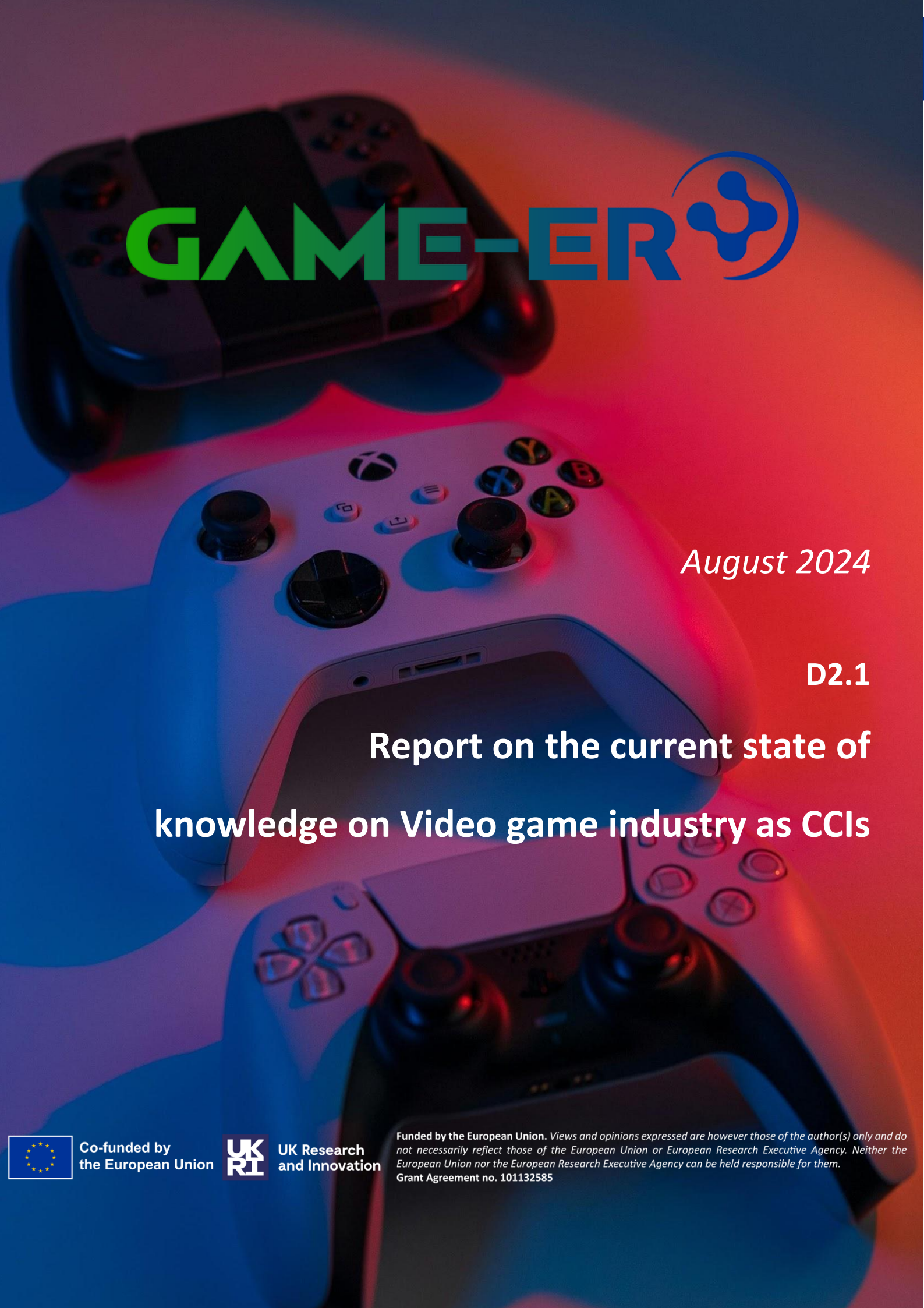

GAME-ER

August 2024

D2.1

Report on the current state of knowledge on Video game industry as CCIs

Co-funded by the European Union

UK Research and Innovation

Funded by the European Union. *Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency. Neither the European Union nor the European Research Executive Agency can be held responsible for them.*
Grant Agreement no. 101132585

Project Details

Acronym: **GAME-ER**
Title: Gaming Clusters Across Multiple European Regions Project
Coordinator: **INOVA+ - INNOVATION SERVICES, SA** (Portugal)
Call: HORIZON-CL2-2023-HERITAGE-01
Type: HORIZON Research and Innovation Actions
Topic-ID: HORIZON-CL2-2023-HERITAGE-01-06

Start: **1 March 2024**
End: **28 February 2027**
Duration: **36 months**
Website: www.game-er.eu

Consortium:

No	Participant Name	Short Name	Country
1	INOVA+ - INNOVATION SERVICES, SA	INOVA+	Portugal
2	UNIVERSITÀ DEGLI STUDI DI TORINO	UNITO	Italy
3	ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS	CRG	France
3.1	ECOLE POLYTECHNIQUE	EP	France
4	ASOCIACE CESKYCH HERNICH VYVOJARU ZS	GDACZ	Czech Republic
5	SPIN SYSTEM	SPIN	Belgium
5.1	NOVARECKON	NR	Italy
6	UNIVERZITA KARLOVA	CUNI	Czechia
7	OGR-CRT - SCPA	OGR-Torino	Italy
8	PLUG AND PLAY PLATFORM SPAIN SL	PNPTC	Spain
9	KLASTER HRVATSKIH PROIZVODACA VIDEOIGARA	CGDA	Croatia
10	GAME ONLY	GO	France
11	HERNÍ KLASTR Z.S.	HK	Czech Republic
12	MUNICIPIO DO FUNDÃO	CMF	Portugal
13	THE UNIVERSITY COURT OF ABERTAY UNIVERSITY	AU	United Kingdom

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency. Neither the European Union nor the European Research Executive Agency can be held responsible for them.

Grant Agreement no. 101132585.

© Partners of the GAME-ER Consortium, 2024

Acknowledgements

This deliverable was developed based on collective efforts from all partners of the GAME-ER consortium.

Deliverable Details

Number:	**D2.1**
Title:	**Report on the current state of the knowledge on Video game industry as CCIs**
Lead beneficiary:	**UNITO**
Work package:	WP2
Dissemination level:	**Public**
Nature:	**R**: Document, report (excluding the periodic and final reports)
Due date:	31/08/2024
Submission date:	30/08/2024
Authors:	**Enrico Eraldo Bertacchini**, University of Turin **Cecilia Maronero**, University of Turin **Pier Paolo Patrucco**, University of Turin
Reviewers:	**Thomas Paris**, Centre de Recherche en Gestion (CRG), École Polytechnique **Chahira Mehouachi**, Institut Supérieur de Gestion (ISG) **Stefano de Paoli**, University of Abertay **Luís Leça**, INOVA+

Version History:

Date	Version No.	Author	Note
26/07/2024	**0.1**	Thomas Paris, Chahira Mehouachi, **CRG**	First revision and input provided
05/08/2024	**0.2**	Stefano de Paoli, **UA**	Scientific Revision and input provided
09/08/2024	**1.0**	Enrico Bertacchini, Cecilia Maronero, Pierpaolo Patrucco, **UNITO**	Integration of inputs and final version sent for final revision and submission.
30/08/2024	**1.1**	Luís Leça, **INOVA+**	Revision of the final version and submission.

Glossary and Abbreviations

Augmented Reality	**AR**
Cultural and creative clusters	**CCC**
Cultural and creative industries	**CCI**
Creative cluster research	**CCR**
Creative economy research	**CER**
Department of Culture Media and Sports	**DCMS**
Directorate-General for Communications Networks, Content and Technology	**DG Connect**
Directorate-General for Education, Youth, Sport and Culture	**DG EAC**
Digital Software Incorporated	**DSI**
Department for Science, Innovation and Technology	**DSIT**
Electronic Arts	**EA**

Electronic games sports	**EGS**
European Game Developers Federation	**EGDF**
European Union	**EU**
Electronic sports	**Esports**
Hierarchical Density-Based Spatial Clustering of Applications with Noise	**HDBSCAN**
Information and communication technology	**ICT**
Large Language Models	**LLMs**
Location Quotient	**LQ**
Multiple Country Publications	**MCP**
Nomenclature statistique des activités économiques dans la Communauté européenne	**NACE**
National Endowment for Science, Technology and the Arts	**NESTA**
Nomenclature of Territorial Units for Statistics	**NUTS**
Research and Development	**R&D**
Regional Innovation System	**RIS**
Real Time Industry Classification	**RTIC**
Single Country Publications	**SCP**
Standard Industrial Classification	**SIC**
Small and medium-sized enterprises	**SMEs**
Software, video game development and editing electronics	**SVE**
Travel to Work Areas	**TTWAs**
United Nations Conference on Trade and Development	**UNCTAD**

United Nations Educational, Scientific and Cultural Organization	**UNESCO**
World Intellectual Property Organization	**WIPO**
Web of Science	**WoS**
Virtual Reality	**VR**

Table of Contents

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The **GAME-ER** project aims to understand the spatial organisation and clustering dynamics of the video game industry in Europe, focusing on local and regional clusters outside major cities. This report responds to the objectives of the **GAME-ER** project by addressing the following research questions:

1) *What is the state of knowledge on the video game industry in Europe, its classification in comparison to other sectors, and the challenges in mapping the industry on a regional level?*

2) *What are the main interpretative building blocks for analysing the determinants of cluster formation and evolution in innovative and creative sectors?*

3) *To what extent the academic literature on the video game industry has addressed the analysis of clusters and the territorial dimension?*

Guided by these questions, the report is divided into three parts. The first part situates the European video game industry within the creative economy debate, highlighting the existing issues with industry classification and quantitative spatial mapping, and noting the promise of new data-driven approaches for spatial mapping. The second part illustrates key analytical dimensions relevant to interpret cluster formation, their structure and characteristics. The third part reviews academic literature to assess the focus on video game clusters and gather insights on studied clusters.

