adoption levels for green innovation.

Results show that only 17% of audiovisual businesses are frequent green innovators. This is on average 10% lower than for other sub-sectors where green impact is more frequent. However, an important share of audiovisual businesses are moderate green innovators, a similar situation to the music, performing and visual arts sub-sector, but unlike the publishing and IT domains where there are fewer moderate innovators and more frequent innovators. Figure 1 provides an overview of respondent groups based on the frequency with which their innovations have a green impact.

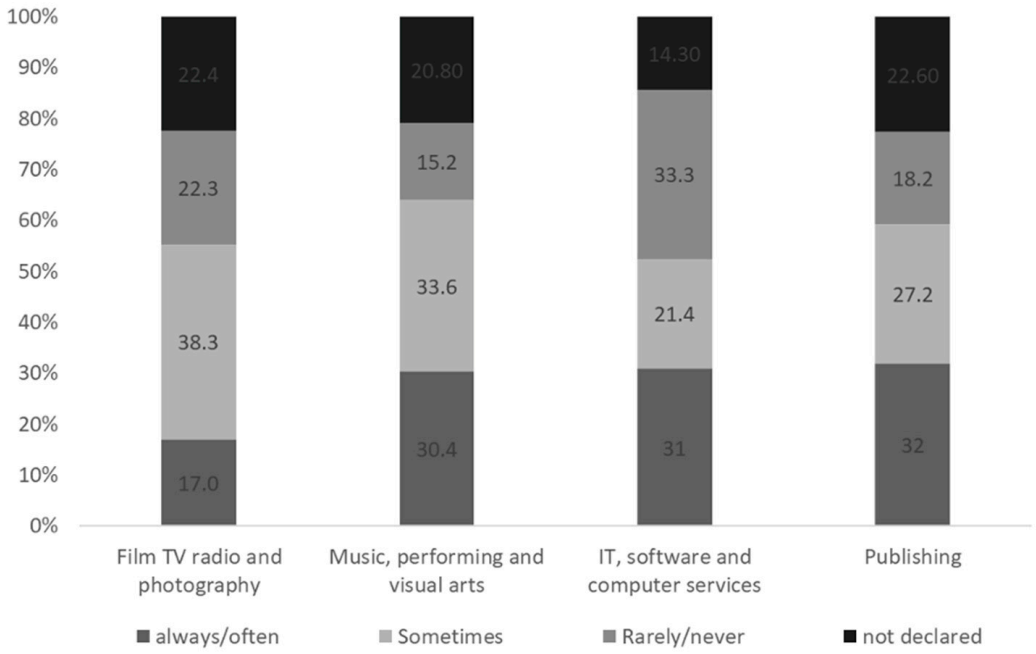

Figure 1. % of creative businesses creating innovation with an environmental impact by sub-sector.

Measurements of the fourth variable of the survey unveiled also that the audiovisual sector is less likely to attach business value to green innovation compared to other creative domains. For example, only 21% of audiovisual companies attribute a high business value to green innovation, compared to other sub-sectors, such as publishing, where 43% of respondents perceive a high business value for green innovation (see Figure 2 below). By contrast, we found *no* respondents in the IT, software and computer service sector who attributed a low value to green innovation. This may partly reflect the findings of studies showing tech-intensive industries as more prone to undertake green innovation. Nevertheless, more businesses attribute a high value to green innovation than businesses which often create green impact. This indicates that the business potential of green innovations remains fairly strong for the audiovisual sector even if such innovations are not adopted on a large scale.

As revealed by the survey, the low presence of high-frequency green innovators in the audiovisual sector points to a reluctance—or unawareness— of Research & Development as a viable path to greening their sector [73]. Research & development remains in fact a

potential route to green innovation, but not the only one [74]. Some businesses conduct research to improve business processes without necessarily resulting in commercial outputs. While this may reflect the nature of a sector which is often unfamiliar with R&D processes as a route to innovation (especially those that are not technology-based), the same could be said of other creative sectors, where enthusiasm for green innovation is higher. So, while most of the audiovisual companies in the Welsh sector are small, with limited access to R&D budgets, this is typical of the creative industries overall.

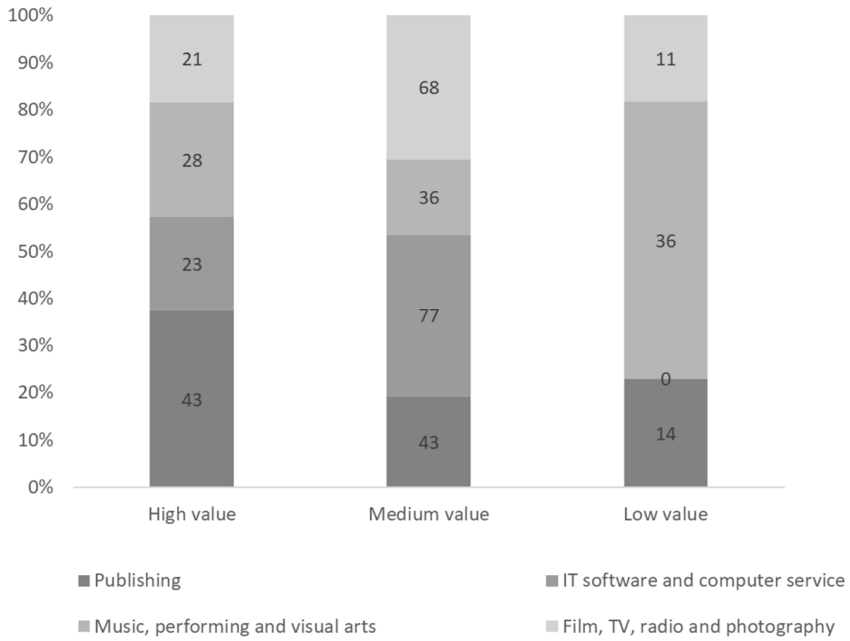

Figure 2. Perceived business value of high-frequency environmental innovations by sub-sector.

The uncertainty, novelty and systematic criteria defining the R&D processes [75] represents an important factor hampering green innovation. As a result, businesses can easily associate new (green) technology development with higher costs/investment and uncertainty, compared to its productivity generated throughout its lifetime (actual added value). However, our survey suggests that this is a particular challenge for the audiovisual sector. To better understand the barriers and enablers to innovation for the sector we decided to conduct a qualitative analysis of green innovations and their specific R&D routes.

3.2. Qualitative Analysis: Case Studies Approach of R&D as a Viable Route to Green Innovation

In our qualitative study we identified 9 case studies of green innovation in the Welsh audiovisual sector, all part of the R&D initiative titled Clwstwr [76] which focused on audiovisual innovation in the Welsh media sector. Clwstwr was part of an ambitious AHRC funded scheme (the Creative Industries Clusters Programme), in which, for the first time, the creative industries were given substantial R&D investment from the UK industrial strategy. The CICP created 9 creative industries innovation clusters across the UK. Our sample was drawn from 120 Innovation projects with creative industry partners funded by Clwstwr between 2019 and 2022 and was representative for green innovation. We analysed the specificities of the 9 R&D routes based on the type of innovation they were proposing and the associated green impact (assessed against criteria of the Screen New Deal).

The mapping revealed three main pathways through which R&D routes lead to green innovation: solution-oriented route (R&D aiming to support the development of concrete commercial outputs), content-oriented (R&D focusing on audiovisual content as a medium of innovation) and mindset-oriented (R&D that is oriented towards achieving an overall change in the industry towards more sustainable processes). While the first two routes are commonly found in studies on green innovation research, the third route is less present in

current literature [77]. This route represents a holistic mode of researching and developing innovation that is in line with green principles and follows an ecosystem approach [78]. In the following section we discuss the specificities of each route to innovation, focusing on the associated opportunities and challenges which come to support and strengthen our quantitative fundings.

3.2.1. Solution-Oriented Route

The first most common path to innovation works towards the development of specific solutions. In the audiovisual sector, such solutions can be products, services and technologies that reduce environmental impact across different stages of the audiovisual process (pre-production, production and post-production). three out of our nine identified green innovations have chosen this path to create specific solution such as a cloud-based digital product, a plugin to visualise production sets and a remote editing toolkit:

- Pre-production: A cloud-based digital product that provides production design and drawing management to the film and television Art Department. The solution contributes mainly to reducing impact in two areas defined by the Screen New Deal: production materials (paperless and remote working practices reduce the generation of waste) and production planning (shared tools for collaboration that maximize the focus of the procurement process and streamlines production processes).
- Production: A plugin to visualise virtually created sets, scenes and worlds by using VR to provide a realistic sense of scale/detail. The solution provides new ways of working by enabling users in remote locations to work on and share project files in a 3D space, which reduces impact across two areas defined by the Screen New Deal: production materials (waste connected to physical sets) and production planning (collaboration tools for the delivery of productions and virtual planning that minimize resource use)
- Post-production: A remote editing toolkit that enables teams operating from different locations to work on the same material without the need of physical travel. In doing so, the solution contributes mainly to reducing impact across one area defined by the Screen New Deal: studio and location (reduces transport/travel demand and associated emissions).

These examples follow an innovation roadmap with clear and measurable outcomes that are addressing challenges associated with the unsustainable consumption levels of the sector. As shown above, all three solutions aim to reduce the environmental impact in different areas defined by the Screen New Deal. In this case, the R&D strategies leading to innovation are designed around the identification of a specific challenge that needs to be solved through a concrete solution. While this represents a commercial return for innovators in the long-term, in the short term this route requires time and resources to invest in user testing and refinement of the solution, which can easily become difficult to sustain especially for small innovators.

3.2.2. Content-Oriented Route

Content creation and storytelling are some of the most powerful strategies for engaging audiences in meaningful ways on a variety of topics. The second identified path works with content creation as a powerful medium for raising awareness about climate change and contributing to a more sustainable media industry. In this category we identified three examples of animated content, each targeting climate emergency through different narrative strategies:

- Engaging storytelling: The Promise is an animated film about how one person can make the world greener and fairer. It is based on The New York Times Best Illustrated Book of the same name, written by Nicola Davies and illustrated by Laura Carlin. Set as an urban fairy tale, The Promise uses engaging storytelling strategies to engage audiences with positive environmental actions.
- Audiovisual techniques: Following the migration of white storks as they navigate man-made perils, this film invites viewers to fly with storks as they migrate from

Germany to Sudan, navigating perils including pollution and pesticides. In addition to its narrative structure, the animation uses a distinctive 'zoom' feature to draw viewers along the stork's journey. The animation was informed by research papers, GPS maps, photographs and interviews from the Max Planck Institute of Animal Behavior, offering a solid research foundation for the story.

- Educational approaches: Obki is an animated series featuring the original character Obki, a loveable alien, on his journey to be a positive force for good on Earth. Using an educational lens, it explores issues around climate change in an informative and entertaining way for 5–9-year-old children through Obki's adventures with his friend, the Orb.

As exemplified through the three case studies, this route to innovation aims to create dedicated audiovisual material and new formats (e.g., the eco-thriller) that raise awareness and educate towards action on climate change and environmental protection. R&D strategies designed around new content creation can take technical avenues (working with audiovisual techniques and effects) or more 'soft' approaches, including storytelling and educational methods. While this route to innovation can sometimes have a quicker return for innovators than the development of green solutions, which is more long-winded, it does require the mobilisation of highly creative capacity and skilled teams able to transform the creative vision into tangible results. Shared IP resulting from these innovations can also pose challenges for innovators.

3.2.3. Mindset-Oriented Route

In our analysis, we identified a third route to innovation that is less straightforward in terms of outcomes compared to the first two ones. Instead of focusing on addressing a specific problem, these innovations deploy a more complex approach to solving the environmental challenges of the audiovisual sector. Initiatives following this route adopt a green mindset approach aimed at triggering systemic change towards more environmentally sustainable practices. They adopt specific actions with more wide-reaching impacts, that generate an ecosystem of sustainability rather than providing targeted solutions. We have identified three projects falling within this category:

- A new service for greening animation: a route map to reaching net zero through the development of a new economically sustainable service. Dedicated to the animation, games and post-production industry, the route map was prototyped using in-depth interviews, carbon footprint analysis, co-creation workshops and public/private consultation surveys. It provides a new collaboration model to reach net zero by 2030. Although seeking tangible solutions in different areas of sustainability—energy and water, studio buildings and facilities, and production planning—the route map goes from the creation of a single solution to offering a new economically-sustainable service.
- A sustainable alternative for location filmmaking: a new method combining low-cost tools and techniques for film production to replace location filmmaking with a sustainable alternative. Aimed at creating a new film production system, this project combines different approaches: discussions with subcontractors/motion graphics experts, production/post-production tests, and business model development. Although it experiments with different existing technologies, the system takes a novel approach to making production greener, involving a wholesale re-imagining of how we tell stories on screen.
- A green infrastructure model for productions: a sustainable and collaborative infrastructure model to support the future of film and TV production. The model combines carbon footprint analysis with reporting on sustainability success stories and concept development for new apps/platforms. In doing so, it provides a production model that leverages new learning and systems to move towards a greener sector.

Although this route to innovation can include the creation of products, services and technologies, these often have a broad impact and tackle large-scale problems. R&D roadmaps for reaching these solutions are very complex, as they often involve mixed

methodologies drawing from multiple research domains. Therefore, innovations following this route are more adapted to foster models, systems and strategies rather than tangible products. Such innovations pose an important challenge to businesses in terms of complexity and uncertainty of their underpinning R&D strategies. Moreover, the long-term impacts of these innovations remain at a rather abstract level and alternative business models are required to make them commercially viable. Although these innovations are not necessarily cutting-edge/disruptive, the considerable resources invested, and the time and planning that they require, often render them inaccessible to businesses.

3.3. Towards a New Framework for Mapping Green Innovation in the Audiovisual Sector

Our survey revealed that Welsh audiovisual businesses are less likely to develop green innovations compared to other creative sub-sectors. In doing so, it suggested that the roadmap to innovation—most commonly taking the form of R&D processes—is cumbersome for the audiovisual sector. This was confirmed by our qualitative case study analysis where we identified three roadmaps to green innovation, each connected to a specific set of challenges. This shows that while the uncertainty, novelty and systematic criteria defining R&D remain important factors hampering innovation, the situation is much more complex than that. This is due to the specificity of each type of R&D, which affects the nature of green innovation. As a result, being able to identify the specific route to innovation in the audiovisual sector is important, insofar as it sets out expectations for innovators and provides them with a context for their innovation process. Moreover, offering a systematic approach for framing innovation practices based on R&D processes contributes to rendering research around green innovation less fragmented than it currently is. Therefore, a framework for mapping green innovation practices for the audiovisual sector based on different R&D routes, can have both practical and theoretical benefits.

The framework that we propose is based on the three routes to innovation that we identified in our qualitative study: the solution-oriented route, the content-oriented route, and the mindset-oriented route. Each route provides a specific roadmap to innovation, meaning it implies determined R&D practices, foresees typical forms of innovation outcomes, and is characterised by a series of particular challenges. As outlined by our case study analysis, the solution-driven route is more straightforward in terms of final outcome (technology, product or a service). R&D routes aiming to develop such solutions often try to solve a clear-cut green challenge (e.g., reduce energy consumption, waste production or other damaging impacts on the environment). Nevertheless, they require solid investment and time for development and are thus not very accessible for small businesses. Examples for the first route include, among other things, solar energy-driven power sets (LED/ solar generator supplies) and biofuel-based technologies. The content-driven route looks at content creation as the main driver of innovation. Examples include animations, immersive experiences, and installations, but also new genres such as the eco-thriller and trans-media approaches to content creation (e.g., for augmented, virtual and mixed reality). Because R&D strategies designed around new content creation can take different avenues (e.g., more technical vs. soft/design approaches), outputs are less tangible than solution-driven innovations and much more reliant on IP protection. Especially when mobilizing complex and multi-author creation processes, content-based innovations are difficult to protect and manage. Nevertheless, such roads to innovation represent powerful tools insofar as they draw upon the vast pool of creativity distinguishing the audiovisual sector in order to activate collective imaginaries towards greener mindsets. The third and last route to innovation deals with a more systemic approach to tackling green challenges. Although innovations following this route can take the form of concrete solutions, they are better expressed as systems, models and strategies that contribute to a systemic shift inside the industry. This is mainly due to the challenges that these R&D routes are addressing, which are much broader than the clear-cut energy or waste problems tackled by solution-driven innovations. Although such routes to innovation can provide important transformative and holistic shifts towards a greener mindset of the audiovisual sector, they are often very

complex to set up and require extended timelines. R&D routes to innovation which adopt this ecosystem approach often integrate social and cultural elements to trigger change. As a result, these forms of innovation can sometimes be hard to separate from cultural or social innovations. Due to these complex processes and challenges, R&D routes to green innovation are many times inaccessible to small businesses, as they need to be supported by solid investments (time and resources), as well as by highly skilled and transdisciplinary teams. Examples of innovations that follow mindset-oriented routes include, among other things, collaborative models across the production value chain, new film production systems, and sustainable infrastructure. Figure 3 below provides a synthetic overview of the proposed framework.

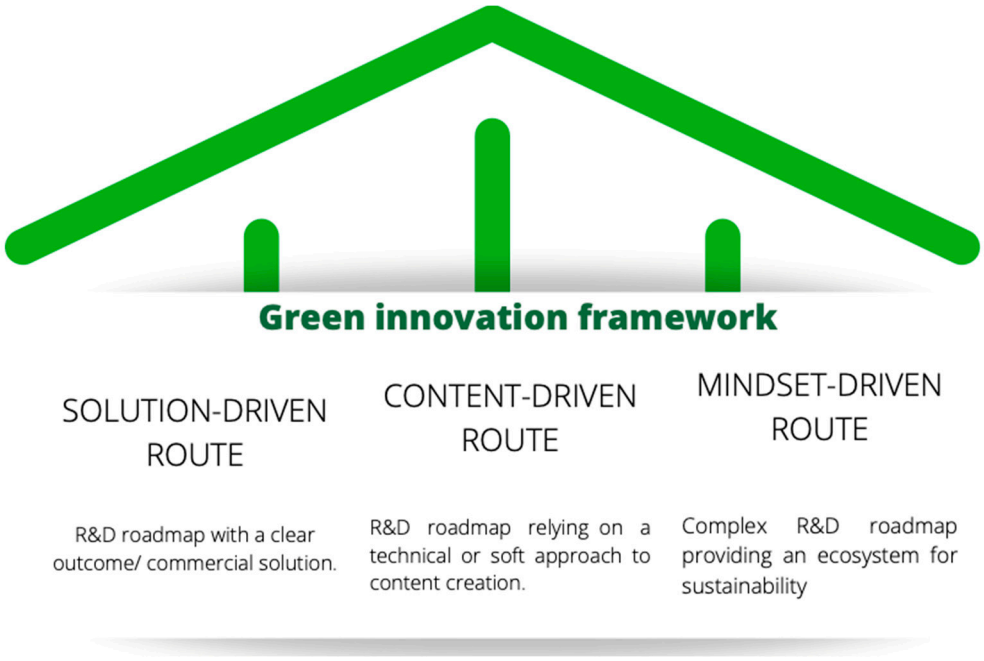

Figure 3. Framework for understanding R&D roadmaps to green innovation in the audiovisual sector.

From a practical perspective, the proposed framework can prove to be a useful guide, especially for businesses who are new to the field of R&D&I. As previously detailed, by providing a description of each route to innovation, businesses gain more clarity on the overall process and can more easily plan their innovation projects. The small size of most audiovisual companies (and, indeed, creative industry companies in general) means that most do not have the resources to commit to investment in R&D, so they need to attract external funds [79]. Using this framework, businesses can identify early on the type of R&D route they need to go down and search for adequate funding and support to develop their innovations successfully. The framework can thus support a better knowledge and diffusion of the required R&D approaches for green innovation. After all, the rethinking required to meet the challenge posed by the climate crisis—and the need to move quickly to net–zero—will not be achieved without the kind of creative and systematic work that is intrinsic to the R&D process.

From a theoretical perspective, the framework offers an expanded vision of green innovation through the inclusion of the mindset-oriented route, which places green innovation in a broader context that is not dominated by overly-technocratic definitions or content-specificity [80]. In doing so, it contributes to rendering the definition of green innovation more inclusive while foregrounding the essential role of R&D in fueling processes and driving change. This is even more important as R&D represents a newer area of study and its effects on innovation are still unclear [81]. The examples we describe in our case study analysis—all of which involved undertaking R&D to enable innovation—suggest that while R&D is helpful in the development of green solutions and green content, it is

essential to the systemic rethinking necessary for the mindset-oriented approach—a point we develop in our conclusion.

4. Conclusions

Moving quickly towards net zero in the audiovisual sector is a significant challenge. While we have seen the development of various initiatives to encourage greener audiovisual production, these are tentative and slow-moving—especially when matched to the scale and urgency of the climate crisis [82]. Unlike industries such as manufacturing or aviation, many of the environmental costs of audiovisual production are hidden [83], spread across different sites (generators on location, servers storing audiovisual data, individualised transport costs, food consumption, etc.). There are no obvious belching smokestacks or trails of fossil fuels marked across the sky. Indeed, while initiatives like Albert have made progress on data collection, the process of measuring the carbon footprint of film and TV production is neither easy nor straightforward [84]. Despite various initiatives, the lack of clarity around the carbon costs of audiovisual production allows those involved to see carbon emissions as somebody else's problem. This may explain the low proportion of those working in the audiovisual sector who identify the need to innovate to reduce their carbon footprint—a percentage that is low even for the creative industries in general.

The complexity of the climate challenge requires a sophisticated response, one that interrogates business-as-usual. Put simply, it requires innovation. This, in turn, requires the systemic creativity of the R&D processes. However, it also suggests that we incorporate a systemic level of enquiry, of the kind expressed by the projects described above adopting a mindset-oriented route to innovation. This involves thinking about environmental impacts at the very beginning of the creative process, creating stories that are easy to tell without, for example, location shoots requiring fossil fuel generators, significant private transport. or one-off sets, props and costumes. Greening the audiovisual sector thus becomes more of a systemic approach to change across all aspects of media production and its supply chains, developing comprehensive knowledge/skills and making green choices practical and cost-effective. Nevertheless, the conditions for pushing green innovation are linked to a predominantly project-driven and diverse sector, as well as to funding needed to support complex R&D processes. This means that R&D needs to become easier, offering the necessary time and resources to do R&D, especially for micro and small companies lacking the capacity to lead on organic innovation. Because the audiovisual sector is typically made up of disparate and small-scale businesses, this requires both coordinated industry action—by, for example, the main commissioners of audiovisual content through agencies such as Albert—and public investment (of initiatives like Clwstwr and the CICP programme) to enable small business innovation.

To this end, we recommend:

- A better alignment between policies/strategies and sector needs in order to provide the best support for green innovation.
- More investment in creative approaches to green innovation and skills development.
- The need for more tailored R&D funding programmes designed to cater for the needs of the sector.
- The creation of clear incentives and greater clarity about how investment in R&D by audiovisual companies can benefit them in the long-term.

The framework for mapping routes to green innovation, building on the findings of our mixed study, represents a step towards meeting the challenges posed by the limitations of overly technocratic definitions of R&D&I. It also shows that definitions need to align with the specificities of individual sectors instead of adopting a general approach for the entire creative industries. If we are to inform the research in R&D, we will need to:

- Conduct more consistent and holistic research into the nature of R&D practices in the audiovisual and media industry that enables the formulation of a unified sectoral definition for R&D.

- Undertake better mapping of the enablers and barriers for green innovation in the audiovisual sector.
- Explore the potential of the proposed framework to work in synergy with other tools to create a stronger link between forms of green innovation and the nature of R&D practices in the audiovisual sector.

The urgency of the climate crisis—and the distance the audiovisual sector needs to travel—means that this research cannot be a precursor to practical action but should take place alongside more of the practical and systemic interventions we propose. The proposed interventions, building on the findings of our mixed method form the strength and originality of our article. We acknowledge the geographical limitations of our study and the fact that applying the mixed method to other regions in Europe and beyond can provide not only snapshots of different green innovation contexts (including barriers and enablers), but also enrich and expand the proposed types of R&D routes for mapping green innovation in the audiovisual sector.

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Article

The Power of Makerspaces: Heterotopia and Innovation

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Abstract: "We all are makers" as a slogan of maker movement seemed to be a utopian imagination. Although spirits such as openness and sharing in the slogan successfully directed the attention of the government, the capital, and the general public to individual innovation, they might be unilaterally presented. Drawing upon Michel Foucault's conceptualization of heterotopias, this article explores the features of makerspaces in Shenzhen, China, arguing that the heterogeneous culture generated by makerspaces played an essential role in stimulating innovation and expanding the impact of maker movement. This article presents four types of heterogeneous culture, the cultures of tolerance, liminality, compensation, and confrontation, which enriched the research on makerspaces and enhanced the status of makerspaces in innovation studies. Through the critical lens, this article shows the social and cultural meanings of makerspaces to makers, makerspace operators, and governments, calling for their rethinking in sustainable development of makerspaces.

Keywords: makerspaces; heterotopia; culture of innovation; maker culture

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1. Introduction

Although it was the contribution of Dale Dougherty to expand the impact of the maker movement, and his words of "we all are makers: as cooks preparing food for our families, as gardeners, as knitters" [1] encouraged a lot of people to join in making, the side effects of generalization of the maker concept led to the research of this article. Two cases showed the decline of the maker movement. On 15 November 2017, TechShop, the most successful commercially operated makerspace chain in the United States, announced its closure, and in June 2019, Maker Media, the creator of Maker Faire, laid off its staff and closed down. The two cases threw a pot of cold water on young makers who were keen to innovate and create globally, and the enthusiasm and will of youth innovation began to falter. The failure of promoting makerspaces and maker concepts does not mean the end of the maker movement. As the pandemic has resulted in more uncertainties in employment, the makerspaces as the buffer zone for the youth to gather and create become more essential. The makers still need physical spaces to meet, to communicate, and to innovate in order to maintain their interactions with society and their enthusiasm for creation. It is meaningful to rethink makerspaces, for it is beneficial to the maker activists and government to establish more valuable and culturally-concerned makerspaces.

However, as makerspaces transform and develop in different countries, the recognition of makerspaces differs among relevant subjects. Western activists of the maker movement share the discourse of new industrial revolution [2] and democracy [3,4], especially the democratization of technology production [5,6], which emphasizes that makerspaces as a form of democratization of digital manufacturing allow citizens or individuals to have the chance to carry out all kinds of projects [1,7,8], while Chinese makers have been experiencing identity shift since 2015. Both situations show that different subjects share different ideas of makerspaces. The makers themselves, especially in the earlier time, viewed the makerspaces as a community with the maker spirit of being sharing, open, and tolerant, or they tried to explore a commercial module to promote makerspaces. The enterprise and capital expected the continuous outcomes of makerspaces to ensure their

profit. Schools treated the makerspaces as a buffer zone before students step into the society, as well as a place where they can cultivate the maker spirits of students. Last, but not least, the government hoped the makerspaces would accommodate people with technological and innovative ideas and the youth who graduated from universities, in order to relieve the employment pressure. What exactly are makerspaces? Are they a sharing community, a training institution, an entrepreneurship base, or a 'hybrid'? This article would like to take Shenzhen as an example, discussing the true images and meanings of makerspaces in order to find the mechanism of innovation in them, as well as showing the relationships between makerspaces and innovative culture.As is known to all, Shenzhen is the most innovative city in China and it has attracted makers worldwide. In this case, the results of this article have implications for building makerspaces and promoting maker culture in developing countries. At the same time, it also enriches the picture of the maker movement on a global scale. This article includes seven sections. After the introduction is the literature review part, talking about the existing studies of makerspaces. Following that is the theoretical framework, which is associated with the concept of heterotopia stressed by Foucault. In the methodology part, this article presents participant observation and in-depth interviews as the main content. The analysis and findings of this article explain the formation of four types of heterogeneous culture. After stating the findings, the discussion and conclusion parts stress the value of the article.

2. Literature Review

The maker phenomenon originated in western countries, and was highly associated with creative industry in Britain and DIY (do it yourself) culture in the USA. Therefore, the studies regarding makerspaces are usually in the fields of management and economy, talking about the operations, models, and development of makerspaces. Recently, library makerspaces and university makerspaces have been typically researched by educators, seeking the strategies to make or design a makerspace [9,10]. Scholarly research outlines a rough picture of makerspaces that is unique and typical.

As makerspaces are usually seen as workshops for producing, they have mixed physical features with places such as offices, factories, and laboratories. The design of the office focuses on creating leisure and comfortable spaces with bright windows, well-designed furniture, and beautiful visual elements. Some of the new established makerspaces borrow the design ideas of modern offices, creating communication norms guided by the type and layout of the furniture [11]. However, no matter how good the spaces look, the key elements of makerspaces are still tools and machines [12,13], some of which are large and expensive, that individuals struggle to afford [14]. Some open-source hardware such as Arduino, Raspberry Pi, 3D printers, etc., make makerspaces a node of knowledge sharing [3], while the self-made tools lead the ideaof maker identity [15]. Tools and machines are typical features of makerspaces, as they make makerspaces not only for white-collar people typing on laptops, but for people who love to make and perform experiments. Makerspaces become the physical nodes of collaborative culture [16] where individuals or communities can physically access technologies and make things in a physical space [17]. The materiality of makerspaces emphasizes the significance of embodied presence, which means that the physical access to technology and innovation is much more important for people who love to create.