This deliverable sets the foundation for the **GAME-ER** project's conceptual and empirical assessments, providing a basis for future quantitative and qualitative research on video game clusters at the European regional level.

1. INTRODUCTION

The overall ambition of the **GAME-ER** project is to provide a comprehensive understanding of the spatial organisation and clustering dynamics of the video game industry in Europe, focusing on the local and regional clusters emerging outside capital cities and large metropolitan areas.

Academic research has long emphasised the tendency of innovative and creative sectors to geographically concentrate and form clusters (*Lazzeretti et al., 2008; Garcia and Bakhshi, 2016; Burlina et al., 2023*). Several studies have explored the spatial concentration of creative firms and workers in the music industry (*Scott, 1999; Watson, 2008; Florida et al., 2010; Hracs, 2015),* media and publishing (*Bathelt and Boggs, 2003; Heebels and Boschma, 2011*), film and television (*Turok, 2003; Durmaz et al., 2010; Berg, 2015; Chapain and Stachowiak, 2017),* fashion (*Wenting 2008; Williams et al., 2011; Casadei and Lee, 2019*), and design (*Bertacchini and Borrione, 2013*). Compared to other innovative and creative sectors—and despite its unique blend of creativity, software and potential for technological spillovers (*Lê et al., 2013; Ukie, 2023*)—the video games industry has not received a comparable degree of attention in the academic field. Consequently, the resulting knowledge appears fragmented and there has so far been very limited systematic research aiming at reviewing these scholarly contributions.

More generally, beyond the research stream devoted to industrial clusters (*Cruz and Teixeira, 2010; Hervas-Oliver et al., 2015*), only limited efforts have been put forward in the attempt of systematising the abundant and "fuzzy" literature on the specific cultural and creative industries (CCIs) clusters (*Mommaas, 2009*). Specifically, only a handful of contributions provide overarching reviews of creative economy research (CER) (*Lazzeretti et al., 2017, 2019*), clustering of creative industries (*Gong and Hassink, 2017*) cultural and creative clusters (CCC) (*Chapain and Sagot-Duvauroux, 2020*), and creative cluster research (CCR) (*Casadei et al., 2023*).

This report responds to the objectives of the **GAME-ER** project by addressing the following research questions:

1) What is the state of knowledge on the video game industry in Europe, its classification in comparison to other sectors, and the challenges in mapping the industry on a regional level?

2) What are the main analytical dimensions to investigate clusters in innovative and creative sectors?

3) To what extent the academic literature on the video game industry has addressed the analysis of clusters and the territorial dimension?

Although interconnected, answering these questions requires leveraging different knowledge domains and sources. A first domain concerns the contextualization of the industry in the broader European debate of the creative economy paradigm, with references to the approaches developed over the past two decades to map the macro-sector of cultural and creative industries (CCIs), and to the attempts made to map its geographic organisation.

The second domain relates to existing scholarship investigating the factors and conditions that favour the emergence and evolution of clusters in creative and innovative sectors and the relevant features that allow the characterization of them. The last domain can be finally explored by analysing the literature on the video game industry to understand existing gaps in video game cluster research.

Following this tripartite approach, the report is structured in three main parts. The **first part** (Section 2) contextualises the **Video Game Industry in Europe** within the broader creative economy debate. Mainly relying on policy reports and documents, this part explores to what extent the European video game industry has been recognized and classified within the creative economy macro-sector and the efforts made to measure and spatially map the industry.

The **second part** of the report (Section 3) draws on the extensive and multidisciplinary literature on clusters to provide an **overview of key analytical dimensions**. It explores approaches explaining cluster formation, considering agglomeration economies and spin-off dynamics. Types of resources pooled within clusters, proximity factors and the role of innovation are also analysed as specific characteristics that shape clustering in innovative and creative sectors. Far from being an exhaustive review of the literature, this part aims rather at providing an initial interpretative framework on which the partners of the **GAME-ER** project can build upon in the analysis of clusters.

Finally, the **third part** (Section 4) leverages on a scoping literature review of the academic scholarship to identify to what extent the **analysis of video game clusters** is central in the academic literature and draw insights into the clusters that have been so far studied. Fifty-one studies are identified addressing specific video game clusters at the global level. As for European clusters, the analysis reveals how the extant literature has generally analysed the bigger and highly structured metropolitan clusters of London, Paris, Helsinki and Hamburg, but also a number of cases localised in cities of smaller size. Based on the cases reviewed, a preliminary discussion of key patterns characterising video game clusters is conducted.

In summary, this deliverable provides an examination of the state-of-the-art of the research on the video game industry as a CCI, focusing on the theoretical and methodological challenges in mapping this sector at the spatial level and studying its clustering patterns. In doing so, this deliverable aims to establish the context within which the **GAME-ER** project will develop its own conceptual and empirical assessments, thus providing the knowledge base to validate the methodological approaches helpful in studying video game clusters that will be performed in subsequent tasks and WPs. In particular, Section 2 in the current deliverable aims to offer insights for the development of quantitative spatial mapping of gaming companies at the European regional level and the related clusters (T2.2). At the same time, the analysis of the literature on the factors characterising the clusters of innovative and creative industries (Section 3), and the more detailed evidence collected on video game clusters (Section 4), provide an essential knowledge base that will inform the qualitative research activities of **WP3** and **WP4** on the case studies of the **GAME-ER** project.

2. MAPPING THE VIDEO GAME INDUSTRY IN EUROPE

The video games industry is emerging as a rapidly growing and dominant sector within the creative economy. This industry exhibits distinctive characteristics as it incorporates elements from both the software and the artistic creations sector (*O'Donnell, 2011*), sharing similarities with other CCIs. On the creation side, game development is a project-based collaborative process involving numerous disciplines, of which creative, design and artistic skills are relevant factors for innovation (*de Vaan and Stark, 2015a)*. Video games also share business models and digital consumption challenges very close to that of other CCIs, such as the publishing or audio-visual sectors *(Marchand and Hennig-Thurau, 2013*).Given its growing importance in the European context, in the last two decades, an increasing number of commissioned reports and policy documents have addressed several dimensions of the video game industry, including its economic and societal relevance and its pivotal role in fostering innovation and stimulating regional development.

In this section, a contextualisation of the industry in the broader debate of the creative economy paradigm at the European level is provided. In addition, a revision of the key documents and reports is made, offering evidence on how the video game sector has been defined and investigated within the aggregate of cultural and creative industries. Moreover, it is also highlighted the current challenges in measuring its economic size and the efforts made to map the spatial organisation of the sector.

2.1 The video games industry within the cultural and creative sectors

Under the broad umbrella term of "Creative and cultural industries" (CCIs), various and thriving sectors of the modern economy exist. Although the emergence of the term "creative industries" dates back to 1994 with the launching in Australia of the report "Creative Nation" (*UNCTAD, 2010*), a first formal definition of CCIs was provided by the UK Government's Department of Culture Media and Sports (DCMS), which describes them as: "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (*DCMS, 1998, 2001*). Since then, these industries, which provide a key contribution to economic growth and regional development, have witnessed considerable policy and academic attention, with a renewed interest in the recent years (*KEA and PPMI, 2019; European Commission, 2021; Salvador and Benghozi, 2023; Interreg Europe, 2024*).

With the emergence of the cultural and creative economy debate (*UNESCO, 1996*), one of the first issues addressed within the debate has involved how to define the boundaries of this fluid macro sector of the economy and which industries and activities to include (*UNESCO, Creative Economy Report, 2013).* By reviewing the main classification approaches proposed over time, as highlighted in blue in Table 1, it is possible to obtain a first insight as to how the video game industry has been conceptualised within the framework of the cultural and creative sectors.

Table 1 - The video game industry within CCIs classification systems

1. UK DCMS model (1998)	2. WIPO Copyright Model (2003)		3. KEA Concentric Circle Model (2006)	4. UNESCO Institute for Statistics Model (2009)	5. UNCTAD Creative Economy Model (2010)
Advertising, Architecture, Arts and antiques market, Crafts, Design, Fashion, Film and video, **Interactive leisure software**, Music, Performing arts, Publishing, Software and computer services, Television and radio	***a) Core copyright industries:*** Advertising, Collecting societies, Film and video, Music, Performing arts, Publishing, **Software and databases**, Television and radio, Visual and graphic art ***c) Partial copyright industries:*** Architecture, Clothing/Footwear, Design, Fashion, Household goods, Toys	***b) Interdependent copyright industries:*** Blank recording material, Consumer electronics, Musical instruments, Paper photocopies, Photographic equipment	***a) Core arts fields:*** Visual arts, Performing arts, Heritage, ***b) Cultural Industries:*** Film and Video, Television and Radio, **Video Games**, Music, Book and Press ***c) Creative Industries and Activities:*** Design, Architecture, Advertising	***a) Industries in core cultural domains:*** Museums, galleries and libraries, Performing arts and festivals, Visual arts, Crafts and design, Publishing, Television and radio, Film and video, Photography, **Interactive media** ***b) Industries in expanded cultural domains:*** Musical instruments, Sound equipment, Architecture, Advertising, Printing equipment, Software, Audiovisual hardware	***a) Heritage and Arts:*** Cultural sites, Traditional cultural expression, Visual arts, Performing arts ***b) Media:*** Audiovisual, Publishing and printed media ***c) Functional creations:*** Design, **New Media**, Creative services

Source: Authors' own elaboration.

In general, the video game industry has been recognized as an integral part of the macro sector of the creative economy since the earliest elaborations of classificatory models, as evidenced by the DCMS Creative Industries Mapping Document of 1998, which considers the Interactive Leisure Software sector among the creative industries.[1]

However, in comparison to other more established and clearly delineated sectors identified in all the classification approaches, the definition and positioning of the video game industry within the CCIs have been much more heterogeneous. In some cases, this has involved emphasising the software component (as in the case of the World Intellectual Property (WIPO) model), interactivity (DCMS and UNESCO models), or including video games in a New Media category, to distinguish it from the audiovisual or traditional publishing sectors (as in the case of the UNCTAD model).

The 2006 KEA concentric circle model is particularly illustrative of the conceptual challenges in classifying the video game industry within the cultural and creative economy. Commissioned by the Directorate-General for Education and Culture (DG EAC), this report is the first pioneering effort at the European level to define and investigate the economic contribution of the macro-sector of cultural and creative industries in Europe.[2]

One of the key contributions of the report is methodological, that is delineating a workable classificatory framework for CCIs, which is partly inspired by the concentric circle model proposed by *Throsby (2008).*[3] More specifically, the centre is constituted of non-industrial cultural products, i.e. "the arts field". A first circle around this core is that of "cultural industries", which include economic activities whose output is made of cultural content. Notably, the conception, creation, and production functions in this first circle are linked to more industrial functions of manufacturing and commercialising at large scale, using material supports and communication technologies. Another distinctive feature of this circle is that economic activities heavily rely on copyright to incentivise output production and commercialisation. A second circle includes activities whose outputs are functional but that incorporate elements from the two previous layers into the production process, i.e. "creative industries and activities".

According to the KEA Concentric Model, video games are included in the classification of the Cultural Economy but discussed as a borderline sector. The report underlines that the games industry meets the criteria of "copyright" and "mass reproduction". As a result, it has been categorised as a cultural industry, although some question whether video games are "cultural products" or belong to another category of products (such as toys).

[1] https://www.gov.uk/government/publications/creative-industries-mapping-documents-1998

[2] Full report available here: https://ec.europa.eu/assets/eac/culture/library/studies/cultural-economy_en.pdf

[3] Throsby, D. (2008). The concentric circles model of the cultural industries. *Cultural trends*, *17*(3), 147-164.

The 2010 EU Commission Green Paper on CCIs has essentially adopted the classification proposed by the 2006 KEA Report, thus distinguishing between cultural and creative industries (*European Commission, 2010)*.[4] Video games are again included in the class of cultural industries, similar to book publishing, movie industry, and music:

«"Cultural industries" are those industries producing and distributing goods or services which at the time they are developed are considered to have a specific attribute, use or purpose which embodies or conveys cultural expressions, irrespective of the commercial value they may have. Besides the traditional arts sectors (performing arts, visual arts, cultural heritage – including the public sector), they include film, DVD and video, television and radio, video games, new media, music, books and press. » (page 5)

2.1.1 European reports addressing the video game industry

While the Green Paper enabled a systematisation and recognition of the cultural and creative sectors at the European level supporting the design of European policies and programs in line with this definition, the studies commissioned in subsequent years have mostly focused on capturing the complex patterns and potential of the heterogeneous activities included in this macro-sector as a whole, giving less prominence to the analysis of individual sectors, including that of Video Game.

However, some recent reports show the increasing interest at the European level for the video game industry within the cultural and creative sectors and provide key insights about its features which are partly relevant for the **GAME-ER** project objectives. For instance, the 2017 report "*Mapping the creative value chains: A study on the economy of culture in the digital age*"[5] has utilised the case of video games software as a paradigmatic example of the multi-media sector, one of the main beneficiaries of the digital developments of the CCIs (Figure 1).

[4] 2010 EU Commission Green Paper, "Unlocking the potential of cultural and creative industries" (2010): https://op.europa.eu/en/publication-detail/-/publication/1cb6f484-074b-4913-87b3-344ccf020eef/language-en

[5] 2017 EU Commission Directorate-General for Education, Youth, Sport and Culture (DG EAC), "Mapping Creative Value Chains - A study on the economy of culture in the digital age" (2017): https://op.europa.eu/en/publication-detail/-/publication/4737f41d-45ac-11e7-aea8-01aa75ed71a1

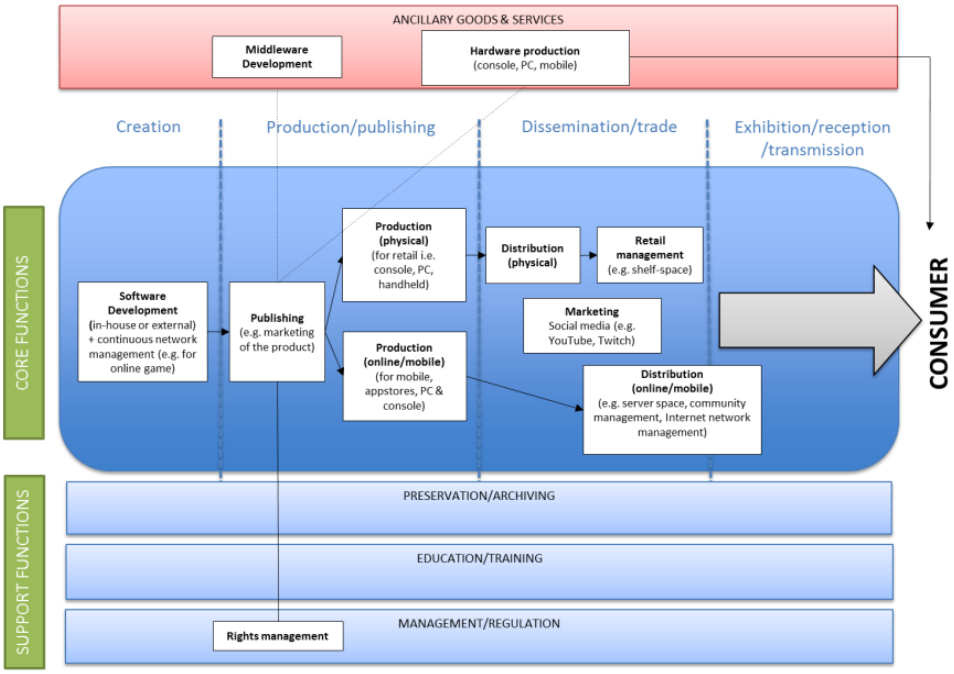

Figure 1 - Stylised value chains for multimedia (2017, DG EAC report)

***Source**:* The figure has been extracted from the 2017 "Mapping the creative value chains" report, page 195.

There are a number of key takeaways from the 2017 EU Commission DG EAC report that can inform **GAME-ER** research on factors affecting clustering dynamics and the spatial organisation of the video game industry:

- By using the value chain perspective with four core functions (Creation, Production, Dissemination/trade and Exhibition/reception), the report emphasises how developers and publishers are the two key economic actors along the video game value chain, confirming the priority of identifying and studying these players to understand the structure of the video game sector and its manifestations at territorial level.

- Although the subject is not explored in depth, the report confirms that some national differences in the value chain configuration and/or dynamics can be observed (with reference to developers specialising in different market segments, or niches, such as mobile games vs. console, AAA games, games with different monetization models, etc.). This implies that the emergence and evolution of video game clusters across regions must also be sought in the development trajectories of the video game industry at the national level, as different configurations of value chains may reflect different locational factors and conditions for spatial proximity.

- According to the report, the creation phase (Figure 1) is marked by monopolistic competition, with many developers competing against each other but selling products that are differentiated from one another, and hence not perfect substitutes. Conversely, the production/publishing phase can be described as an oligopoly with a competitive fringe, dominated by a few major publishers alongside many mid-size or small publishers. These major publishers oversee critical business activities, particularly the pre-financing of games, which necessitates substantial resources and risk-taking capabilities, thereby advantaging larger companies. This dominant position endows major publishers with significant bargaining power within the value chain.

- The study also identifies international sourcing (de-locating teams in other countries), institutional competition between national regulatory frameworks, and competition in attracting skills as key forces influencing European multimedia (and video game) value chains. It is very likely that these factors are also relevant to influence video game industry cluster dynamics.

The 2023 DG Connect report "*Understanding the value of a European video games society*" provides the most recent and comprehensive analysis of the video game industry in Europe.[6]

According to the study, as of 2023, the video games sector in Europe employs around 74,000 people across 5,000 game development and publishing studios.[7] In addition, 70% of companies in the EU video games sector employ fewer than 10 people, but the diversification of distribution platforms beyond consoles and PCs has created a space for indie games from smaller companies to flourish. Still, capital-intensive parts of the market, such as hardware manufacturers, are generally located outside the EU, and only 14 of the 100 largest publicly listed companies in the gaming sector in the world are EU27-based.[8]

Although not explicitly focusing on the spatial and territorial organisation of the video game industry, the report addresses several relevant issues that can be used to analyse video game industrial dynamics and the opportunities and challenges to support the video game industry in different European countries and regions. In particular:

[6] European Commission, Directorate-General for Communications Networks, Content and Technology, "Understanding the value of a European video games society – Final report", Publications Office of the European Union, 2023, available here: https://data.europa.eu/doi/10.2759/332575

[7] Estimates do not include the UK.

[8] https://companiesmarketcap.com/video-games/largest-video-game-companies-by-market-cap/, accessed 30th July 2024. Note: the data also include companies specialised in digital entertainment and gambling.

- The EU video game sector is mostly characterised by small to medium size companies that operate at different levels in the global video game industry, but includes some renowned global publishers and game studios, which are in many different European countries. Most of the studios develop games ranging from indie to AAA games, with a large part of the EU industry developing AA games (mid-sized games). The EU is host to some relevant developers of third-party software (game engine, a physics engine or a code compiler), which are relevant tools in the game development process.

- According to a survey conducted for the report, for European video game companies, the main perceived barriers to entry and growth in the video games sector are: (1) lack of finance, (2) strong competition and (3) lack of skilled labour. Conversely, weak supply chain/difficulty to find partners in the industry, inadequate IP protection and poor market conditions are not seen as relevant causes. Financing is a key challenge particularly for small and medium developers. The main problem lies in the fact that, unless a video games studio has already launched a successful game, it is often difficult to attract financing from traditional players, including banks. To solve these issues, studios are turning towards alternative ways of funding, such as crowdfunding projects or public loans and grants.