Makerspaces are places for meeting other makers, exchanging information, and forming communities [18], providing nonspecialists with access to sophisticated technologies [19] and leading to the idea development and transition among makers [20] and also amateurs. Furthermore, makerspaces represent a culture of the community, that is, sharing, open exchange of information, and experimentation [21,22]. Mitch Altman, as the founder of Noisebridge, considered the makerspace as a kind of physical space where people can explore what they love and have the support of community members through hacking—hacking means maximizing your abilities and being willing to share [23]. With the sense of community engagement with other makers [15], makers own the core spirit of collaborative

community [24] associated highly with the makerspaces or the temporal makerspaces such as Maker Faire, regarding which Dale Dougherty stated the significance of exchanging ideas and creating a sense of community [1]. Aubrey Jenkins et al. argued that makerspaces promote equity, diversity, and creativity by creating shared and safe spaces that enable authenticity and peer-to-peer relationships in learning, hence forming a unique community where makers can "learn and make together, and thereby stay (and grow) together" [25].

Makerspaces as communities have nurtured a large number of makers who have unique personalities and characteristics. Makers are a group of people who build things for themselves with attitudes, skills, actions, practices, and expressions around DIY activities [15]. Norwegian scholars argue that makerspaces foster a "participatory culture" in which young people are transformed from consumers to active creators [26]. Susana Nascimento et al. argue that maker culture has grown and spread effectively from cultures such as hacking, and it contains not only the ultimate ideal of liberation and unlimited empowering action through technology, but also a complex relationship with the values and practices of a more social or collective consciousness, where young makers active in makerspaces have beliefs in "sharing and openness" [27]. Alison Powell argues that DIY activities in makerspaces are not utilitarian, but, rather, "joyful", allowing for personal expression and exploration [3]. Hidden behind the "serious leisure" [28] are unique maker cultures representing the groups' spirits of passion and exploration for creating.

The makerspaces are not absolutely places for working, playing, or chatting, but a mixed space, neither home nor office, providing "social experience outside of the home or workplace/school" [29]. In that case, some scholars regard makerspaces as "third spaces" [30,31], which originated from Edward Soja's point of view in criticizing spaces' historicality–sociality–spatiality ([32], p. 16). Makerspaces should not be viewed merely as experimentation sites with local manufacturing technologies but as places "where people are experimenting with new ideas about the relationships amongst corporations, designers, and consumers" [33], that arguably illustrate the unique human capacity and innovative culture that is unlocked through access to knowledge, infrastructure, and fundamental means of making [16].

Above all, makerspaces are a different kind of space because they have not been in the mainstream of innovation, even though they are promoted by leaders and encouraged by policies. Whether in the framework of innovation performance or in the vision of innovation researchers, they are similar to a "trend" that attracts a lot of attention at the time of their emergence, but is constantly abandoned at the time of their decline. The heterogeneous, marginal, and deviant characteristics of makerspaces point them to a more profound spatial and social relationship, that is, heterotopia.

3. Theoretical Framework

What are heterotopias and why are makerspaces heterotopias? How does makerspace as a kind of heterotopia stimulate innovation? To create the theoretical framework, the first step is to clarify the reasons why a makerspace can be seen as a kind of heterotopia.

3.1. The Core of Heterotopias

In a 1967 lecture [34], Foucault cited many spatial manifestations that destroyed the apparent continuity and normality of ordinary everyday space, such as schools, armies, nursing homes, mental hospitals, prisons, graves, cinemas, libraries, museums, fairs, carnivals, honeymoons, resorts, colonies, and ships. The places heterotopias referred to were real places with different norms, regulations, forms, or orders to daily life. When Foucault gave examples of nursing homes, mental hospitals, and prisons, he pointed out the heterotopias of deviation which absolutely shared other regulations with normal places in the same society. The cinemas were another kind of heterotopia as they could juxtapose incompatible places in a single real place, e.g., the three-dimensional images generated by the projector and the two-dimensional screen. The examples of libraries, museums, fairs, and carnivals were the places with different time order, i.e., the former (libraries and

museums) meant the accumulation of time while the latter (fairs and carnivals) were the explosion of time. As it was from the lecture, the concept of heterotopias Foucault referred to was almost all-embracing. Foucault systematically described, explored, analyzed, and interpreted heterotopias through the newly constructed term "heterotopology", which was a methodology and an analytical framework of heterotopias, including six principles.

However, Foucault's seemingly concrete and rich examples of heterotopias actually show a great deal of incompleteness, abstraction, and rambling. It is not necessary for the space to contain six characteristics in order to be called a heterotopia, nor could the six principles completely and scientifically encompass all relations and logics of heterogeneous space. According to the contents of heterotopology, heterotopias share some core characteristics that distinguish them from other social places.

First, heterotopias should be understood as places out of the center. This overview shows that heterotopias have the quality of being different from everyday places, that is, heterotopias are places where an alternative spatial order exists. The intention of heterotopias is that they reflects the opposite side of society ([35], p. 44), questioning and challenging sameness. Of course, this does not mean that heterotopias are places of rebellion, but rather that they retain special and deviant elements outside of everyday places, such as groups and behaviors outside of social norms, outside of cultural understanding, etc. The postmodern view of the heterotopias is that they are spaces of "otherness" and an alternative composition of cities. With their inclusive, radical openness and infinite connectivity, heterotopias become sites of political and social significance for the empowerment of minorities and marginalized groups ([35], p. 47).

Secondly, heterotopias are results of the mediation and interpretation of culture. Heterotopias are not only physical existence, but are also highly relevant to society and culture. Foucault tried to establish parameters (heterotopology) for a completely different system of classification (heterotopia), which was not a fixed or strict structure, but a flexible, indeterminate, and unstable system ([35], p. 45). The ubiquity of culture means that heterotopias are highly composable and complex in their structures. However, the theory of heterotopias is used to explore the mediating and explanatory role of culture in different contexts and situations. That is to say, despite the variety and diversity of heterotopias, "heterotopia" as a theory can be seen as a critical approach. It is important and meaningful to discuss and analyze a space, a society, or a culture through the lens of "heterotopia".

Thirdly, heterotopias indicate a new set of relations. The emplacements indicated by heterotopias are real places, characterized by representation, contestation, and subversion. They rely on recoding and heterogeneity, highlighting their differences from other places in their surroundings through their temporalities. They are places that are open but isolated and with controlled access. They are places of extremes, either creating an illusionary space that dismisses everything around them as unreal, or creating a (imaginary) perfect, detailed, well-arranged space, while in reality its counterpart (the real space) is "disorganized, poorly arranged, and chaotic" ([35], pp. 31–32). Those "alternative places" have properties that are related to, and yet different from, all other places, owning a critical aim to discover, explore, and analyze new sets of relations of spaces in a way of suspecting, neutralizing, or inverting the existing relationships of spaces. In the margins of modernity, heterotopias constantly threaten to undermine their closure and certainty [36]. By constituting a new collection of relations and forming a new philosophy of space, heterotopias reveal their essence of disputing power relations, places of knowledge transmission, and spatial concepts.

In summary, heterotopias are, firstly, real places, and at the same time they must be places out of the center that subvert the conventional spatial order. Secondly, heterotopias must not only be physical, but must also be the result of cultural mediation and interpretation, connecting various heterogeneous factors. Finally, heterotopias are flexible and net-like systems, aiming to map out the social and cultural aspects with a critical and perspective of "otherness".

3.2. Makerspaces as Heterotopias

Makerspaces have marginal characteristics, and most youth have a vague perception of this. In the beginning, as someone who participated in the activities of the Chaihuo Makerspace, Shenzhen was advised not to "enter the pyramid scheme by mistake" (Maker Fu) when they introduced the space to their colleagues and friends at their original workplace, which is ridiculous but understandable. Makerspaces are a kind of heterotopia as they representthe core of heterotopias. Specifically, as physical spaces in the city, makerspaces are not conventional. They are not spaces that most people use in their daily lives, but they gradually take shape in order to solve the kinds of problems that cannot be solved in the space of daily life. It is evident that makerspaces have a certain characteristic of "deviating" from the space of everyday life. Meanwhile, the emergence of makerspaces has changed the situation that science and technology innovation is mainly dominated by institutions and large enterprises to one in which hobbyists and the public can also participate in science and technology innovation, breaking the monopoly of scientific research institutions and large enterprises on them. Thus, it can be seen that makerspaces meet the characteristics of heterotopia as "a place out of the center". Secondly, as the maker movement flourishes around the world, makerspaces in various countries have undergone different evolutions. In Europe and the United States, makerspaces originated from hackerspaces, focusing on community-based operations, while in China, makerspaces practice the concept of "mass makerspaces", which is more inclusive. From this point of view, makerspaces have experienced different cultural mediation and interpretation. That is to say, in different cultural backgrounds, makerspaces present different roles and meanings. In China, the formed makerspaces in different cities are influenced by different city cultures, social norms, and group personalities, reflecting different functional modes and spiritual cores. Finally, makerspaces exist in the urban system and are connected to various elements in the city. Even though they seem to be insignificant or seem to be a substream of innovation, they do exist in the innovation network and renew the composition and texture of the innovation network, forming a unique collection of spatial relationships in the urban innovation network.

3.3. Heterotopology as Framework

When Foucault discussed the six principles of heterotopology, he stated that he had no ambition to treat heterotopology as a science. It was only described in a narrative and introductory tone, accompanied by a large number of practical examples. Therefore, heterotopology could not form a systematic or standardized way of analyzing social spaces, just as Edward Soja once said that Foucault's heterotopologies were "frustratingly incomplete, inconsistent, incoherent" ([32], p. 162). Foucault advocated and encouraged future scholars to treat the concept of heterotopias as a toolbox and to transform themselves into the users of heterotopias. In that case, this article is motivated to further explore the idea of heterotopias according to the six principles and to try to analyze the makerspaces from a perspective of cultural study.

This article use the six principles of heterotopology as the analysis framework to study makerspaces. However, by disrupting the order in which Foucault stated, this article reorganizes the six principles and fits them into the unfolding of specifics of makerspaces in Shenzhen. According to the features of makerspaces as heterotopias, this article tries to find different types of culture, which are key to innovation.

In order to better explore the relationships between makerspaces and innovation, the authors took various makerspaces in Shenzhen as academic fields between April 2018 and July 2019 and adopted methods such as participatory observation and in-depth interviews to promote research. With in-depth descriptions, this article presents the details of maker culture in Shenzhen before the pandemic. The authors visited 19 makerspaces in Shenzhen and had in-depth interviews with 23 makers. In addition, the authors had open-structured chats with 12 participants from several maker activities.

4. Methodology

In order to better explore the relationships between makerspaces and innovation, the authors took various makerspaces in Shenzhen as academic fields between April 2018 and July 2019. Phase I lasted for one week in April 2018 and involved visiting Huaqiangbei District and some makerspaces, experiencing the innovation and maker atmosphere in Shenzhen. Phase II lasted from July to August and October to November in 2018. In this phase, the authors mainly observed SZDIY Community and maker activities, including Shenzhen International Maker Week, Maker Faire Shenzhen, High Tech Fair, and Global Open Science Hardware Conference (GOSH). Phase III lasted for three months from April to July 2019, involving field work in Chaihuo makerspaces. The main methods included participatory observation and in-depth interviews. The authors visited 19 makerspaces in Shenzhen and had in-depth interviews with 23 makers. The in-depth interviews of makers included 10 semistructured questions: (1) What was your previous identity? When did you first become a maker? (2) What motivated you to become a maker? (3) How do you understand the word maker? What have you gained after becoming a maker? (4) What innovative projects are you working on? What are your next plans? (5) How did you meet your current partner? (6) Why did you choose to come to Shenzhen? (7) Has it caused any trouble to others when becoming a maker? (8) How do you think about the current phenomenon of makers? What do you know about the maker movement, maker spirit and maker culture? (9) What's the difference between being a maker and an entrepreneur? What is the happiest situation you have encountered? What was the most difficult situation? What kept you going on? (10) What do you think it takes to be a maker (yourself, others, makerspace, government)? In addition, the authors participated in 30 activities held by the government or the makerspaces and had open-structured chats with 12 participants, mainly concerning the questions of the process and feelings in participating in maker activities.

5. Analysis and Findings

In China, makerspaces are usually seen in the cities, especially cities such as Beijing, Shanghai, and Shenzhen, which are super big and modern, gathering lots of early Chinese makers. The makerspaces spread from the creative industry parks to technological parks, which are founded by individuals, companies, government, and foreign capital. However, those makerspaces are different from other spaces in the park as they share the different ideas of creativity and innovation. Furthermore, the makerspaces in different cities differ from each other. For example, makerspaces in Beijing seem to be the organizers of resources, makerspaces in Shanghai have the preference of being creative and artistic, while makerspaces in Shenzhen perform similar to laboratories, where new ideas and needs can be iterated quickly. That is to say, makerspaces have already formed a unique culture of innovation as they are a typical kind of newly-arisen city space highly associated with technology and innovation.

By analyzing the composition of makerspaces, such as people, space, activities, interaction among people and space, etc., this article found four types of innovative culture reflected especially by makerspaces in Shenzhen. They are the culture of tolerance (associated with the first and the third principles of heterotopology), liminality (associated with the fourth principle of heterotopology), compensation (associated with the sixth principle of heterotopology), and confrontation (associated with the second and the fifth principles of heterotopology).

5.1. Tolerance

The culture of tolerance indicated by makerspaces includes two aspects: one is about people, and the other is about space. In the description of the first principle of heterotopia, Foucault said there was probably not a single culture in the world that failed to constitute heterotopias, demonstrating the coexistence of multiple cultures, and he further took two kinds of examples, that were people in crisis or in deviance, to clarify the capacity of heterotopias. The existence of people is the first condition for a heterotopia to start func-

tioning, and it is a prerequisite for space to be connected. Without the presence of people, heterotopia would be meaningless. In turn, without the tolerance of heterotopias, deviant people have nowhere to stay. The tolerance of space means the concept of juxtaposition in Foucault's idea of heterotopias, that is, "heterotopia is capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible". He cited a number of very specific situations, such as stages, cinemas, and gardens, to show the places where many different spaces converge and become entangled and jumbled together ([32], p. 160), presenting a surreal and artistic representation of space.