- In terms of attractiveness, the two key strengths of the EU market are the access to public support and access to staff with the right skills. Access to an adequate consumer market and to a strong supply chain are not perceived either as key elements of the EU's attractiveness or otherwise. On the other hand, one of the main problems highlighted in the study by European video game companies is access to private finance.

2.1.2 Other documents addressing the Video Game sector in European countries

Beyond official and commissioned reports by European Institutions, there are other sources of data and studies that help to build a knowledge base on the European video game industry's spatial organisation, at least at the national level.

The European Game Developers Federation (EGDF)[9] publishes annual key facts about the video game industry at the European level, providing a comparative view of the sector in terms of companies and employees between different countries. The data used in these annual reports generally comes from surveys produced by national game developers and publishers' associations.[10]

[9] Available at https://www.egdf.eu/category/data-studies/

[10] This type of data has been used by the 2023 European report to estimate the size of the sector.

At the national level, beyond annual surveys produced by game developers and publishers' associations, some white paper reports endorsed by national governments and ministries have been released in some countries (Spain, Ireland), providing a more comprehensive analysis of the sector structure, trends and challenges at the national level.

Looking at other international organisations interested in the video game sector, it is worth to mention the WIPO Report 2024 "*Making Innovation Policy Work for Development*",[11] which has used the video game industry to study the importance of leveraging local know-how to develop innovative capabilities and considered two European video game hubs, Poland and Finland, as paradigmatic case studies.

Compared to other more established hubs, such as the United States and Japan, Finland and Poland are considered newer entrants into this industry, building primarily on computer art and programming hobbyist culture and translation/video game localization know-how, respectively. Poland developed its local video game industry mostly by focusing on PC and console games, and already has many AAA successes, which is rare for a newer hub. Finland has a long history of mobile games and is still a leading hub in this segment. In addition, these two countries followed separate developmental trajectories, showcasing different yet eventually successful paths for video game hub development.

In particular, in Finland, the video game industry emerged from a subculture of teenage hobbyists who created computer audiovisual demos. This grassroots innovation led to the development of a robust video game sector, characterised by creative talent and technical expertise. On the other hand, Poland's video game industry paired game translation and distribution know-how with local literature and design talent. This combination of skills enabled the country to develop a thriving video game sector.

[11] Available at https://www.wipo.int/publications/en/details.jsp?id=4724

2.2 Business statistics and industrial classification challenges in measuring the video game industry

A key issue in the spatial mapping of the video game industry and the identification of clusters is to understand to what extent it is possible to identify firms operating in the sector by means of standard industrial classifications.

The NACE (*Statistical Classification of Economic Activities in the European Community*) classification, which serves as the standard system for categorising European industries, has been long acknowledged to provide an incomplete or inaccurate coverage of the Cultural and Creative sectors in general,[12] but this limitation especially applies for the video games ecosystem, leading to a partial representation of activities within the sector (*EU Commission, 2023*). While **NACE category J58.21**, "Publishing of computer games", is directly relevant, it primarily addresses publishing and overlooks other essential aspects such as development, artistic direction, music creation, and distribution (EU Commission, 2023). Eurostat's 2019 statistics for category J58.21 encompass various metrics such as the *number of enterprises, turnover, production value, and value-added*. Sections R (Arts, entertainment, and recreation) and J (Information and Communication), which could potentially include relevant data for video games, do not provide specific references to the industry (*EU Commission, 2023*).

According to the European Game Developers Federation (EGDF),[13] as game developers do not identify themselves as game publishers (meaning, companies that focus strictly on publishing third-party video games), studios developing games often end up registering themselves under other industrial classifications, such as, under **62.0.1** – Computer programming activities, **R90.0.3** – Artistic creation, **C32.4.0** – Manufacture of games and toys, **R93.1.9** – Other sports activities, **R93.1.9** – Other sports activities **J62.0.2** – Computer consultancy activities, **J63.1.2** – Web portals, **M72.2.0** – Research and experimental development on social sciences and humanities, **P85.6** – Educational support activities.

[12] Measuring CCS Consortium (2020) Final Report - Measuring the Cultural and Creative Sectors in the EU, available at https://www.measuring-ccs.eu/the-measuring-ccs-consortium-publishes-the-final-report/

[13] EGDF (2021). EGDF position on the games industry statistical classification (NACE code) Available at: https://www.egdf.eu/wp-content/uploads/2021/04/202004-EGDF-position-on-the-games-industry-statistical-classification-NACE-code.pdf

In a few countries, such as in the UK, within the NACE category **62.0.1** – Computer programming activities, a five-digit SIC code has been expressly added (62.0.1.1) to account for enterprises whose main economic activity is "Ready-made interactive leisure and entertainment software development". This finer classification, although possibly useful for measuring more accurately the number of video game companies in a country, is however not useful for comparative analyses at European level, as official statistics remain at the four-digit level.

The measurement problem of the video game sector is further compounded at the regional level, where the official statistics collected by Eurostat on the number of enterprises are limited to two digits of the standard industry classification, rendering analysis impractical. Indeed, in the case of the publishing of computer games (NACE J5821), this activity is included in NACE code J58, corresponding to the broader category of publishing activities.

To overcome the limitations imposed by standard industrial classifications to accurately identify firms operating in complex and innovative industries, more data-driven and web-based approaches have been proposed and tested, with particular reference to the UK context.

The 2014 NESTA report "*A Map of the UK Games Industry*" (*Mateos-Garcia et al., 2014*) has developed a methodology that combines web sources with business registries to identify and map the companies operating across different segments of the video games value chain in the UK (i.e., developers, publishers, distributors, etc.). Data on video game companies has been collected through web directories with information about video games titles, developers and publishers, and other websites covering the video games industry.[14] By using validated data scraping and text matching techniques, the name of the active companies in the UK has been linked to business information available in company register databases, allowing to obtain information on their location and economic structure.

The evidence collected through this approach provides a more accurate measure of video game companies operating in the country[15] and highlights how only one-third of the companies identified in the study are captured by official games SIC codes.[16] Crucially, by knowing the exact location of the companies, the report provides an in-depth analysis of the geography of the video game industry and its clustering structure.

[14] Examples of web directories consulted are MobyGames, GameSpot, Pocketgamer, Tothegame, Develop 100, GameDevMap.

[15] Specifically, the authors identify 1,902 video games companies.

[16] The official games SIC codes 6201/1 and 5821 used in UK business statistics cover just over one–third (35 per cent) of companies, with the majority of video game companies having registered under other SIC codes, such as 6201/2 Business and domestic software development, 6209/0 Other information technology and computer service activities or 6202/0 Computer consultancy activities.

Another research initiative, which adopts a data-driven approach to identify innovative emerging sectors is the UK Innovation Clusters Map from the Department for Science, Innovation and Technology (DSIT).[17] The study utilises the Real Time Industry Classification (RTIC) developed by Datacity[18] to detect emerging innovative sectors, which are not fully captured by official standard industry classification codes. This novel classification system classifies businesses using language patterns within the website text of individual companies to understand their key activities and operations. The video game industry is one of the 46 RTIC sectors identified through this approach.

2.3 Evidence on the spatial patterns of the Video Game industry in Europe

One of the main objectives of **GAME-ER** is to provide a comprehensive understanding of the spatial organisation of the European video games cluster ecosystem, with a particular focus on local and regional clusters.

Table 2 provides an overview of the state of the art of studies and initiatives that have provided mapping of the video games industry at the spatial level in Europe in recent years. The selection consists mainly of research investigating the spatial specialisation and clusters of CCIs and surveys by national trade associations that provide a picture of the video game industry's geography in given countries.

[17] https://www.innovationclusters.dsit.gov.uk/

[18] https://thedatacity.com/rtics/

Table 2 - Studies and reports with spatial mapping of the video games sector in Europe

Title	Authors	Year	Geographic coverage	Unit of analysis	VG Industry Classification method	Data	Source	Indicators
A map of UK Video Game Industry	Mateos-Garcia, Bakshi, Lenel (NESTA)	2014	UK	Travel To Work Areas (TTWA); Zip Codes	Business data-driven approach based on VG companies information obtained from web sources	Firms, VG training institutions	Games web directories (e.g. Mobysgame); Business Registers Database (e.g. Opencorporates, UK Companies House)	TTWAs LQs; Gini, Correlation between CCIs; 4 clusters typologies
The geography of creative industries in Europe: comparing France, Great Britain, Italy and Spain	Boix, R., Lazzeretti, L., Capone, F., De Propris, L., & Sánchez, D.	2012 (data: 1999 France, 2001 Spain and Italy, 2007 UK	France, UK, Italy, Spain	Local labor markets (LLMs)	Nace rev. 1 Software & Computer Services (72.2; 72.6)	Employment	National Business surveys	LLMs LQs
Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages.	Boix, R., Hervás-Oliver, J. L., & De Miguel-Molina, B.	2015 (data 2009)	15 countries (mainly Western Europe and Scandinavia)	Spatial nearest neighbour clustering (NCC); NUTS2	NACE rev. 2 Software & Videogames	Firms	Business Registers Database (Amadeus)	number/share of firms in clusters, Regional LQs
The European Cluster Observatory, Priority Sector Report: Creative and Cultural Industries	Dominic Power (Europe Innova)	2011 (data 2009)	30 countries	NUTS2	NACE rev.2 58.21 Publishers of Computer Games	Employment	Eurostat SBS	Share employment by region, Gini, Correlation between CCIs
Libro blanco del Desarrollo Español de Videojuegos	Desarrollo Español de Videojuegos (DEV)	2018	Spain	NUTS2	Companies monitored by the trade association	Firms	Sector survey	Regional distribution
Annual Survey of Video Games in France	SNJV	2022	France	NUTS1	Companies monitored by the trade association	Firms	Sector survey	Regional distribution
Les dynamiques territoriales de l'industrie du jeu vidéo en France Territorial dynamics of the French videogame industry	Hovig Ter Minassian	2019	France	NUTS1	Companies monitored by the trade association	Firms, VG training institutions	Sector survey	Regional distribution
The Baltic Sea Region as a Hotspot for the Game Industry (http://profile2020.baltic-games.eu/)	Baltic Game Industry INTERREG Project output	2018	Baltic Sea are: 3 countries and 5 regions (Berlin/Hamburg/Krakow, Helsinki, Central Denmark)	NUTS0/NUTS2	Companies monitored by trade associations	Firms, Employment, regional competitive factors	Sector survey, Experts' opinion	National statistics, Regional Barometer
The Game Industry of Finland	Neogames	2022	Finland	Regions (no NUTS2 classification)	Companies monitored by the trade association	Firms	Sector survey	Regional distribution
UK Innovation Clusters Map	Department for Science, Innovation and Technology, Datacity, Cambridge Econometrics	2024	UK	HDBSCAN spatial clustering algorithm	Gaming sector defined from Real-Time Industrial Classifications (classifying companies through website information)	Firms	RTIC Database, IDBR Business register	number/share of firms in clusters, employment, turnover

Source: Authors' own elaboration

From the examination of the studies reviewed, it is possible to draw some useful indications on the potential and limitations of the methodologies used to analyse the spatial structure of the video game industry in relation to the objectives of WP2.

A first set of studies, predominantly comprising industry association reports, attempt to delineate the geography of a country's video game industry, presenting companies' regional distribution (at **NUTS1** or **NUTS2** level). Many of these mapping exercises were conducted in countries where the video game industry is already well established (France, Spain, Finland). In such cases, the number of companies (or employment data) is obtained through dedicated surveys or knowledge of companies operating in the sector without relying on specific industry classification codes.[19] From a methodological viewpoint, this approach provides only a rough indication of the level of sectoral specialisation of a region or the presence of clusters, understood as spatial agglomerations of companies.

A second group of studies (*Boix et al, 2012; Nesta, 2014; Boix at al., 2015*) follows a more established, but rather traditional approach in economic geography to identify clusters, namely through the measurement of location quotients. The location quotient (LQ) is an analytical statistic that measures the industrial specialisation of a given area with respect to a larger geographical unit, calculated as the share of a sector in the area's economy divided by the sector's share in the national economy (using either employment or number of businesses). The territorial scale of analysis in this type of study at the European level is generally regional (NUTS2), allowing for greater availability of data and socioeconomic variables that can explain the heterogeneity in regional specialisation observed through LQs. However, some mapping reports have also adopted a finer level of resolution—such as, Travel To Work Areas (TTWAs) or Large Language Models (LLMs)—warning that the regional scale might be too big to provide a detailed geography of clusters as this territorial level of analysis masks hotspots of industrial activity at the local level.

A third group of mapping studies aims eventually to overcome the limitations given by the use of regional specialisation proxies to identify clusters by using spatial statistical clustering techniques that aim at identifying clusters through a data-driven inductive process.

[19] This first group also includes the 2011 Priority Sector Report on Cultural and Creative Industries, which analysed the spatial structure of the cultural creative sectors in Europe on a regional (NUTS2) level. According to this study, employment in SIC codes related to the video game industry is highly concentrated in a few regions and metropolitan areas, showing the highest concentration compared to other cultural and creative sectors and with a tendency to co-localise with design and advertising activities.

For instance, *Boix et al. (2015)* have used microdata from the Business register database AMADEUS, which includes over 500,000 firms from 16 European countries, classified under SIC codes related to Cultural and Creative sectors, with geographic coordinates provided for each firm's postal address. Interestingly, the number of clusters identified by the spatial clustering algorithm is 2.3 times larger than by considering clusters in terms of regional specialisation using the Location Quotient methodology (774).

A similar approach has been also followed in the UK Innovation Cluster Map, using a Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN) clustering algorithm to detect innovation clusters, including video game clusters.[20]

In summary, these studies, relying on spatial clustering algorithms, use the density of firms in continuous geographic space, without relying on administrative boundaries, to identify clusters of firms in each creative industry based on a distance threshold specific to that industry. This allows detecting both large and small clusters, even within metropolitan areas.

[20] Department for Science, Innovation and Technology (2024) Analytical Report: Identifying and describing UK Innovation clusters. DSIT Research Paper Number 2024/001

3. CLUSTERS IN INNOVATIVE AND CREATIVE SECTORS: AN OVERVIEW OF KEY ANALYTICAL DIMENSIONS

There is a consensus in the academic and policy debate that clusters play a significant role in driving the evolution and growth of both regions and industries. The initial formation of a local concentration of firms appears to be an essential precursor to the later development of an industry, both at the regional and national levels.

Since the seminal work by Alfred Marshall on agglomeration of firms at the end of the XIX century, scholars interested in the analysis of clustering of economic activities have developed a rich and articulated body of theoretical and empirical analysis. Cluster research has been developed through different disciplinary approaches, methodologies and focus on different analytical aspects that contribute to explain distinct elements on cluster characteristics and dynamics.

Far from being an exhaustive literature review, this section aims to provide an overview of the main interpretative frameworks and perspectives used to analyse clusters in innovative and creative sectors. Moreover, this part deals with the topic in a more general way, leaving an in-depth look at the literature of video game clusters to the next part.

The main analytical dimensions portrayed in this part refer to (i) the drivers of clustering formation, (ii) the characteristics of clusters' structure and actors, (iii) the different types of proximity that should be considered in interpreting clusters and, finally, (iv) the role of clusters in shaping innovative process and products.

3.1 Drivers of clustering: agglomeration economies and spin-off dynamics

A first analytical dimension to analyse clusters of economic activities refers to the different forces shaping their structure and the incentives of actors to cluster. Different kinds of agglomeration economies (positive externalities) contribute to local clustering, and these have been identified in an extensive body of literature (*Glaeser et al., 1992; Lorenzen and Frederiksen, 2007; Beaudry and Schiffauerova, 2009*).

The Marshallian (*Marshall, 1920*) tradition argues that geographical concentration and specialisation in a single industry, coupled with local specialisation strategies, foster technical externalities to be generated, transmitted and accumulated by local firms. Clusters are then the result of intra-industry and geographically well-defined agglomeration of technical know-how and resources.

Firms in the same industry, operating in the same location, benefit from localised knowledge spillovers, a specialised local labour market pooling and a specialised local supplier-customer network. These factors, defined as localization economies, work to promote firm clustering within an individual industry.

On the contrary, the so-called Jacobs externalities tradition (*Jacobs, 1969*) alternatively gives prominence both to the transfer and exchange of skills and resources across geographically proximate but technologically different industries, and to local economic differentiation in contrast with specialisation.[21] Moreover, Jacobs stresses the role of cities and metropolitan areas as especially conducive for the effective exploitation of inter-industrial technical externalities because of the presence of academic and research institutions, and hence for the growth of diversified technological clusters that incorporate also research institutions. *Porter (1990)* integrates this second approach and emphasises also the role of large firms as key actors in the local formation of diversified technological clusters that exploit complementarities between different sectors.

Jacobs externalities emphasise the role of technological complementarities across different and yet related industries. The idea of related and complementary industries (*Boschma and Wenting, 2007; Frenken et al., 2007)* highlights that the benefits of agglomeration can derive from local diversification in complementary or related industries through the cross-fertilization of ideas and transmission of technological solutions, ideas and competencies. Agglomeration economies arise among clusters of complementary industries, i.e. industries based on similar technologies and skills, shared infrastructures, and similar demand and institutions. The presence of related industries in a specific location supports new firm formation and the growth of the clusters because it enhances the opportunities to develop new products by accessing complementary inputs and technologies (*Delgado et al., 2010*).

Both these externalities are well-known in cultural and creative clusters. CCIs tend to attract a pool of talented individuals with specialised skills. This concentration of creative talent enhances the labour market by providing opportunities for collaboration and skill development, which are mutually beneficial to both established firms and start-ups (*Florida, 2002*). Moreover, creative clusters often benefit from the development of common infrastructure and support services that are specifically tailored to the needs of creative industries (*Cohendet et al., 2010*). At the same time, creative clusters tend to co-locate in metropolitan areas benefiting from urbanisation economies, where coordination and spillovers between unrelated knowledge bases occur and creative firms benefit from the diversity of institutions, infrastructures and local amenities that cities are able to provide (*Lorenzen and Frederiksen, 2007*).

[21] Jacobs (1969) supported the view that innovation and the creation of knowledge in clusters benefits more from an urban environment with research and creative institutions and a variety of sectors, rather than from a rural location and a specialisation in a single sector, as described by Marshal.

Although it is commonly recognized that specialisation and diversification can overlap as agglomeration forces in cluster dynamics, **Table 3** stylises possible different patterns in typologies of clusters that rely on different externalities, namely specialised (i.e. single-sector) industrial clusters and diversified (i.e. multi-sectors) technological clusters (*John St. and Pouder, 2006*).

Table 3 - Specialized vs. Diversified Clusters

	Specialized cluster	Diversified cluster
Localization	Rural areas, non-urban areas, small cities	Urban and metropolitan areas
Growth economies	Specialisation and division of labour along the supply chain	Diversification in related, complementary industries
Externalities	Vertical, intra-industry	Horizontal, inter-industry
Type of firms	Small, local firms	Large, international firms and small firms
Key institutions	Industrial unions, local policy	Universities, R&D centres, Technological Transfer Offices, Incubators

Source: Authors' own elaboration.

While traditional approaches based on Marshall and Jacobs emphasise the role of external scale and scope economies to explain cluster formation, other studies have identified in the generative capacity of firms the main factor of cluster emergence and evolution *(Buenstorf and Klepper, 2009; Klepper, 2007, 2010*).

This alternative perspective sees in the spinoff dynamics the main driver of the formation and development of clusters and the local concentration of industry. The spinoff process is considered as facilitating the transmission of skills, knowledge and abilities between parent companies and new entrants. The knowledge and skills that promote entrepreneurship are derived from the new entrepreneur's previous experience of working in the parent company in the same or a similar sector. Moreover, more successful parent firms are able to generate a larger number of spinoffs which are more successful than other new firms.