5.1.1. Tolerance for Makers as Deviated Groups

Makerspaces show the tolerance of people, mostly of makers. Makers are the main subjects of makerspaces who share unique characteristics and spirits. However, makers are usually seen as the deviants of innovation, both in terms of group size and social awareness. Those engaged in science and technology innovation and creative industries, or what Florida calls the creative class [37], either work in research institutions, technology companies, design firms, or open their own studios. Makers, on the other hand, are more similar to the subculture groups, as they are not understood or recognized by the main culture as most of them are just hobbyists or amateurs of technology. The narrow definition of talent makes it difficult for young people whose ideas are not in line with mainstream society to find a place to act, so their good ideas are often stifled. The youth who love making are usually deviant in their daily life. The most important reason is that they easily become unsatisfied with their regular life and want to make some difference.

> *(Maker Fu) "I used to work in a traditional foreign-owned company which was controled by Chinese managers. It was quite a torturous process to stay in such a company. They rarely gave young people a chance."*
>
> *(Maker Zhen) "It was the most energetic time for us from the time we graduated to the time we worked for a year, and we wanted to change the world. All the friends around me, at the beginning, wanted to pursue their dreams. "I want to do high-tech", "I want to do the entity", "I want to do sales", etc. These years down many people are defeated by reality."*
>
> *(Maker Jimmy) "Before I worked in the state unit, living the life of stability. But I am personally crazy about tinkering with circuit boards, so I quit the job."*
>
> *(Maker Leung) "I'm a Singaporean from Hong Kong, I don't have a fixed job, and I go to maker events when there are any."*

In addition, the founder of Chaihuo Makerspace had once talked about his experience of becoming a maker in the newspaper, that is, "I was born in Ya'an, Sichuan in 1983. Since I was a child, I love to 'wreak havoc', always dismantle everything I can at home, and then reassemble, and enjoy the process very much... After graduating from university, I joined the manufacturing department of Intel Products (Chengdu) Co. After staying for more than ten months, I felt that my work life at Intel was too secure... Although I could learn a lot, it was not challenging enough and I felt it was too meaningless and I preferred to do something adventurous. In the end, I resigned despite my family's obstruction" [38].

Those interviews and news show that a large portion of the makers are unable to achieve fulfillment in their current jobs, are not valued, or have lost interest in their jobs. It has been proven through observation that those makers who are considered to be "deviating" from mainstream careers often find solace in the makerspaces in three ways: they find people with similar interests, they find a way to realize their dreams, and they find personal value. The three forces intermingle and develop to form a constant upward momentum of innovation. In other words, the makerspaces provide shelters for the deviant youth, where they can escape from the pressure and misunderstanding in their formal work, find peers with similar interests, form teams, invent products, and move beyond their interests to seek industrialization. Since ancient times, China has had the literati

sentiment of "sheltering the world's poor scholars". As a product of modernization, the makerspaces have realized the ancient people's desire for "place" and "identity".

Taking Silicon Valley as an example, what set it apart was not just Stanford University or the warm climate, but its openness to and support of the creative, the different, and even the downright weird. The Valley integrated those who were offbeat; it did not ostracize or discourage them [37]. The makerspaces are tolerant places where makers can try and put into practice certain pursuits and ideas that cannot be realized in the external society. In turn, it is the presence of the person that constitutes the interweaving of heterogeneous experiences and it is the young people who are regarded as "deviant" by the society that have the courage to break the rules and stimulate the creative energy of makerspaces.

In short, makerspaces embrace makers as the deviant innovators in the society, and their accommodation of makers ensures a stable place for such "deviant" groups to meet and interact with each other. Makerspaces strengthen and solidify the community of makers and increase the possibility and motivation of makers with different attributes to participate in the innovation process.

5.1.2. Tolerance for Spaces with Mutual Heterogeneity

There are various spatial forms with different structure, function, and nature inside and outside the makerspaces; some of them are even conflicting and discordant with each other, but the makerspaces juxtapose and unify the spaces that are different from each other and extend outward from inside the space, forming heterogeneous connections between each space.

The Chinese makerspaces are largely inspired by the "cafes" in Silicon Valley; the interplay of leisure space and office space is, therefore, the most typical spatial juxtaposition here, demonstrating the features of "in-between" of makerspaces. That is to say, the makerspaces try to model themselves in the atmosphere of neither work nor leisure. Furthermore, there are always tool areas, display areas and lecture areas in makerspaces, forming the informal connection inside the space.

Outside the makerspaces, the conflict scenes are always seen, for example, the makerspace is embedded in the living scene (SZDIY Community), or the modern makerspaces are above the crowded and cluttered market (HAX, Huaqiangbei International Maker Center), etc.

Shenzhen's earliest self-organized makerspace, SZDIY Community, has its offline gathering place in a residential building, which looks no different from ordinary residents, but in fact is linked to hundreds of technology enthusiasts. Such a scene happens every day—next door lives a local resident who cooks every night and waits for his children to come home from work, while at the same time, in the SZDIY Community there is a scene of technology enthusiasts talking about open source and freedom, thinking about the future development of technology, conceptualizing the invention of a revolutionary product, or solving a brain-burning technical problem. What happens in the two spaces is almost unrelated and is even conflicting, because in most people's perception, anything related to technology should be high-end, sophisticated, and futuristic, and it is not destined to happen "next door". However, the makerspace embodied in a neighborly environment can strengthen the connection of high-tech and ordinary people. Sillver and Clark's "scenescape" theory lists "neighborhoodliness" [39] as one of the fifteen subdimensions of scenario analysis, where neighborly communities present a warm and caring environment through intimacy and personal networks. A harmonious scene of warmth and care, which is crucial for science and technology innovation, is created by makerspaces such as SZDIY Community. Technology comes from and moves to daily life, so SZDIY, a way to set up a technology innovation space in residential areas, can be said to be the simplest and most direct way to juxtapose technology and daily life.

Another example of juxtaposition of incompatible spaces is shown obviously in Huaqiangbei District. On the upper floors of the noisy and crowded electronics market, which is stuffed with "one-meter counters" (Figure 1), there are three makerspaces.

Figure 1. *Huaqiang Electronics World*, the largest electronic trading market in China.

"Downstairs are the electronics markets, upstairs are the makerspaces, they magically merge together", said Kevin, the American maker of Huaqiangbei International Makers Center, "so that you can buy anything". The makers living and working in Huaqiangbei District are similar to fish living in the ocean, with a vast space to explore and abundant resources to utilize. The complete and inexpensive industrial chain is the natural advantage to Huaqiangbei District, which is so attractive to hardware makers and venture investors. Because of the appearance of makerspaces, Huaqiangbei District has been more than an electronics market. "In Huaqiangbei you can find the technology related to your project and find a way to fit it with your product. It is close to the consumers and extremely close to the market, so we can predict whether our products are practical or not, and we can quickly modify and improve our products and business plans through the feedback from consumers", said Ata, a maker from Huaqiangbei International Makers Center. The makerspaces show the ability in juxtaposing visually incongruous spaces and seemingly unrelated groups, where technology and ordinary life, elite and grassroots, meet. The juxtaposition of space reflects a surprising connection of space and people, based on which individuals are no longer entirely shaped by identity and place, but, rather, the interaction between people and space, therefore expanding the meaning of "place" and highlighting the status and significance of space.

5.1.3. The Culture of Tolerance

Although tolerance as a kind of innovation culture is a cliché, many scholars believe that tolerant and diverse communities usually have an open and weak social structure in which new ideas can flourish, people have few barriers to communicate and learn from each other, and knowledge and creativity can constantly overflow [40–42]. The makerspaces embrace heterogeneous identities and cultures where multiple people coexist, and contradictions become unity, forming weak social structure via the flow of space.

Showing the ability to reorganize people and space, the makerspaces as connectors with tolerance can connect almost everything and all kinds of phenomena, which creates a state of "flow". In the movement of fixed and unfixed space functions, in the arrival and departure of objects and people, multiple "flow spaces" are formed in the makerspaces. The flow brings the vitality and infinite possibilities of space, and the flow also forms multiple inclusive spaces and cultures, such as the inclusion of the unknown, the inclusion of conflicts, the inclusion of differences, etc., which protect and support the innovation at its very beginning.

5.2. Liminality

As Foucault said, the fourth principle of heterotopias is that they are most often linked to slices in time. The heterotopia begins to function at full capacity when men arrive at a sort of absolute break with their traditional time. The makerspaces sometimes play the role of temporary spaces for activities or create the isolated atmosphere for makers to produce, which both break the order of time in the real space, leading to the culture of liminality.

5.2.1. Liminal Space of Maker Activities

An important way to promote the maker culture is to hold various maker events. The activities held in the makerspace vary in size and influence, but they all profoundly shape the image of makers and people in the city. In the maker activities, the makerspaces become temporary locations for strangers to meet. As the activities are generally temporary, they will be suspended, end, or disappear, and after the activities, participants can choose to continue to communicate or withdraw completely. The activity spaces, as "middle landscapes" [43], become a buffer zone for unfamiliarity. In a state of psychological relaxation, interpersonal interactions are more likely to occur, which creates the possibility of deeper interactions and more cooperation between makers and participants.

> *(Maker Jimmy) "After I came to Shenzhen, my invention was actually still a prototype. However, after I came here, I found that some makers from Shenzhen stood there for several hours, chatting with me for more than an hour, and stood there and refused to leave, thinking that this is what they wanted. I felt for the first time that something was possible and could happen."*

The experience in the temporary activity space provides the opportunity for "embodied" real perception and exploration. What is disappearing in the contemporary era is proximity, while the temporary makerspaces use the open public space of the city itself to create an instantaneous burst of neighborhood, free from the constraints of media technology to a certain extent. It relies on the threshold experience of individuals entering the physical space in order to think and act differently. The temporary space has more people moving around, carrying more information and creating more frequent information exchange opportunities. For makers, the liminal experience not only drives away their tension, but also exists in their minds for a long time, which becomes a kind of motivation and inspiration.

5.2.2. Liminal Space of Tool Room

The first time I visited Chaihuo Makerspace, I was attracted by its tool room, which was the largest and most well-equipped tool room among the makerspaces I have visited in Shenzhen (Figure 2). Upon entering, there was a blue shelf full of small tools such as wrenches, screwdrivers, pliers, saws, etc., as well as measuring instruments such as voltmeters and level meters. Several transparent PVC vacuum pipes hung down from the ceiling to the concrete floor, similar to a python. On the left-hand side, along the glass wall, there were turret milling machines in grass green, CNC milling machines in red, and industrial-grade laser cutting machines in gray and white in turn. On the right-hand side, there were red automatic soldering machines, orange robotic arms, green bending machines, and other medium-sized tools, and a small 3D printer area. Semiautomatic mechanical tools such as bright yellow woodworking table saws were placed randomly on the ground

and desktop, to name a few. Faced with large machines and precision instruments, I felt the smallness of people. The first time I saw the tool room I was shocked—although I did not know the name of the large tools, or how to use them, those mechanical arms, spindles, and pushers seemed to "beckon" to me, saying "come and turn me! "! There was really no space that could accommodate such a variety of machines at once.

Figure 2. The tool room of Chaihuo Makerspace.

The tool room provides another type of liminal experience. As Yi-Fu Tuan stated, "tools and machines enlarge man's sense of space and spaciousness. . . A tool or machine enlarges a person's world when he feels it to be a direct extension of his corporeal powers" ([44], p. 53). With the fulfillment of tools, the makerspaces become the space where the desire for innovation can be stimulated more easily. The chance to use tools in the makerspaces is higher than an office, which attracts more people to join the process of making and producing, generating "accidental entrepreneurs" [45] with flourishing innovation ideas. This shows that the tool spaces have the ability to enlarge human capacity and potentiality.

5.2.3. The Culture of Liminality

The fourth principle of heterotopology, about the rupture of time, gives an incredible experience to people and space, and while the experience of people explodes, the dynamics of space is also activated, therefore forming a continuous interaction between people and space, and both the potential of people and space are stimulated.

It is the combination of chance and randomness that becomes the very fabric of innovation and diffusion [14] and it strengthens in a liminal situation. In its ambiguity, openness, nondeterminism, and temporality, the makerspace as a kind of liminal space enhances the possibility of information exchange, resource-matching, and opportunities creation. As mentioned in the idea of heterotopia, it "isolates space and time at the same time", and in that way, the makerspace breaks the traditional space–time order. It opens up a place separated from the real space and time, where people live a different life and experience a unique practice. In the midst of countless small and large activities, the makerspace becomes a temporary but carnivalesque space that simultaneously compresses and mixes time and space, creating a sense of explosive excitement that acts on all kinds of groups in it. A unique spatiotemporal experience is created. In the constant flow of time and space, whether eternal or momentary, a different way of experience and interaction is constructed. As David Harvey points out, heterotopias are where "life is experienced differently" [46]. In the different life, strangers join together and communicate more freely, which is beneficial to nurture innovation.

5.3. Compensation

The sixth principle of heterotopology is that heterotopias have a function in relation to all the space that remains. This function unfolds between two extreme poles, that is, heterotopias have two poles of reality and illusion. Similar to the colonies, they act as a compensatory spatial system as the sovereign state places its own intentions on them. That

is to say, between the two extreme poles of heterotopias, the reality and illusion, there more possibly is a broad space of compensation operating.

The compensation zone of makerspaces consists of the policies launched by the government and the cooperation developed by traditional industries, both reflecting the the imagination of different subjects on innovation. In that case, makers and makerspaces are linked into a network centered on maker innovation, allowing the marginalized individuals and startups to repair the fracture zone of innovation network.

5.3.1. Maker Policies as a Compensated Network

Around the construction of makerspaces, the government at all levels have formulated a series of policies including founding, support, and assessment. On the one hand, the policy support has a significant positive effect on the operation of the makerspaces, which means the makerspaces can reduce the financial pressure and focus more on the operation of the space itself. On the other hand, it increases the healthy competition among the makerspaces and enhances the competition consciousness among the makerspaces, which causes the makerspace to pay more attention to the effectiveness of its operation. By laying out policy support, the government aspires to make detailed plans of makerspaces in which innovation can function perfectly. Financial support policies (subsidies), technical support policies (Internet, big data, cloud computing), talent support policies (talents from colleges and enterprises), and public service support policies (rent, water and electricity exemptions, tax exemptions) are the most important elements of the policy-driven network. The policy support aims to lower the threshold of innovation and entrepreneurship, encourage scientific and technological personnel and college students to start their own businesses, support public services for innovation and entrepreneurship, strengthen financial funding guidance, and improve the entrepreneurial investment. Although the maker policies form a compensated network in makerspaces, the makerspaces have to bear the government's expectations of "low cost, facilitation, all-factor, openness", "specialization", and "refinement". The terms "accelerate the construction", "vigorously develop", "make full use of", and "continuously promote" fully reflect the government's urgent expectation for the makerspaces in the "mass innovation" era.