In this approach, clustering is driven by the entry and exit of firms with different inherited capabilities and the ability of existing, early-established firms to generate a larger number of new firms, rather than by agglomeration economies *(Buenstorf and Guenther, 2011; Buenstorf and Costa, 2018*). The role of universities has also been highlighted as a source of important spinoffs that support the formation and development of innovative clusters *(Garnsey and Heffernan, 2005; Bathelt et al., 2010*).

The phenomenon of firm spin-offs, whereby new business ventures emerge from existing companies or institutions, is particularly common in creative sectors due to the nature of innovation and entrepreneurial opportunities they offer. Entrepreneurs in creative clusters frequently leverage the knowledge and networks acquired from their previous employment or affiliations with established firms or institutions (*Cassi and Plunket, 2014*). Creative industries foster an entrepreneurial spirit, which in turn leads to the creation of new firms and startups. Such spin-offs frequently introduce novel perspectives and innovations to the market (*Rizzo, 2015*).

Table 4 presents a summary of the contrasting approaches to understanding the emergence and evolution of clusters. These approaches can be broadly divided into two categories: traditional theories focused on agglomeration economies and knowledge spillovers (Marshallian and Jacobsian), and perspectives highlighting the role of firm spin-offs in driving cluster formation and development (Klepperian). Furthermore, it demonstrates the applicability of these theories to cultural and creative clusters, emphasising the distinctive dynamics of talent attraction, entrepreneurial spirit, and innovation in these industries.

Table 4 - Externalities vs. spin-offs as formation process for innovative and creative clusters

Externalities approach	Spin-offs approach
Main features	**Main features**
Concentration of economic activities in space due to agglomeration economies	Formation and development driven by firm spin-offs
Technical externalities and knowledge spillovers facilitate agglomeration	Spinoff process facilitates transmission of skills and knowledge
Co-location of specialised workers and suppliers lowers costs and enhances access to resources	Skills and abilities for entrepreneurship inherited from previous experience
Knowledge circulates via labour mobility, user-producer interactions, and local institutions	More successful parent firms generate more successful spin-offs

Application to Innovative and Creative Clusters	Application to Innovative and Creative Clusters
CCIs attract talented individuals, enhancing labour market collaboration	Creative clusters foster entrepreneurial opportunities and spin-offs
Development of infrastructure and support services tailored to creative industries	Universities also contribute as sources of important spin-offs
Key references	**Key references**
Florida, 2002; Cohendet et al., 2010; Garnsey and Heffernan, 2005; Bathelt et al., 2010	Klepper, 2007, 2010; Buenstorf and Klepper, 2009; Buenstorf and Guenther, 2011; Buenstorf and Costa, 2018; Cassi et al., 2010; Rizzo and Whitaker,2015.

Source: Authors' own elaboration.

3.2 Pooled resources

Industrial and creative clusters originate, organise and develop around a wide array of resources within well-defined geographical spaces *(Florida, 2002; Santagata, 2002; Scott, 2006; Santagata, 2009; Evans, 2009*):

- **Concentration of human capital, skills:** geographical agglomeration and specialisation within a single industry support the formation of a local pool of skilled labour, input-output linkages and knowledge flows which occur along the supplier-buyer supply chain *(Marshall, 1920; Becattini et al., 2009)*;

- **Education/R&D:** the role of institutions that generate formal knowledge and training to be transferred to firms has been stressed as a crucial factor in the birth and evolution of industrial and innovative clusters (*Bathelt et al., 2010; Enrietti et al., 2022; Menzel and Kammer, 2019; Morrison and Boschma, 2019*);

- **Tacit knowledge/buzz:** economic geographers revisited the Marshallian notion of "industrial atmosphere", using the lenses of "untraded interdependencies" (*Storper, 1995*) and "local buzz" (*Bathelt et al., 2004*) to capture the idea that clusters benefit learning and the accumulation of tacit skills and knowledge that would be difficult to share without a common culture and social context and the thick network of local face-to-face and personal contacts;

- **Social capital:** political and public resources and social capital more general are mobilised and aggregated in the emergence of clusters in industrial sectors *(Rugafiori, 1999; Sorenson and Audia, 2000; Trigilia, 2007; Sine and Lee, 2009; Bathelt et al., 2010; Bagnasco, 2012; Antonietti and Boschma, 2021*) as well as in creative and cultural clusters (*Casadei et al., 2023*); purely cultural clusters centred around public and non-profit cultural institutions such as museums, theatres, and libraries heavily rely on this type of resources (*Lorenzen and Frederiksen, 2007*);

- **Infrastructures:** clustering favours the pooling of different kinds of infrastructures, such as communication, transportation, commercial and economic infrastructure *(Saxenian, 1994; Porter, 1998)*.

3.3 Beyond geographical proximity

The formation of creative and innovative clusters is contingent upon the convergence of multiple forms of proximity, which in turn creates an environment conducive to collaboration, knowledge exchange, and trust. The various forms of proximity, including geographical, cognitive, organisational, social, and institutional, each contribute to the dynamics of these clusters in a distinctive manner.

Proximity is a critical factor that supports the formation and success of creative and innovative clusters. Different types of proximity play distinct roles in fostering the necessary conditions for creativity and innovation (*Paris, 2010; Cohendet and Mehouachi, 2018*).

A number of contributions to the field of innovation studies have highlighted the idea that the advantages in terms of growth and innovation due to location-specific factors are actually exploited only because of the presence of systemic interactions and networking in the process of generation and diffusion of innovation. This coupled effect of locational advantages and interactions has been recognised as a key determinant of the emergence and evolution of clusters. Clusters are found in well-defined areas where networking and knowledge flows between relevant actors are sufficiently dense and robust to facilitate the exploitation of external knowledge (*Brenner et al., 2013*).

While in *Saxenian (1994)* and *Porter's (1998)* works, clusters develop spontaneously and organically, driven by advantages such as proximity, homophily, and spillovers, the knowledge-based view of clusters suggests that knowledge does not necessarily and freely spread in one specific region (*Antonelli, 2006; Malmberg and Maskell, 1997, 2002*). Rather, structured interactions are of paramount importance in encouraging the actors within a region to engage in knowledge processes and generate the fruitful local buzz (*Bathelt et al., 2004; Bocquet and Mothe, 2015*).

The concept of proximity, understood in its various forms, has been identified as a factor that facilitates interactions (*Thompson and Fox-Kean, 2005; Antonelli et al., 2011; D'Este et al., 2013*). This allows for the identification of the channels that enable local organisations to benefit from external economies (*Gertler, 1995, 2003*).

Not only geographical proximity matters, as in traditional studies that highlight its effect in lowering transportation costs. Also, cognitive (*Noteboom et al., 2007*), institutional *(Giuliani, 2007; Graf, 2006*), social (*Breschi and Lissoni, 2001*) and cultural proximity matter for explaining participation in clusters, and their persistence. In these cases, proximity matters because it lower different and more intangible costs associated with the innovative and creative process such as imitation costs (Mansfield et al., 1981), absorption costs (*Cohen and Levinthal, 2000; Griffith et al., 2003*), networking costs (*Agrawal et al., 2006; Beugelsdijk, 2007*), cognitive costs (*Nooteboom et al., 2007*), relational costs (*Glaeser and Scheinkman, 2000*), congestion costs (*Boschma, 2005a; Frenken, Van Oort, Verburg, 2007*). The capability of actors to learn and share skills and knowledge depends on their network of relations and interactions, which are facilitated by immaterial kinds of proximity.

In sum, these key forms of proximity have been identified and presented by *Boschma (2005b)* as:

- **Geographical proximity:** it is used to describe the physical closeness of firms and institutions within a cluster. Such proximity facilitates the occurrence of frequent face-to-face interactions, the transfer of knowledge, and the sharing of resources, all of which are crucial for innovation. For example, Boschma (2005a) emphasises how geographical proximity can enhance innovative performance by facilitating frequent interactions and knowledge exchanges, through enhanced communication, easier collaboration and the formation of local networks;

- **Cognitive proximity:** this type of proximity refers to the similarity in knowledge bases and cognitive frameworks among actors in a cluster. It guarantees that firms and individuals are able to comprehend one another's expertise and convey intricate concepts with efficacy. Cognitive proximity (*Nooteboom et al., 2007*) can facilitate effective knowledge transfer and innovation due to the ease of knowledge transfer, a common understanding of industry-specific languages and methodologies;

- **Organisational proximity:** it refers to the degree of similarity in organisational practices, cultures and structures among firms within a cluster. It fosters trust and reduces transaction costs, thereby facilitating collaboration. Creative and innovation hubs, where gatekeepers and knowledge brokers align organisational structures and practices, also encourage companies to adopt similar innovation practices and standards, which in turn lead to smoother inter-firm collaborations, shared norms and practices, and increased trust. These factors in turn support knowledge creation and innovation;

- **Social proximity:** it is defined as the extent to which individuals in a cluster are connected through social relationships, networks, and trust. The existence of strong social ties can facilitate cooperation and the sharing of tacit knowledge. *Maskell and Malmberg (1999)* posit that social proximity fosters trust and informal networks, which are crucial for innovation. Art and design clusters may serve as illustrative examples of contexts where social networks among artists facilitate collaborative projects;

- **Institutional proximity:** it refers to the alignment of formal institutions, such as laws, regulations, and policies, within a cluster. This ensures that firms operate under similar institutional frameworks, thereby facilitating smoother interactions. The implementation of supportive policies and regulations serves to promote innovation, since they facilitate the proximity of institutions.