5.3.2. Industrial Cooperation as a Compensated Network

Driven by interests, the makerspaces evolve from a platform to an ecology and become a conceptual body for the effective integration of creativity, capital, and talents. The creation of makerspace in China is no longer a transplantation of European and American maker culture by maker pioneers and individuals, but has become an action of investment and financing institutions, unicorn enterprises, and even real estate developers to invest funds to seek business expansion and income returns. Hence, a compensated network of industrial cooperation is established. The first case is about the cooperation between Chaihuo Makerspace and Vanke Real Estate. Jane, a Taiwanese architect of Vanke Real Estate, said, "We invited Chaihuo to come over and invite them to join the smart building solution, helping Vanke to upgrade the building and serve better community residents, which is also Vanke's sentiment and social responsibility". Of course, the sentiment is one side, and the benefit cannot be ignored. The real estate developers and the most influential makerspace in China have formed a "complicity of interest" relationship, which shows that the makerspace does not reject the intervention of corporate power. The makerspaces in Huaqiangbei District show the other aspect of industrial cooperation, that is, the mutual influence between traditional and new industries. The makers rely on the low prices and abundant material resources in Huaqiangbei while merchants in Huaqiangbei hope that the makers' new products can facilitate the operation of their stores. Meanwhile, the traditional enterprises such as Huaqiang Group and Saige Group both opened up several floors to establish makerspaces. Huaqiangbei relies on dozens of years of electronic components industry base and electronic product production supply chain, attracting the attention of makers worldwide, therefore opening up another business path. The symbiotic

relationship between makerspaces and Huaqiangbei is also a symbiosis between traditional business and high-tech, conservative thinking, and creative thinking, domestic market, and overseas market.

5.3.3. The Culture of Compensation

The makerspaces operate through the conception of different subjects where arguments and negotiations are intertwined. Now that the demand for makers has passed, the only way for makerspaces to be sustainable is to empower makers and make profits at the same time. The makerspaces have to maintain good communication and cooperation with both the upstream and downstream of product design and production. Through policy intervention and space mediation, various circles, including makers, capitals, and industries, are moving toward symbiosis with the makerspaces, forming a compensated network. For example, the government's policy not only acts on the makerspaces, but also influences the investment of enterprises and capital in the makerspaces, which laterally promotes all parties to strengthen the maker innovation. The Chaihuo Makerspace not only builds an exchange platform for domestic and foreign makers, but also provides chances for makers to better integrate into the industry chain. In Huaqiangbei District, the close connection among makers, merchants, and traditional enterprises not only realizes the dreams of makers, but also satisfies the needs of partners who can provide industrial resources, making traditional industries gradually have a cross-border vision to realize industrial upgrading through collaboration with makerspaces. By weaving a network of compensation, makerspaces realize a model in which individual innovation is connected to specialized and market-oriented technological innovation. Governments, industries, capital, and enterprises step out of the comfort zone of innovation and turn their attention to individual and risky innovation. Similar to Foucault's metaphor of the ship, the makerspaces connect the unknown and hope. As a construction rich in the spirits of exploration and expansion, the makerspaces map the imaginations of different subjects for their hope for the perfect operation of innovation. Through various strategies and actions to compensate for the innovation network, a more diversified and rich kind of innovation practice is launched.

5.4. Confrontation

The second principle of heterotopias is that "a society, as its history unfolds, can make an existing heterotopia function in a very different fashion" so that the heterotopias change their meanings when the society and the culture develop. The fifth principle of heterotopias is that heterotopias always presuppose a system of opening and closing that both isolates them and makes them penetrable. In other words, the heterotopic site is not freely accessible as is a public place. According to the spirits of openness of the makerspaces, people can easily enter the physical space of them. However, the situation has gradually changed. Most of the makerspaces nowadays set rules for people to join in, that is to say, not only the passers-by and visitors, but also the makers may not be actually "invited" by the makerspaces. The makerspaces in that case show the confrontation by the way of setting up various barriers.

5.4.1. Privacy as Confrontation

I would like to start the discussion with a case study of visiting the HAX Hardware Accelerator. It is not easy to visit the makerspace because you cannot find the specific address of its physical space on the Internet. This successful makerspace is an almost untraceable "invisible" place. How exactly does one find HAX? After failing to find it alone in Huaqiangbei, I started to contact an acquaintance and learned that Shenzhen University would soon hold the 2018 "Cultural Technology Innovation Forum" and one HAX staff would participate. On the day of the conference, a senior research analyst from the HAX gave a presentation; after that, I obtained his business card and was told that I could make an appointment by sending an email to him. That night, after sending the email, I soon

received a reply, agreeing to my request to visit HAX, and provided a WeChat contact, through which the staff sent me a series of text and pictures of how to find HAX, asking me not to tell others.

Out of curiosity, I asked him the reason why I should not tell others the address of HAX in the interview. The reply was that it was a way to ensure that the innovation process would not be disturbed. In HAX's view, the process of innovation and entrepreneurship for makers is very difficult and lonely, and they also need a lot of concentration to devote to their creative endeavors, so the makerspace must create a stable, quiet, private, and protected environment to support them. "This will interfere with the progress of the maker's project, which is not good for them", said the analyst, "many people want to visit HAX, but we don't host them very often. Here is meant for entrepreneurship and creativity". Open spaces may "threaten self's fragile integrity" ([44], p. 54); the open spirit of makers does not necessarily mean that they can be generated in open spaces either. The success and reputation of HAX in the maker industry is certainly not entirely due to their "closed door" approach, but it is worth considering the purpose of maintaining the independence and stability of makerspaces. This kind of opening and closing system of the makerspaces in the form of "boundary maintenance and discipline" ([32], p. 161) can be viewed as a way of anticonnection. In reality, it proves the positive effect of keeping the space closed and stable for innovation.

5.4.2. Maker Cultural Capitals as Confrontation

Although a makerspace is open and welcomes any maker or person, theoretically, it is difficult for ordinary people to enter, and even more difficult for makers to set up in a well-operated makerspace.

"Cultural capital" is a powerful conceptual tool used by French sociologist Pierre Bourdieu to critique capitalist society, referring to a form of value that marks the social identity of actors which is regarded as orthodox cultural interests, consumption patterns, cultural capacities, educational qualifications, etc. Cultural capital is considered in terms of concrete states (spirituality, taste), objective states (cultural commodities), and institutional state (objectified form) [47]. Sarah Thornton borrows the insights of "taste" and "habitus" from Bourdieu's cultural capital theory and proposes "subcultural capital" in the book Club Culture [48]. The concept of "subcultural capital" is the style and personality represented by "hipness", which gives its owner an identity and status in the subcultural group. Accordingly, we can understand "maker cultural capital" as a kind of cultural capital expression between "cultural capital" and "subcultural capital". Specifically, it is a variety of factors that have uniqueness and influence in the makers group, which together become the characteristics and capabilities of the makerspaces. Microscopically, the skills, creativity, negotiation ability, and cooperation ability of makers can be the expression of "maker cultural capital", while the values, operation mode, development strategy, and resources of makerspaces can be regarded as a kind of "maker cultural capital" of the space.

In the case of Chaihuo Makerspace, it is necessary to examine the matching degree of makers and projects, and only individuals who are generally suitable for the business focus and development needs of the space can be admitted. The concept of "makerpros" (professional makers) is proposed in the Chaihuo Makerspace, and the skills required of the resident makers are high, as they must have at least one manufacturing and design-related skill, including woodworking, metalworking, 3D-printing, laser cutting, soldering, Arduino, Raspberry Pi, CNC, network technique, structural design, aesthetic design, PCB design, and innovative development. At the same time, unlike coworking spaces, which can be occupied as long as there are available spaces, Chaihuo Makerspace requires a detailed understanding of the projects and needs of the incoming makers, and can only be occupied after assessment by the makerspace operators.

The requirements of the space for makers reflect what kind of makers can be based in and develop in the makerspace for a long time. First of all, skills are the key capital that makers possess, which are also the visible cultural capital of makers. If a maker can use

a laser cutter, woodworking carving machine, or even a CNC lathe, then he or she will receive the approval and admiration of other makers. A "pro–am" (professional–amateur hybrid) situation can describe this group of people, who are very talented amateurs with the ability to become professionals in their field, but are definitely not professionals. Secondly, the cultural capital of makers is not suddenly acquired, but increasingly accumulated, even dating back to the adolescence of makers. Many makers have enjoyed hands-on manufacturing since childhood. In the process of studying at university, combined with the expertise learned, these young people are more likely to invent a product. Finally, the most difficult thing to crack in the maker cultural capital is the code of creativity generation. While skills can be acquired and become more proficient over time, the generation of ideas is highly uncertain and unrepeatable. Consequently, the makers who can come up with great ideas usually become the soul of the team. Through the maker cultural capital, the makerspaces establish a spontaneous and dynamic exclusion mechanism which, to a certain extent, forms a dynamic and stable innovation core. This power will not be easily disturbed and destroyed.

5.4.3. The Culture of Confrontation

The maker culture advocates openness, sharing, and the idea that "everyone can be a maker", but in the actual operation process, there are certain restriction mechanisms, as mentioned above. The makerspaces themselves are experiencing changes and uncertainties during their development and struggling among the operating concept, mechanism, and spiritual core. In the midst of uncertainty and instability, makerspaces have become exclusive spaces that are open on the surface but cannot be truly integrated by makers, attempting to subvert the characteristic of openness from Western maker culture. By setting access conditions to create a suitable innovation environment and establish a new innovation order, they have become a kind of space that is isolated and permeable and requires "permission" to enter. It is in the complex dialogue and confrontation between heterogeneous spaces and real spaces that the makerspaces try to explore a collaborative path, adapting to the traditional innovation rules while seeking a balance of retaining their own critical spirit. The goals for makerspaces are to enable the makers, to attract the attention of traditional industries and capital, and to play an active role in the continued promotion of the global maker movement, via which the individual innovation can be treasured.

6. Discussions

As many scholars have researched the operational modules of makerspaces from perspectives of management, education, and libarary service, the culture in makerspaces is always ignored or merely summarized as the culture of DIY, sharing, and openness. This shows the neglect of cultural properties of makerspaces in research. In fact, the makerspaces, as a kind of heterotopia, are a mixture of unique cultures. In that case, this article focuses on the culture of innovation generated by makerspaces, showing the power of makerspaces as the heterogeneous medium, which enriches the research on makerspaces and enhances the status of makerspaces in innovation studies. The renewal of makerspaces and the mutual influence among makers, makerspaces, capitals, and governments are still essential topics for scholars and policymakers who care about technology innovation developing continuously.

However, there are three main limitations of this study. Firstly, this study takes the makerspace as the starting point and also talks about different people in a general way, failing to develop a focused group study. Secondly, this study mainly focuses on the discussion of profitable makerspaces, but the examination of library makerspaces and school makerspaces is missing. In that case, further studies in makerspaces, such as the cultural elements of university and makerspaces, are worthwhile to focus on. Meanwhile, it is meaningful to study specific makers, for example, graduating college students. Last, but not least, although this article shows the examples of makerspaces formed by different capitals, e.g., foreign capitals, state capitals, and private capitals, it seldom stresses the

influence of different capitals on the makerspaces, which ignores the connections between makerspaces and the capitalist market forces.

7. Conclusions

This article reorganized the principles of heterotopology described by Foucault, creating a cultural analysis framework so as to focus on the cultural properties of makerspaces. The research showed that the heterogeneous culture generated by makerspaces played an essential role in stimulating innovation and expanding the impact of the maker movement.

As heterogeneity is the main issue when investigating the makerspaces [19], it is also the key point to generating different cultures in the makerspaces. Makerspaces as a kind of heterotopia have four features, demonstrating the power of mediation and forming the culture of innovation. At first, the makerspaces connect unique groups, unrelated spaces, and various subjects that can not easily meet, reflecting the connectivity of reorganizing people and space and promoting the exchange of resources and information in material space. The culture of tolerance forms.

Then, through the temporary space and activities, the makers, makerspace operators, and activity participants intertwine their embodied practices to form a flow space, reflecting the interactivity of breaking the space–time order. The culture of liminality appears.

Thirdly, the makerspaces are reflections of ideal spaces, as they receive the attention of the government (policies), industry, and capital (cooperation), together gaining compensated strategies, which in turn react to the makers and makerspaces and form a compensated network. Therefore, the culture of compensation is established.

Lastly, the makerspaces maintain the innovative atmosphere for makers through setting rules and strengthening maker cultural capital. That is to say, the makerspaces choose to confront the spirit of openness and the idea that "everyone can be a maker" in order to make sure the innovation happens more frequently inside them. The culture of confrontation emerges.

Above all, the study shows that the makerspace as a kind of heterotopia is the bearer and mediator of unique cultures and a heterogeneous cultural creation system. Makerspaces are the central axis for the convergence, integration, and delivery of global makers and organizations, technology and innovative products, capital and resources, creativity, and pioneering ideas. If there is no makerspace, the ideas of makers may not be realized, the innovation potential of makers cannot be stimulated, and innovation deeds cannot be spread. Obviously, the makerspaces have a positive effect on urban innovation, not only in the fact that they support a large number of creative makers to carry out innovative practices, but also that they serve as a window to show the public the lively maker life and culture other than high-tech, which feeds back and shapes urban innovation.

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Cultural and Creative Industries and Copyright at the Regional Level: The Cases of Shenzhen and Hangzhou in China

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Abstract: Cultural creative industries (CCIs) have become an important driver in motivating the modern economy around the world, and the sustainable development of CCI is calling for a proper profit mechanism. Using China as the research context, this article investigates how copyright is used in the development of CCIs. The cities of Shenzhen and Hangzhou are selected as cases, and I identify 98 representative CCI enterprises from Shenzhen and 127 representative CCI enterprises from Hangzhou to conduct the analysis. It is found that the development of CCIs in different cities shows different models with regional characteristics, and shares some characteristics in common; most CCI enterprises have experience with copyright registration; copyright is highly correlated with other types of intellectual property (e.g., patent, trademark), and there is an obvious integration of copyright and technology; judicial lawsuits have become a major tool for enterprises to use copyright to protect their benefits, with plaintiffs winning the majority of the lawsuits. This research has both significant theoretical and practical implications, and contributes to theory about the use of copyright in the development of CCI at a regional level.

Keywords: cultural creative industries (CCIs); copyright; creative economy; China

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1. Introduction

This article attempts to investigate the role of copyright in cultural creative industries (CCIs). On the one hand, CCIs are becoming increasingly important in encouraging economic growth and have been growing rapidly worldwide [1–4], bringing about an era of creative economy [5]. The impact of CCIs on society is significant in affecting people's social and cultural life, and the development of CCI is seen as a source of the prospective economy [6,7] and a reflection of soft power [8] and a sophisticated society [9]. It is estimated that in 2020 there was a USD 750 billion contraction in the gross value added (GVA) generated by CCIs globally [10]. A pre-crisis forecast predicts that the creative economy could represent 10 percent of global GDP before 2030 [2], and a report by UNESCO found that 51.2 million people across the globe were self-registered as working in some capacity (full-time, part-time, intern) in the CCIs on LinkedIn as of January 2021, accounting for 6.7% of all global LinkedIn users at the time [10].

On the other hand, the sustainable development of CCI is affected by various factors [3,4,11,12], and intellectual property (IP), including copyright, is a crucial factor [13,14]. CCIs contribute to the economy in a variety of ways [1,5], with copyright being one of the most important mechanisms [13]. Copyright helps firms to protect innovation and guarantee their capability to profit from innovation [15], providing CCIs with competitive advantage and appropriability. Because CCIs rely heavily on copyright, they are also called copyright industries [14].

However, the literature has not fully studied the function of copyright in the development of CCIs. Most of the prior research on this topic only theoretically stresses the role of copyright for CCIs [16–18]. Although some empirical research has studied CCIs [19–21],

only a few papers have empirically examined the development of regional CCIs and the role of copyright. For example, Pager [22] studied the cases of Nigeria, India, and China and found that copyright offers distinct advantages over alternative models. Ncube [23] used South Africa as a context to study the role of IP, particularly copyright in the creative industry, and stressed the importance of the copyright framework.

Therefore, the present article asks the following question: what is the role of copyright in the development of CCIs? Specifically, I investigate whether CCIs use copyright and how CCIs use copyright. By doing so, I try to provide some empirical evidence about the relationship between copyright and CCIs. This will reply to the "what is" question, thus developing existing research that pays attention to the "what should be" issue in this topic [16–18].

To answer the above question, I set China as the research context and select the cities of Shenzhen and Hangzhou to conduct case studies. I identify 98 representative CCI enterprises from Shenzhen and 127 representative CCI enterprises from Hangzhou according to official information published by the local governments. More enterprise information is matched using an external database, and I am then able to analyze the characteristics of CCIs and the role of copyright.

2. Literature Review

2.1. IP and Industry Development

IP and industries are closely connected in the modern economy [24]. An increasing number of industries rely on IP to develop and are named IP-intensive industries [25,26]. In the US, the Economics and Statistics Administration (ESA) and the US Patent and Trademark Office (USPTO) published the report Intellectual Property and the US Economy: Industries in Focus in 2012 and found that IP-intensive industries accounted for approximately 5.06 trillion dollars in value added, 34.8% of the US GDP [27]; and the direct and indirect employment of IP-intensive industries contribute 40.0 million jobs, 27.7% of all jobs in the US. The report was updated in 2016 and 2022, and the latest version found that IP-intensive accounted for 41% of the domestic economic activity and 44% of the employment [28]. In Europe, the European Patent Office (EPO) and the Office for Harmonization in the Internal Market (OHIM) (Presently the European Union Intellectual Property Office (EUIPO).) published Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union in 2013, and found that IP-intensive industries contribute 26% of employment and 39% of GDP in the EU [29].

Enterprises frequently use IP as strategic business tools to access competitive advantages [30–34]. The protection of IP rights helps prevent market failure induced by free riding and encourages the efficient allocation of innovative and creative elements [22]. Enterprises in certain industries that hold IP can choose to use their IP in different ways [32], such as selling it, licensing it or donating it. IP can bring several effects to their holders, such as preventing potential rivals from entering the market, attacking by litigating competitors who already exist in the market, and establishing and improving reputation [30,32].

Different types of IP have different characteristics and advantages for the development of products and industries [15]. Patents are more often used in technology-based industries [35], while copyright is more often used in content-based industries such as movies, online games, and publications [36]. This is the reason why the previously mentioned reports by ESA and USPTO and EPO and OHIM divided IP-intensive industries into copyright-intensive industries, utility patent-intensive industries, design patent-intensive industries, and trademark-intensive industries [27,29]. Boudreau et al. [15] recently investigated the use of patents and copyright in mobile apps and found that apps differentiated by their design are more likely and effectively protected by patents, while apps combining elements of differentiated content are more likely and effectively protected by copyright.

2.2. Copyright and Cultural Creative Industries (CCIs)

CCIs reflect the economic value of copyright. Since copyright and CCI are inextricably correlated, CCI is frequently referred to as the copyright industry [14]. The concept of the copyright industry is popular with the World Intellectual Property Organization (WIPO) and the US. WIPO published the first edition of Guide on Surveying the Economic Contribution of the Copyright-Based Industries in 2003 to promote the development of the related industries [37], and in the US the research team of economist Stephen E. Siwek has been writing reports about the copyright industry in the US economy for a long time [38]. Towse [18] pointed out that copyright policy is also cultural creative policy. Manfredi et al. [25] explored the economic contribution of copyright industries in Italy, and found that copyright has a great impact on the aspects of economic growth, the labor market and country development.

As a typical type of IP, copyright is heavily emphasized in the study of CCIs [39]. Copyright plays a crucial role in the development of CCIs [17,18], providing an institutional framework for the development of CCI [35]. Creative contents are the foundation of CCI, and CCI is also named the content industry [22]. Enterprises make profits by producing, duplicating and sharing their content [40]. However, it is difficult for enterprises to control content, especially in an era where the Internet is widely used. Copyright is effective in protecting content-based products and industries [15]; thus, CCI enterprises rely on copyright to grow [41].

A core logic of copyright law is to protect expressions. This allows authors of particular works to profit from assigning or licensing their works and encourage them to create more content or works [42]. Furthermore, how exactly copyright functions in the development of CCI is understudied, and this is the main research question the present paper stresses.

3. Research Design

3.1. Research Context

China holds a dominant position in the global market for creative goods and services [43]. The CCIs in China began to develop after the open and reform policy was implemented in 1978, particularly in the 21st century, and the output of CCIs has grown at a quick speed in recent years [44–46]. The added value of CCIs increased from 878.6 billion Yuan in 2009 to 4494.5 Yuan in 2020, the latter is more than five times the former value; the total imports and exports increased from 38.89 billion USD in 2009 to 108.69 billion USD in 2020, and the latter is approximately 2.8 times the former; and, since 2016, the percentage of the added value of CCI to GDP in China has been above 4% (Table 1). Governments in most Chinese cities have fostered this growth [19]. In 2009, the General Office of the State Council in China issued the Plan on Reinvigoration of the Cultural Industry. In 2010, the Ministry of Finance launched special funding to support the development of CCI.

I choose the two cities in China, Shenzhen and Hangzhou, as cases for this research. In 2015, the National Cultural Industry Research Centre in Tsinghua University published a report about the CCI competitiveness of the cities in China (Available at: https://www.tsjc.tsinghua.edu.cn/info/1017/2278.htm, accessed on 10 January 2022), and the top five cities include Beijing, Shanghai, Shenzhen, Guangzhou and Hangzhou. In 2018, in a report about the city level cultural creative activity index, the cities of Chengdu, Beijing, Hangzhou, Shanghai and Shenzhen received the highest score (Available at: https://www.sohu.com/a/241901835_99925288, accessed on 10 January 2022). In 2020, Zero2IPO Research published a report about the investment and development of CCI in China, where the development index of CCI in select cities was calculated, and the top five cities included Beijing, Shanghai, Guangzhou, Hangzhou and Shenzhen (Available at: https://free.pedata.cn/1440998437317018.html, accessed on 10 January 2022). It can be seen from these reports that, apart from Beijing and Shanghai, Shenzhen and Hangzhou perform well in the field of CCI. However, Beijing and Shanghai are cities with special positions in China; they are directly governed by the central government, and have the same administrative level as provinces, while other prefectural cities are governed by

provinces. Considering the special position of Beijing and Shanghai, their CCI development may not be representative. Therefore, I use them as our research targets.

Table 1. Development of the CCI in Shenzhen and Hangzhou.

Year	Added Value (100 Million Yuan)	% of the Added Value to GDP	Total Imports and Exports (100 Million USD)
2009	8786	2.52	388.9
2010	11,052	2.68	487.1
2011	13,479	2.76	671.4
2012	18,071	3.36	887.5
2013	21,870	3.69	1070.8
2014	24,538	3.81	1273.7
2015	27,235	3.95	1013.2
2016	30,785	4.12	881.5
2017	35,427	4.26	971.2
2018	41,171	4.48	1023.8
2019	44,363	4.5	1114.5
2020	44,945	4.43	1086.9

Notes: CCI is classified using the 2004 edition of the Cultural and Relative Industry Classification published by the National Bureau of Statistics before 2012, and after 2012, it has been classified using the 2012 edition. The data comes from the China Statistical Yearbook on Cultural and Related Industries 2021; the data of added value and its percentage to GDP in 2020 comes from the website of the National Bureau of Statistics in China since the yearbook does not have data on this year, available at http://www.stats.gov.cn/tjsj/zxfb./202112/t20211229_1825717.html, accessed on 18 March 2022.

3.2. Data and Method

The data used in this work comes from several sources. The added value of CCI comes from the Chinese Statistics Yearbook of the Cultural and Relative Industry, the Shenzhen Statistics Yearbook, the Hangzhou Statistics Yearbook and the Hangzhou CCI Office's website (Available at: http://www.0571ci.gov.cn/article.php?n_id=7845, accessed on 10 January 2022). I use a popular patent database INNOJOY (innojoy.com) to search the patent applications of the enterprises. Enterprise information is manually collected from a commercial online firm information database QICHACHA (qcc.com), and I mainly look up the enterprises' registration type, final beneficiary, certification of national High-Tech Enterprise, registration of copyright, trademark and websites.

I conduct the analysis in the following steps. First, I have a general look at the development of CCI in Shenzhen and Hangzhou. This is realized by analyzing the annual added value of CCI and its percentage to the local GDP in the two cities.

Second, I select representative enterprises in CCI from Shenzhen and Hangzhou to analyze the development characteristics of the CCI. I identify 98 local CCI enterprises in Shenzhen based on a list of the top 100 enterprises of CCI (2015–2016) released by the Shenzhen Culture and Sport Office in 2017 (The list includes 100 enterprises, two of them are dropped since they are enterprise groups and the exact enterprise information is difficult to determine, and their businesses are too widespread. According to the Cultural Creative Industries' revolution and development policy in Shenzhen (Shenzhen Municipal Government [2011], No. 175), the growth of the added value of the Top 100 CCI enterprises should be above 30%). I identify 127 local CCI enterprises in Hangzhou based on the following lists: the "CCI Demonstration Enterprises" recognized by the Propaganda Department under the Hangzhou Municipal Government, and the first, second and third batches of "Growing Cultural Enterprises" recognized by the Cultural Reform Work Lead Group under the Zhejiang provincial government.

After identifying these enterprises, I am able to analyze the sub-industry structure of the CCI and the ownership structure of the CCI enterprises. CCIs include a variety of sub-industries, and looking at the internal industry structure can provide a new perspective in understanding the development of regional CCI. In this article, I use the classification mentioned in the Revolution and Development Outline of CCI in Shenzhen (2011–2015),

where CCIs are divided into ten types of related industries: creative design, cultural software, animation and game, new media and cultural information service, digital publication, film and television, cultural tourism, intangible cultural heritage development, high-end printing, high-end arts and crafts.

Enterprise ownership is an important feature of an industry. I divide enterprises into three categories according to their ownership: state-owned enterprises (SOE), private enterprises (PE), and foreign-owned and Hong Kong, Macau and Taiwan owned enterprises (FHMT). State-owned enterprises include those that are registered as such or have a registered state-owned enterprise as one of their first three final beneficiaries. Foreign-owned and Hong Kong-, Macau- and Taiwan- owned enterprises include all types of foreign-owned and foreign-invested enterprises, as well as Hong Kong-owned and invested enterprises, Macau-owned and invested enterprises, and Taiwan-owned and invested enterprises. Finally, the remaining enterprises are private enterprises.

Third, I examine the exact role of copyright in the development of regional CCI. I analyze how the selected CCI enterprises are make of copyright by looking at their registration of copyright. Copyright is a type of IP that protects original works of authorship, and I divide copyright into two types according to their nature—general works and computer software (hereinafter referred to as "software"). Software means computer programs and relevant documents, it is different from general works (e.g., written works, music works, photographic works, art works, audiovisual works) in that it is more technology-intensive and can also be protected by patents under certain conditions. However, not all copyrighted works are registered, which means that some unregistered works can also be protected by copyright law. However, I only consider registered copyrights since those unregistered are not observable.

I then examine the integration of copyright and other types of IP. As noted by Al-Aali and Teece [34], IP—including patent, trademark, copyright, etc.—needs to be strategically managed from an integrated perspective. Crafting an integrated IP strategy can help build a competitive advantage for enterprises [31]. Therefore, I investigate how those selected CCI enterprises use copyright and other types of IP together, and patent, trademark and domain name are considered. Patents in China include three types of invention patent, utility patent, and design patent. Trademark is submitted by enterprises and granted by the China National Intellectual Property Administration (CNIPA). The use of domain names is usually reflected in the registration of websites.

The enterprises' certification of national High-Tech Enterprise is considered. This is a title recognized by the Ministry of Science and Technology (MOST) in China to those enterprises that are advantaged in high and new technology and have potential in development. The certification in itself is an integration of IP and can help enrich the findings. By examining whether the selected CCI enterprises in Shenzhen and Hangzhou are national High-Tech Enterprises, it can be seen how those enterprises are using technology.

I also look at the judicial protection of copyright of the selected CCI enterprises. Since copyright is a type of negative right [47], judicial protection becomes an important tool in the functioning of copyright [48]. I mainly analyze the copyright lawsuits involving the selected CCI enterprises. I search for copyright lawsuits concerning ownership and infringement involving those enterprises that were terminated before 31 December 2018 from PKULAW.

4. The Development of Regional CCIs and Their Characteristics

Table 2 shows the development of CCIs in Shenzhen and Hangzhou. The CCIs in both cities have developed to a high level. In 2012, the added value of CCIs in both cities increased to more than 100 billion Yuan; the added value of CCIs in Shenzhen exceeded 200 billion Yuan since 2016, and Hangzhou reached this milestone since 2015. The percentage of CCIs added value to the local GDP in Shenzhen and Hangzhou has been increasing in recent years, the percentage in Shenzhen reached 10% for the first time in 2018, and the percentage in Hangzhou is even higher, which has been above 20% since 2015.

Seen from a national view, the added value of CCIs in Shenzhen accounted for more than 6% of the overall added value of CCIs in China, and Hangzhou's share has been above 8% since 2015.

Table 2. Development of the CCI in Shenzhen and Hangzhou.