For a recent review of the main proximity factors, although not directly applied to innovative and creative clusters, see for instance *Wilke and Pyka (2024a, 2024b).*

3.4 Different types of actors

The exchange of knowledge and skills becomes a crucial variable in cluster growth via collaborations between firms and scientific and training institutions, and mobility of human capital. Hierarchical structures characterised by non-redundant connections favour knowledge sharing because of the key role played by "structural holes" (*Coleman, 1990*), knowledge brokers and gatekeepers: for example, large firms, technology transfer centres, incubators occupy a brokerage position between more "peripheral" actors. They arbitrate and flow knowledge between firms and groups of firms that are not connected directly, for this reason occupy a powerful and central position in the structure, which hence assumes a hierarchical configuration (*Giuliani, 2007; Patrucco, 2005, 2014*). Hubs are instead crucial in the evolution of clusters from more traditional business networks into complex innovation and creative ecosystems (*Gill et al., 2019*).

Within innovative and creative clusters, gatekeepers, knowledge brokers, and hubs play a key role in facilitating the flow of information, resources, and opportunities. The role of gatekeepers, knowledge brokers, and hubs is interconnected and mutually reinforcing. Gatekeepers often rely on knowledge brokers to stay informed about emerging trends and potential opportunities. Knowledge brokers, in turn, use their networks to navigate through gatekeepers and connect with hubs. Hubs serve as the physical or conceptual focal points where gatekeepers and knowledge brokers operate and interact. Gatekeepers ensure quality and manage access, knowledge brokers facilitate information flow and innovation, and hubs provide the necessary infrastructure and community support. In what follows **UNITO** identified more specifically their features and role in innovative and creative clusters:

- **Gatekeepers** are individuals or organisations that control access to resources, opportunities, and networks within a cluster. They play a pivotal role in filtering information and opportunities, ensuring that only high-quality ideas and projects gain traction. Gatekeepers often hold positions of power and influence, such as gallery owners, festival organisers, and editors, who determine which artists, works, or innovations receive visibility and support. By selectively endorsing certain projects, they create benchmarks for success and innovation. Finally, they often have extensive connections and can introduce newcomers to established networks, facilitating new collaborations and opportunities (*Becker, 1982; Caves, 2000)*.

- **Knowledge brokers** are intermediaries who facilitate the transfer of knowledge and information between different actors within a cluster *(Boschma and ter Wal, 2007; Bathelt and Cohendet, 2014*). They connect creators, businesses, and institutions, enabling the exchange of ideas and fostering collaboration. Knowledge brokers often possess extensive networks and deep industry expertise, allowing them to bridge gaps between diverse sectors. They enable cross-pollination of concepts from different fields, leading to novel solutions and approaches. In creative clusters, knowledge brokers play a vital role in innovation by disseminating best practices, new technologies, and market trends (Howells, 2006). Knowledge brokers organise events, workshops, and seminars where knowledge can be shared, helping to build a culture of continuous learning and adaptation *(Bessant and Tidd, 2011*). Effective knowledge brokers build trust and credibility among cluster members. Their ability to facilitate open and honest exchanges of information fosters a collaborative environment. Additionally, knowledge brokers can help small and medium-sized enterprises (SMEs) access resources and expertise that might otherwise be out of reach, levelling the playing field within the cluster (*Dhanaraj and Parkhe, 2006*).

- **Hubs** are central locations or organisations within a cluster that act as focal points for activity and interaction. They provide physical and virtual spaces where creative professionals can meet, collaborate, and innovate. Examples of hubs include co-working spaces, incubators, and innovation centres. Hubs facilitate the serendipitous interactions that are crucial for creative and innovative processes (*Storper and Venables, 2004*). By bringing together diverse individuals and organisations, hubs create environments where cross-pollination of ideas can occur, leading to novel solutions and breakthroughs (*Florida, 2002*). Moreover, hubs often provide essential infrastructure and support services, such as funding, mentorship, and technical resources, that enable creative enterprises to flourish (*Pratt, 2008*). Hubs also play a crucial role in the economic and social development of a cluster. They attract talent, investment, and tourism, contributing to the vibrancy and sustainability of the local economy (Porter, 1998). Furthermore, by fostering a sense of community and shared identity, hubs can enhance the social cohesion and resilience of creative clusters (*Saxenian, 1994*).

Table 5 integrates the roles of gatekeepers, knowledge brokers, and hubs with their impact on clusters and key references.

Table 5 - Gatekeepers, knowledge brokers and hubs in innovative and creative clusters

Role	Description	Functions	Examples	Impact on CCIs	Key references
Gatekeepers	Individuals or organisations controlling access to resources, opportunities, and networks	- Filter information - Maintain quality standards - Endorse projects	- Gallery owners - Festival organisers - Editors	- Maintain quality standards - Shape cultural and creative trends	Caves (2000) Becker (1982)
Knowledge brokers	Intermediaries facilitating the transfer of knowledge and information	- Connect creators and businesses - Disseminate best practices - Organise events	- Consultants - Industry associations - Research institution	- Facilitate innovation - Bridge gaps between complementary sectors	Howells (2006) Bessant & Tidd (2011) Bathelt & Cohendet (2014) Boschma & Ter Wal (2007)
Hubs	Central and shared infrastructures or organisations acting as focal points for activity and interaction	- Provide spaces for collaboration - Offer support services - Foster community	- Co-working spaces - Incubators - Innovation centres	- Foster collaboration and innovation - Share resources - Support economic and social development	Florida (2002) Pratt (2008) Porter (1998) Saxenian (1994) Storper & Venables (2004)

Source: Authors' own elaboration.

3.5 Innovation and characteristics of clusters

Empirical studies have provided substantial evidence of the positive relationship between clusters and innovation in both industrial and creative and cultural sectors *(Breschi and Malerba, 2001; Chapain et al., 2010*). For example, research conducted by *Delgado, Porter, and Stern (2010)* indicates that industries situated within robust clusters demonstrate elevated rates of patenting and enhanced economic performance. Similarly, *Baptista and Swann (1998)* found that firms located in clusters are more likely to innovate than those outside of clusters.

However, the literature on the topic has emphasised how different innovation patterns and strategies may be associated with different cluster types or characteristics.

For example, *Lorenzen and Frederiksen (2007)* propose that in cultural industries three types of product innovation—differentiation through variety, differentiation through novelty, and radical cultural product innovation—each align with specific geographic and clustering dynamics.

Product differentiation through variety occurs within existing design spaces and markets. This type of innovation involves incremental changes and improvements to products, such as new versions or iterations of established products (e.g., sequels in film or updated editions in music). It thrives on localization economies where firms cluster to leverage specialised, related knowledge bases and deep skills. This clustering allows for efficient coordination among established actors, fostering a stable environment conducive to incremental innovation.

Differentiation through novelty involves creating new design spaces within existing markets, introducing new styles or genres that break away from established conventions. This type of innovation requires diverse and broad skills, often brought together temporarily to coordinate unrelated knowledge bases. Urbanisation economies are crucial here, as urban clusters provide the diverse, dynamic environments needed for such innovative processes. Cities offer the necessary concentration of varied knowledge and skills, facilitating the emergence of novel products through the temporary convergence of diverse actors.

Radical cultural product innovation introduces entirely new products that create new markets, such as the emergence of MP3s or webzines. This type of innovation necessitates both specialisation and diversity, demanding long-term coordination of previously unrelated knowledge bases. It benefits from both localization and urbanisation economies, often clustering in global and world cities where extensive networks and resources converge. These cities serve as hubs for both deep specialised skills and the broad, diverse knowledge necessary for groundbreaking innovations, supporting the complex processes required for radical product development.

Also recent studies on industrial (*Wolf et al., 2019*) and creative *(Boix et al., 2015; Cohendet et al., 2021*) clusters have also focused on the idea that innovation frequently arises from an inter-organizational collaboration process, wherein a division of labour with regard to exploration and exploitation exists among the actors within a cluster. Innovative activities within clusters can exploit existing competencies or can be open to the acquisition of novel technologies through exploration. For instance, the case of Montreal (*Cohendet et al., 2021*) shows how the transition to a complex ecosystem of innovation hinges on the establishment of collaborative networks.

The video game industry in Montréal has established collaborative networks comprising partnerships between game studios, academic institutions, research centres, and technology startups. The transition to an ecosystem of innovation signifies the evolution of the industry beyond conventional business interactions.

It encompasses collaborative innovation, R&D initiatives, knowledge exchange, and partnerships with academia and other industries (e.g., digital media, AI, VR). This transformation has resulted in significant economic and technological developments within the gaming industry, influencing global trends and attracting talent and investments as a consequence of the transition to an innovation ecosystem.

This perspective suggests that the advantages of collaboration for innovation within clusters can be realised in two distinct ways:

1. The formation of clusters can facilitate the enhancement of firms' knowledge bases, although there is a risk of undue emphasis being placed on the further development of existing competencies.

2. Collaboration within clusters can also stimulate the creation of new competencies essential for the development of entirely novel products. This may be achieved through collaboration with firms from other industries or by learning about new developments from science through cooperation in the cluster region with universities or research institutes.

Table 6 - Characteristics of clusters and types of knowledge and innovation

Characteristics of cluster	Type of knowledge	Type of innovation process	Type of innovation outcome
-Specialisation -Intra-industry technical externalities -Industrial clusters -High proximity - "Hot spots"	Existing, cumulative	Exploitation	-Incremental product innovation -Incremental process innovation
-Diversification in related industries -Inter-industrial technical externalities -Technological clusters -Lower proximity - "Assemblages"	Novel, recombinant	Exploration	-Significant/radical product innovation -Significant/radical process innovation

Source: Authors' own elaboration.

4. THE CLUSTERING OF THE VIDEO GAMES INDUSTRY: INSIGHTS FROM A SCOPING LITERATURE REVIEW

In this section, **GAME-ER** aims to investigate to what extent the academic literature focusing on the video game industry has addressed the analysis of clusters and its territorial dimension. To answer this question, it was developed a scoping literature review of the academic production on the video games sector in a CCIs perspective. More precisely, the research focused on the literature investigating the specificities of the video games industry and its clustering and territorial agglomeration dynamics.

4.1 Methodology and data

In this analysis, **GAME-ER** adopts a two-step approach combining bibliometrics[22] with a more in-depth content analysis of the studies selected (Kraus et al., 2022).