	Added Value (100 Million Yuan)		% of the Added Value to Local GDP		% of the Added Value to the Total Value in China	
	SZ	**HZ**	**SZ**	**HZ**	**SZ**	**HZ**
2009	585.5	-	6.88	-	6.66	-
2010	740.14	-	7.35	-	6.70	-
2011	944.55	843.3	7.92	14.14	7.01	6.26
2012	1185.41	1060.7	8.78	15.07	6.56	5.87
2013	1393.04	1359.51	9.14	17.35	6.37	6.22
2014	1595.58	1607.27	9.50	16.91	6.50	6.55
2015	1801.35	2232.14	9.77	21.27	6.61	8.20
2016	2007.86	2542	9.71	21.71	6.52	8.26
2017	2244.68	3041	9.64	23.11	6.34	8.58
2018	2621.77	3347	10.38	23.39	6.37	8.13
2019	-	3735	-	24.30	-	8.42

Shenzhen-SZ; Hangzhou-HZ.

One of the typical CCI enterprise in Shenzhen is Tencent S&T (Shenzhen) Ltd. (Shenzhen, China) (https://www.tencent.com/en-us/, accessed on 22 April 2022). The company was founded in 1998 with its headquarter in Shenzhen, and has been listed on the Stock Exchange of Hong Kong since 2004. As a world-leading internet and technology company, Tencent's present business areas cover: (1) communication and social services, e.g., QQ, and Wechat; (2) video games and other digital content; and (3) other services, such as cloud computing, and advertising. Benefiting from the use of internet and information technology, Tencent has a dominant position in certain fields of CCI in China [49]. In 2021, Tencent ranked 132nd in the list of Global 500 by Fortune.

One of the typical CCI enterprise in Hangzhou is Zhejiang Huace Film Co., Ltd. (Hangzhou, China) (http://www.huacemedia.com/, accessed on 22 April 2022). The company was founded in 2005 and has been listed on the Stock Exchange of Shenzhen since 2010, known as the "Number one Stock in the field of TV series" in China. Its main business areas cover TV series, films, and relevant businesses.

Considering that there are more than 300 prefectural-level regions like Shenzhen and Hangzhou, the CCIs of the two cities hold a unique position in China. From the perspective of local development in Shenzhen and Hangzhou, the development of CCIs has a significant impact on local economics. In 2015, the percentage of the CCIs added value in Shenzhen to the local GDP reached 10%, and reached 20% in Hangzhou.

4.1. Structure of the Regional CCIs

Table 3 shows the internal structure of the CCIs in Shenzhen and Hangzhou. The structures of CCIs in Shenzhen and Hangzhou are different but share similarities at the same time. In Shenzhen, a majority of CCI enterprises come from the sub-industries of creative design (26 enterprises), high-end arts and crafts (16 enterprises), high-end printing (20 enterprises), and new media and cultural information service (18 enterprises). In Hangzhou, most CCI enterprises do business in the sub-industries of creative design (32 enterprises), animation and game (21 enterprises), cultural software (13 enterprises), new media and cultural information service (23 enterprises), and film and television (23 enterprises).

Table 3. The internal structure of the CCI in Shenzhen and Hangzhou.

	Shenzhen		Hangzhou	
	# of Enterprises	**%**	**# of Enterprises**	**%**
creative design	26	26	32	25.20
animation and game	7	7	21	16.54
high-end arts and crafts	16	16	4	3.15
high-end printing	20	20	2	1.57
digital publication	3	3	8	6.30
cultural tourism	5	5	1	0.79
cultural software	2	2	13	10.24
new media and cultural information service	18	18	23	18.11
film and television	3	3	23	18.11
Sum	100	100	127	100

In both cities, there are a large number of CCI enterprises in the sub-industries of creative design, and new media and cultural information service; the enterprises in the field of creative design do business mainly in architectural design, industrial design, advertising and brand design; and the enterprises in the field of new media and cultural information service specialize in digital media based on information and communication technology. In addition, the high-end arts and crafts industry and high-end printing industry stand out in Shenzhen, while the animation and game industry, cultural software industry and film and television industry hold a prominent position in Hangzhou.

To better understand the internal structure of the CCI, examples of the sub-industries are shown in Table 4. Several of these CCI enterprises occupy important positions in the Chinese market. In addition to the above-mentioned Tencent and Huace Film in their own fields, Chow Taiseng is a leading jewelry enterprise in China. Furthermore, several of those CCI enterprises have been listed in the stock mark, e.g., Tencent, Huace Film, Chow Taiseng, YUTO, Electronic Soul, Huamei, and Huace.

Table 4. Examples of the CCI enterprises from different sub-industries.

Name	Sub-Industry	Main Business	Location
Shenzhen Institute of Building Research Co., Ltd.	creative design	building design	Shenzhen, China
Chow Taiseng Jewelry Ltd.	high-end arts and crafts	jewelry	Shenzhen, China
Shenzhen YUTO Packaging Technology Co., Ltd.	high-end printing	packaging	Shenzhen, China
Tencent S&T (Shenzhen) Ltd.	new media and cultural information service	Software; online game	Shenzhen, China
China United Engineering Corporation Ltd.	creative design	engineering design	Hangzhou, China
Hangzhou Electronic Soul Interactive Technology Co., Ltd.	animation and game	online game	Hangzhou, China
Quantuo S&T (Hangzhou) Co., Ltd.	cultural software	software	Hangzhou, China
Zhejiang Huamei Holding Co., Ltd.	new media and cultural information service	media	Hangzhou, China
Zhejiang Huace Film Co., Ltd.	film and television	TV series; film	Hangzhou, China

4.2. Ownership of the Enterprises in CCIs

Table 5 shows the ownership distribution of the CCIs enterprises in Shenzhen and Hangzhou. In both Shenzhen and Hangzhou, the percentage of SOEs is approximately 12%, and PEs account for the highest percentage.

However, the number of FHMT enterprises in Shenzhen is 23%, which is substantially greater than that in Hangzhou. This finding highlights the differences in the two cities' economic development models: Shenzhen, as China's pioneer of the open and reform policy, benefits greatly from Hong Kong's industrial transfer, and there are relatively more enterprises owned or invested by foreign countries, Hong Kong, Macau and Taiwan. For example, another famous jewelry enterprise, the Chow Tai Fook Jewelry Shenzhen Ltd. (Shenzhen, China) is invested by its parent company in Hong-Kong.

Table 5. Ownership of the CCI enterprises in Shenzhen and Hangzhou.

Ownership	Shenzhen		Hangzhou	
	#	%	#	%
SOE	12	12.24	16	12.60
PE	63	64.29	109	85.83
FHMT	23	23.47	2	1.57
Sum	98	100	127	100

However, Hangzhou's development benefits more from its business-oriented history, and the private sector plays an important role in the region. Nearly 86% of CCI enterprises are private enterprises. The above-mentioned enterprises, Electronic Soul, Quantuo, and Huace, are all private enterprises.

5. The Role of Copyright in the Development of CCIs

5.1. The Frequent Use of Copyright

Tables 6 and 7 show the copyright registration status of the CCI enterprises in Shenzhen and Hangzhou. In Shenzhen, Shenzhen Nika Jewelry Ltd. (Shenzhen, China) registered the most general works with a number of 477, Shenzhen East Boya S&T Ltd. (Shenzhen, China) registered the most software with a number of 753; Tencent S&T (Shenzhen) Ltd. (Shenzhen, China) registered the most works (including general works and software) with a number of 1043 (Table 8). Among the 98 enterprises, 40 enterprises have registered at least one general work, 61 enterprises that register at least one software, and 74 enterprises have registered at least one general work or software.

Table 6. Copyright and other types of intellectual property (IP) in Shenzhen and Hangzhou.

		General Work	Software	Sum
Shenzhen	Max.	477	753	1043
	Min.	0	0	0
	Avg.	20.66	33.73	54.40
	S.D.	69.58	105.72	150.41
Hangzhou	Max.	197	571	579
	Min.	0	0	0
	Avg.	6.43	27.28	31.58
	S.D.	22.15	62.35	67.16

Table 7. Copyright of the CCI enterprises by sub-industry.

	Shenzhen		Hangzhou	
	General Work	Software	General Work	Software
creative design	0.88	11.31	3.72	2.78
animation and game	84.57	187.29	16.62	83.29
high-end arts and crafts	54.13	1.75	2.5	8.25
high-end printing	0.25	5.4	0	0.5
digital publication	1.5	3	0.88	24.25
cultural tourism	9.2	16.6	0	0
cultural software	13.5	159.5	2.62	40.69
new media and cultural information service	21.22	62.33	0.3	23.57
film and television	40.5	17.5	10.39	4.74

Table 8. Top-15 CCI enterprises in Shenzhen with copyright registration.

Name	Industry	Copyright		
		General Work	Software	Sum
Tencent S&T (Shenzhen) Ltd. (Shenzhen, China)	New media and cultural information service	366	677	1043
Shenzhen East Boya S&T Ltd. (Shenzhen, China)	Animation and game	125	753	878
Shenzhen Nika Jewelry Ltd. (Shenzhen, China)	High-end arts and crafts	477	8	485
Shenzhen Seventh Road S&T Ltd. (Shenzhen, China)	Animation and game	178	122	300
Huaqiang Fangte(Shenzhen) Animation Ltd. (Shenzhen, China)	Animation and game	235	12	247
Shenzhen Zhuozhuang Internet Ltd. (Shenzhen, China)	Cultural software	27	213	240
Shenzhen Chuangmeng Tiandi S&T Ltd. (Shenzhen, China)	Animation and game	21	168	189
Shenzhen Zhongqingbao Hudong Internet Ltd. (Shenzhen, China)	Animation and game	0	159	159
Chow Taiseng Jewelry Ltd. (Shenzhen, China)	High-end arts and crafts	126	2	128
Shenzhen Aidier Jewelry Ltd. (Shenzhen, China)	High-end arts and crafts	128	0	128
Shenzhen Huaqiaocheng Cultural Tourism S&T Ltd., China	Cultural tourism	42	83	125
Shenzhen Xunlei Internet technology Ltd. (Shenzhen, China)	New media and cultural information service	8	107	115
Huaqiang Fangte (Shenzhen) Film Ltd. (Shenzhen, China)	Film and television	79	34	113
Caixun S&T Ltd. (Shenzhen, China)	Cultural software	0	106	106
Shenzhen Bingchuan Internet Ltd. (Shenzhen, China)	Animation and game	7	71	78

In Hangzhou, Hangzhou Xuanji S&T Information Technology Ltd., China registers the most general works with a number of 197; Hangzhou Bianfeng Internet technology Ltd., China registers the most software, with a number of 571 (Table 9). Among the 127 CCI enterprises, 56 have registered at least one general work, 80 have registered at least one software, and 95 have registered at least one general work of software.

Table 9. Top-15 CCI enterprises in Hangzhou with copyright registration.

Name	Industry	Copyright		
		General Work	Software	Sum
Hangzhou Bianfeng Internet technology Ltd. (Hangzhou, China)	Animation and game	8	571	579
Hangzhou Zhexin Information technology Ltd. (Hangzhou, China)	Animation and game	6	347	353
Hangzhou Xuanji S&T Information Technology Ltd. (Hangzhou, China)	Film and television	197	12	209
Hangzhou Dianhun Internet S&T Ltd. (Hangzhou, China)	Animation and game	68	105	173
Hangzhou Fuyun Internet S&T Ltd. (Hangzhou, China)	Animation and game	36	83	119
Tiange S&T (Hangzhou) Ltd. (Hangzhou, China)	Cultural software	4	109	113
Hangzhou Yitao Cultural Creatice Ltd. (Hangzhou, China)	Creative design	110	0	110
Hangzhou Zhangdong S&T Ltd. (Hangzhou, China)	Animation and game	3	94	97
Hangzhou Pingzhi Information technology Ltd. (Hangzhou, China)	Digital publication	0	96	96
Hangzhou Zhangmeng Software Ltd. (Hangzhou, China)	Animation and game	3	93	96
Zhejiang Panshi Information technology Ltd. (Hangzhou, China)	New media and cultural information service	1	94	95
Hangzhou Meisheng Game Technology Development Ltd. (Hangzhou, China)	Animation and game	35	54	89
Hangzhou Danghong S&T Ltd. (Hangzhou, China)	Cultural software	0	86	86
Hangzhou Feiqi S&T Ltd. (Hangzhou, China)	Animation and game	25	52	77
Hangzhou Legang S&T Ltd. (Hangzhou, China)	Animation and game	4	69	73

Specifically, these CCI enterprises use suitable copyrights to protect their innovations and support their business. As an online media server, Tencent uses both software and general work to protect the content, online applications and characters (Table 8). As online game producers, Shenzhen East Boya, Bianfeng Internet and Zhexin Information use software frequently (Tables 8 and 9).

5.2. The Integration of Copyright and Other Types of Intellectual Property (IP)

Table 10 shows that, apart from copyright, other types of IP, including patent, trademark and domain, are also frequently used.

Table 10. Other types of intellectual property (IP) in Shenzhen and Hangzhou.

		Patent				Trademark	Website
		Invention	Utility	Design	Sum		
Shenzhen	Max.	15,612	297	1171	16,833	27,090	109
	Min.	0	0	0	0	0	0
	Avg.	191.28	25.63	36.56	253.09	330.66	3.55
	S.D.	1577.20	51.38	133.21	1701.05	2733.56	11.34
Hangzhou	Max.	92	244	608	611	1291	69
	Min.	0	0	0	0	0	0
	Avg.	3.49	4.35	8.24	16.071	72.74	4.14
	S.D.	13.16	22.75	55.91	64.88	157.29	7.81

Tables 11 and 12 show the correlation analysis of copyright and other types of IP in Shenzhen and Hangzhou, respectively. In Shenzhen, Table 11 shows that both general work and software are significantly correlated with invention patent, design patent and trademark; and that software is highly correlated with the registration of websites.

Table 11. Correlation of copyright and other types of IP (Shenzhen).

	General Work	Software	Invention	Utility	Design	Trademark
software	0.4491 *					
invention	0.5024 *	0.6235 *				
utility	−0.0654	−0.0334	0.0900			
design	0.5516 *	0.5144 *	0.8817 *	0.186		
trademark	0.5098 *	0.6273 *	0.9971 *	0.0469	0.8774 *	
website	0.169	0.7278 *	0.0043	−0.0362	0.0017	0.0102

* significance at 0.01 level.

Table 12. Correlation of copyright and other types of IP (Hangzhou).

	General Work	Software	Invention	Utility	Design	Trademark
software	0.0483					
invention	0.0393	0.165				
utility	−0.0438	−0.0416	0.4956 *			
design	−0.0015	−0.0318	−0.0240	0.0514		
trademark	0.198	0.197	0.212	0.0079	0.216	
website	0.0654	0.7345 *	0.122	−0.0673	−0.0510	0.2326 *

* significance at 0.01 level.

Patent is a reflection and measurement of technological innovation, and the above correlation reveals that CCIs are using technologies. This is also supported by national statistics on the granted patents in CCI areas in China (Table 13), which shows that the number of patents, particularly invention patents, has increased dramatically in recent years. After checking the status of the CCI enterprises one by one, it is found that 49 enterprises out of 98 in Shenzhen are national High-Tech Enterprises, accounting for 50% of all enterprises. This concludes that technology is playing an important role in the development of CCIs, and their integration is deepening.

Table 13. Granted patents of CCIs in China.

	Invention	Utility	Design	Total Patents
2008	1983	10,769	20,015	32,767
2009	3898	10,754	31,415	46,067
2010	4378	16,947	42,880	64,205
2011	5588	20,277	36,329	62,194
2012	6491	24,281	51,997	82,769
2013	5746	30,463	54,117	90,326
2014	6652	23,923	40,729	71,304
2015	9324	32,785	52,543	94,652
2016	12,042	36,356	53,097	101,495
2017	13,645	41,070	63,717	118,432
2018	18,729	61,189	62,986	142,904
2019	22,384	59,785	71,099	153,268
2020	27,327	88,455	85,950	201,732

Source: China Statistical Yearbook on Culture and Related Industries 2021.

This phenomenon can also be explained by looking at the business model of the CCIs. Table 14 shows the top 10 CCI enterprises that have applied for the most patents in Shenzhen and Hangzhou. These enterprises accounted for most of the patents in the CCI area. In Shenzhen, enterprises in the field of new media and cultural information service file the most inventions, and the development of these enterprises depend highly on both information technologies and copyright; enterprises in the field of high-end arts and crafts file the most designs, because this type of patent, together with copyright, can better protect their products.

Table 14. Top-10 CCI enterprises in patent application.

		Shenzhen	Hangzhou
Invention	Sub-industry of CCI	new media and cultural information service (5) high-end printing (3) cultural software (1) creative design (1)	new media and cultural information service (3) creative design (2) animation and game (2) cultural software (2) digital publication (1)
	% of the patent from the top-10 to the patent from the sample	95.61	84.42
Utility	Sub-industry of CCI	high-end printing (4) new media and cultural information service (3) creative design (3)	creative design (8) high-end printing (1) high-end arts and crafts (1)
	% of the patent from the top-10 to the patent from the sample	58.52	92.34
design	Sub-industry of CCI	high-end arts and crafts (6) new media and cultural information service (4)	creative design (5) animation and game (2) high-end arts and crafts (2) cultural software (1)
	% of the patent from the top-10 to the patent from the sample	82.83	95.8

However, the correlation relationship between copyright and other types of IP in Hangzhou is not significant (Table 12); I also find that 52 enterprises out of the 127 enterprises in Hangzhou are national High-Tech Enterprises, accounting for 41%. This implies that CCI development routines differ in different cities.

5.3. Judicial Protection as an Important Way to Use Copyright

Tables 15 and 16 show the copyright litigations of the ICC enterprises in Shenzhen and Hangzhou, respectively. Among the 98 CCI enterprises in Shenzhen, 19 have experience with copyright litigation. Huaqiang Fangte (Shenzhen) Animation Ltd. (Shenzhen, China) is involved in 1803 copyright litigations and acts as plaintiffs in all of those suits; Shenzhen Xunlei Internet technology Ltd. (Shenzhen, China) is involved in 735 copyright litigations and acts as a plaintiff in 580 of them; Tencent S&T (Shenzhen) Ltd. (Shenzhen, China) is involved in 216 copyright litigations and acts as a plaintiff in 144 of them. It is also found that the majority of the copyright lawsuits are settled instead of going to court judgment, and the plaintiffs win the majority of the judged litigations. Taking Tencent as an example, Tencent is the owner and operator of the popular communication software Wechat. In 2018, Tencent found that some chatting emojis were used by another software application without licensing, and filed a lawsuit in the court and won the case (The code of the case is (2019) Jing 0491 Civil No. 16794.).

Table 15. Copyright litigation of the CCI enterprises in Shenzhen.

	All Litigations		**Terminated Litigations**			
	#	**# as Plaintiff**	**#**	**# as Plaintiff**	**# as Plaintiff and Win**	**# as Defendant and Lose**
Huaqiang Fangte (Shenzhen) Animation Ltd. (Shenzhen, China)	1803	1803	537	537	465	0
Shenzhen Xunlei Internet technology Ltd. (Shenzhen, China)	735	580	176	253	239	13
Tencent S&T (Shenzhen) Ltd. (Shenzhen, China)	216	144	24	24	24	0
Shenzhen Zhuozhuang Internet Ltd. (Shenzhen, China)	93	0	30	0	0	30
Shenzhen Chuangwei Digital Technology Ltd. (Shenzhen, China)	5	0	0	0	0	0
Shenzhen Chuangmeng Tiandi S&T Ltd. (Shenzhen, China)	4	1	1	0	0	1
Shenzhen Zhongqingbao Hudong Internet Ltd. (Shenzhen, China)	4	0	2	0	0	2
Shenzhen Tianwei Video Ltd. (Shenzhen, China)	4	0	1	0	0	1
Shenzhen Architecture Design Research Ltd. (Shenzhen, China)	3	3	1	1	1	0
Shenzhen World Window Ltd. (Shenzhen, China)	3	0	0	0	0	0
Chow Taiseng Jewelry Ltd. (Shenzhen, China)	2	0	1	0	0	1
Huaqiang Fangte (Shenzhen) Film Ltd. (Shenzhen, China)	1	1	1	1	1	0
Yachang Culture (group) Ltd. (Shenzhen, China)	1	1	0	0	0	0
Shenzhen Tianbao Broadcast TV Internet Ltd. (Shenzhen, China)	1	0	1	0	0	1
Shenzhen Dangnali Printing Ltd. (Shenzhen, China)	1	0	1	0	0	1
Shenzhen Zhenai Internet Information technology Ltd. (Shenzhen, China)	1	0	0	0	0	0
Bozhu Design Ltd. (Shenzhen, China)	1	0	0	0	0	0
Shenzhen Yuehao Jewelry Ltd. (Shenzhen, China)	1	0	0	0	0	0
Shenzhen East Jinjue Jewelry Ltd. (Shenzhen, China)	1	0	0	0	0	0

Table 16. Copyright litigation of the CCI enterprises in Hangzhou.

	All Litigations		Terminated Litigations			
	#	# as Plaintiff	#	# as Plaintiff	# as Plaintiff and Win	# as Defendant and Lose
Huashu Media Internet Ltd. (Hangzhou, China)	223	21	22	14	6	9
Tiange S&T (Hangzhou) Ltd. (Hangzhou, China)	41	0	28	0	0	28
Migu Digital Media Ltd. (Hangzhou, China)	37	19	27	17	17	10
Hangzhou Fengxia Internet S&T Ltd. (Hangzhou, China)	27	0	2	0	0	2
Hangzhou Bianfeng Internet technology Ltd. (Hangzhou, China)	17	0	0	0	0	0
Boku Internet Media Group Ltd. (Hangzhou, China)	16	0	1	0	0	0
Hangzhou Gig-head Son Cultural Development Ltd. (Hangzhou, China)	8	7	8	7	7	1
Hangzhou East Wangsheng S&T Ltd. (Hangzhou, China)	6	0	0	0	0	0
Zhejiang Panshi Information Technology Ltd. (Hangzhou, China)	3	2	2	2	2	0
Hangzhou Qianyue Information Technology Ltd. (Hangzhou, China)	3	2	0	0	0	0
Zhejiang Xinhua Mobil Media Ltd. (Hangzhou, China)	3	0	0	0	0	0
Hangzhou Kuaifang Media Ltd. (Hangzhou, China)	2	1	1	0	0	1
Hangzhou Qude Internet Technology Ltd. (Hangzhou, China)	2	0	1	0	0	1
Hangzhou Xijiang Cultural Creative Ltd. (Hangzhou, China)	2	0	1	0	0	1
Hangzhou Pingzhi Information Technology Ltd. (Hangzhou, China)	2	0	0	0	0	0
Hangzhou Meisheng Game Technology Development Ltd. (Hangzhou, China)	2	0	0	0	0	0
Hangzhou Feizhu S&T Ltd. (Hangzhou, China)	2	0	0	0	0	0
Zhejiang Guchuan S&T Ltd. (Hangzhou, China)	1	1	1	1	1	0
Hangzhou Dukou Internet S&T Ltd. (Hangzhou, China)	1	1	1	1	0	0
Hangzhou Maipu Cultural Creative Ltd. (Hangzhou, China)	1	1	0	0	0	0
Hangzhou Ruide Design Ltd. (Hangzhou, China)	1	0	1	0	0	0
Zhejiang Hansanjia Cultural Art Development Ltd. (Hangzhou, China)	1	0	1	0	0	0
Hangzhou Xuanji S&T Information Technology Ltd. (Hangzhou, China)	1	0	0	0	0	0
Hangzhou Danghong S&T Ltd. (Hangzhou, China)	1	0	0	0	0	0
Hangzhou Dangbei Internet S&T Ltd. (Hangzhou, China)	1	0	0	0	0	0
Zhejiang Jinxi Film Ltd. (Hangzhou, China)	1	0	0	0	0	0
Zhejiang Sina Media Ltd. (Hangzhou, China)	1	0	0	0	0	0

In Hangzhou, 27 out of the 127 enterprises are involved in copyright litigation, but the enterprises are defendants in most of the lawsuits. Huashu Media Internet Ltd. (Shenzhen, China) is involved in the most copyright litigations, with a total of 223, yet it only files 23 lawsuits. Similar to Shenzhen, most of the copyright lawsuits in Hangzhou are settled, and the plaintiffs win frequently in cases judged by the court. With a lawsuit (The code of the case is (2012) Chao Civil No. 32654.) filed by Huashu as an example, Huashu had exclusive right of network transmission on certain TV series, and found that the series were also broadcast on another website without licensing; thus, Huashu filed a case in the court and was supported in law.

6. Concluding Remarks

The article analyzes the development of CCI and the role of copyright in China using Shenzhen and Hangzhou as cases. Representative CCI enterprises from Shenzhen and Hangzhou are identified, and enterprise information is matched using an external database to support the analysis.

It is found that city-region matters in the development of CCI. The CCI structures in the two cities share both similarities and differences: (1) Shenzhen and Hangzhou are both developed in the sub-industries of creative design, new media and cultural information service; (2) Shenzhen is advantaged in high-end arts and crafts, high-end printing, while Hangzhou is advantaged in animation and game, cultural software industry, film and television; (3) Shenzhen has more FHMT enterprises, while Hangzhou is rich in domestic private enterprises. Concerning copyright, the majority of CCI enterprises in Shenzhen (74 out of 98) and Hangzhou (95 out of 127) have experience with copyright registration. In Shenzhen, enterprises who frequently use copyright come mainly from the sub-industries of creative design, new media and cultural information service, high-end arts and crafts, and high-end printing (Table 6); in Hangzhou, the CCI enterprises that use copyright come mainly from the sub-industries of animation and game, new media and cultural information service, film and television, and creative design (Table 8). These findings are in line with the logic of regionalism [50–52], arguing that city-regions are the key units in the national and global economy. Previously, Liang and Wang [12] traced the development of CCIs in China and paid special attention to urban development, and noticed the spatial characteristics of CCI. Thus, the implication for policy-makers and practitioners concerning CCI is that regional factors (e.g., location, history, culture, etc.) should be considered when making decisions.

CCI enterprises are applying a holistic IP strategy. Copyright is highly correlated with other types of IP, meaning that those enterprises that are using copyright are also frequently using patents, trademarks, etc. This finding is in line with prior conclusions arguing that different types of IP together can coordinate and complement as a whole to bring about better benefits [53,54]. Recently, the rapid progress of new emerging technologies, particularly the development and application of the internet and communication technology, not only poses challenges to copyright protection, but also promotes CCI development, and an increasing number of CCI enterprises rely on technology to develop. The findings to some degree challenge the previous conclusion by Montgomery and Potts in 2008 [35]. In their paper, they argued that a weak IP regime is evolutionarily superior to a strong one, in that it advances operational value over the prospects of global value added, over the incentive to reuse ideas and business model adaptation [35]. They concluded that the creative industries in China have far less reliance on IP, but the present paper finds that CCI enterprises are making use of copyright as well as other types of IP.

Filing copyright lawsuits has become a popular way of enforcing copyright. Filing lawsuits is an important strategy for enterprises to use IP, including copyright. The practice in Shenzhen and Hangzhou shows that, some CCI enterprises actively file lawsuits, and some are accused of infringing on others' copyright. This indicates that the majority of them have strengthened their awareness of using copyright. At the same time, the large number of copyright lawsuits shows the efficacy of China's court system and the fierce competition of the CCI. The findings supplement the research by Pager [22], who wrote that "Until recently, copyright law played little or no role in China's content industries. However, this has begun to shift." It has been agreed that IP in most countries have been and will continue to dynamically change [55–57], and the IP protection in China has been improved a lot in the past years [58]. As a result, how enterprises and industries use IP also changes over time. This implies that scholars and practitioners have to understand the role of copyright in CCI using a dynamic perspective.

The study makes three contributions to theory. First, prior studies on CCI [59–61] lack an empirical focus on CCIs, and this paper uses practical evidence to depict the model and characteristics of CCIs by analyzing select enterprises from CCIs. Second, regions and cities

are important units of the economy [50]. Considering the disparity of regional resource endowment, the development of CCI can be affected by regional characteristics [39]. It is necessary to conduct an analysis at the regional level [62], and this paper contributes to the knowledge about how CCIs develop, and how CCIs motivate regional development. Third, in a creative economy and knowledge economy era, copyright becomes more closely related to CCI [40], and this paper investigates the exact role of copyright; at the same time, using China as the context, the research adds knowledge about the role of IP or copyright in CCI in developing countries [22].

This work has some limitations and needs to be studied in the future. First, copyright can be protected with or without registration. In practice and in law, the protection of copyright is not based on registration, while the unregistered part is not observed; thus, there should be more enterprises using copyright. This article only considers registered copyrights since there is no available data on the unregistered copyright. How unregistered copyright is related to CCI needs to be explored by conducting interviews in the future. Second, two typical cities are selected as cases, and more regions need to be analyzed to test the findings; however, the present work provides an analytical method. Third, I only analyze select CCI enterprises that are identified via official publications from the local governments. These enterprises are recognized by the government because they are performing well in sales or income, and they contribute to a majority of the CCI. However, the relationship between small CCI enterprises and copyright is also of interest, these enterprises may not generate too much added value but are rich in number and are important in the local economy.

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