Firstly, **GAME-ER** consortium partners relied on a bibliometric approach (*Donthu et al., 2021*) to ensure a systematic and replicable identification and selection of the relevant articles focusing on the video games sector within the broader literature on CCIs and its spatial clustering dynamics. A systematic literature search was performed using *Clarivate Analytics' Web of Science* (WoS).[23] More precisely, a search query was built based on the most relevant keywords to be searched in the publications' titles, abstracts, and the keywords assigned by both authors and WoS (Keywords Plus).[24]

The aim is to retrieve studies acknowledging the specificity of the gaming industry, which incorporates both a software and technological component as well as artistic features, such as storytelling and graphical elements, typical of the CCIs. Additionally, one of the main objectives of the research was to uncover the spatial clustering dynamics within this specific creative sector, its innovative component and its implications from a regional development perspective. Thus, search terms in the likes of "video games", "gaming", "video games industry" and their synonyms were used, together with keywords related to "creative and cultural industry", "cluster", "district", "hub", "scene", "agglomeration", "regional development".[25] **UNITO** limited the search to articles, reviews,

[22] Bibliometrics is a research stream of library and information science (LIS), where a collection of bibliographic resources is studied using quantitative methods (Broadus, 1987). Among the advantages of bibliometrics, these techniques provide scholars with the possibility of investigating a larger amount of data than systematic literature reviews (Bertello et al., 2023). Moreover, bibliometric analyses are performed following a more automated and relatively unbiased way (Öztürk et al., 2024), which ensures a transparent, sound, and replicable approach (Rey-Martí et al., 2022).

[23] Web of Science is a comprehensive academic citation and indexing databases of peer-reviewed academic research. See: https://www.webofscience.com

[24] The process of searching among titles, abstracts and articles' keywords is referred to as "topic search".

[25] To keep a closer focus on the video games sector, UNITO explicitly excluded from the search keywords related to other online recreational activities that may generate confusion and result in the retrieval of non-relevant literature.

books, and book chapters—thus excluding conference proceedings, letters, notes, and editorial material—published between 2000 and 2023. Given the research focus is on the multifaceted video games sector, **GAME-ER** targeted specific Web of Science Categories across various disciplines, meaning searching for scholarly contributions published in leading peer-reviewed journals in the fields of Economics, Management, Business, Sociology, Communication, Geography, Regional and Urban Studies.[26]

The database search leads to the **identification of 1,192 potentially relevant results**. To identify the scientific literature on the video game industry, its peculiar cultural and technological features, together with the sector's specific geographical agglomeration, skills and labour dynamics, **UNITO** set up a screening process of the records retrieved. To assess the articles' consistency with the focus of the research, **UNITO** first assessed the articles' titles and abstracts relevance. Second, when necessary, **UNITO** read the articles' content to determine their fit with the topic researched. Following this process, **UNITO** included 182 relevant documents in the final literature collection.

At this stage, bibliometrics techniques were used to analyse the underlying core research themes in the identified literature, trying to uncover in particular the relevance of the territorial dynamics and the spatial agglomeration of clusters (Section 4.2).[27]

Secondly, within this initial literature collection of **182 documents**, **UNITO** identified a subset of **51 articles** that more specifically address the topics of the clustering and of the spatial distribution of the video games industry. In this analysis, **UNITO** thoroughly reviewed the 51 papers to identify the main theoretical lenses adopted, the geographical and methodological focuses, and ultimately the main features of the clusters investigated in the video games industry literature.

Note: UNITO avoided articles related to online sports betting and casinos, whose terminology sometimes collides with terms belonging to the video games realm (for instance, "gaming" is often confused with "gambling"). The full list of keywords and the integral research query are reported in Appendix, together with the table reporting the search rationale and the visualisation of the database search rationale.

[26] UNITO focused the attention on the following 11 WoS Categories: "Economics", "Business", "Business Finance", "Management", "Operations Research Management Science", "Geography", "Urban Studies", "Regional Urban Planning", "Sociology" and "Communication".

[27] Specifically, to perform the thematic analysis, UNITO used the *VOSviewer* software to visualise the network resulting from the co-occurrence analysis of the keywords (Eck and Waltman, 2009). Additionally, UNITO relied on the R-package *bibliometrix* (Aria and Cuccurullo, 2017), which has been gaining increasing traction among scholars (Bertello et al., 2023), to provide a thematic map. See the Appendix for a detailed descriptive bibliometric analysis of the literature identified.

4.2 Relevance of the territorial and cluster dimensions in the video game industry literature

To uncover and examine the "research front" within the literature on the video game industry—thus identifying the key themes addressed by the academic community and the most relevant and recent issues—**UNITO** analysed the thematic structure of the literature (*Aria and Cuccurullo, 2017*). The thematic structure, also known as the conceptual structure, consists in the main topics addressed and their interconnectedness in the examined literature.[28] **UNITO** conducted an analysis of the co-occurrences for the 182 selected studies in the sample using the keywords assigned by both the authors and the database used for the data retrieval (Web of Science's "Keyword Plus"). The resulting co-occurrences network is displayed in Figure 2, while **Table 7** reports the keywords frequency and their respective position within the clusters of keywords identified.[29]

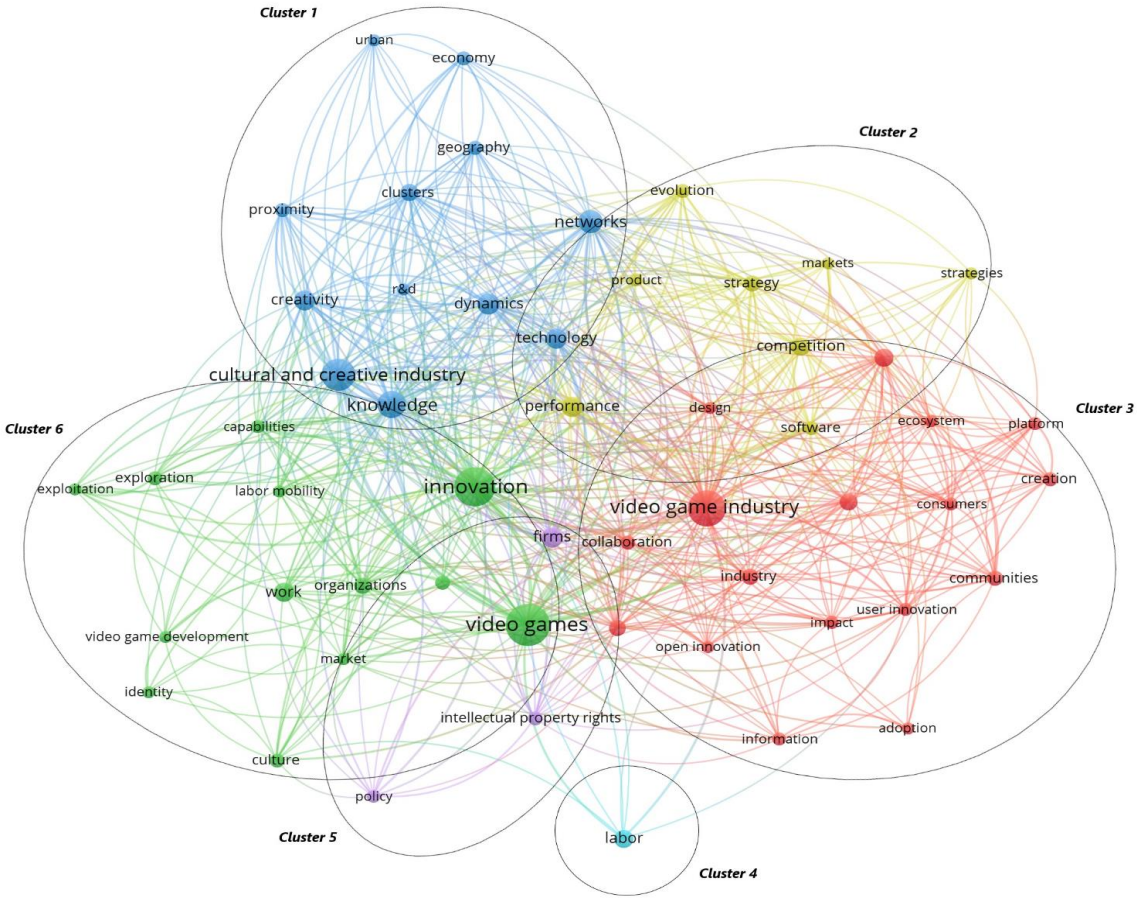

Figure 2 - Keywords co-occurrences network

[28] The thematic structure of a literature collection is also commonly referred to as "conceptual structure" (Aria and Cuccurullo, 2017).

[29] In the present thematic analysis of the identified literature, the term "cluster" refers to the group of nodes, in this case keywords, in the networks. Therefore, in this context, the term should not be confused with, or mistaken as a synonym of, agglomeration of companies in a location.

Notes: The figure reports the co-occurrences network of both authors keywords and Web of Science Keyword Plus with 5 minimum co-occurrences each (54 keywords displayed). Authors' own elaboration generated with *VOSviewer*.

The nodes' size reflects the co-occurrence frequency, while different colours and adjacency of nodes indicate different clusters of keywords, and thus topics. The network mapping obtained clearly reveals the presence of **6 clusters of main themes**, corresponding to the research fronts addressed in the literature collection.[30] More specifically, **UNITO** labelled the clusters identified as follows: **Cluster 1** - *CCIs, knowledge dynamics and economic geography*; **Cluster 2** - *Market competition and strategy*; **Cluster 3** - *Video game industry dynamics*; **Cluster 4** - *Labour practices*; **Cluster 5** - *Firm dynamics, policies and intellectual property* ; **Cluster 6** - *Organization, management and innovation within the video games industry*.

Table 7 -List of authors and database's keywords inside the thematic clusters

Cluster	Cluster title (research front)	Topics (based on keywords occurrences)
1	CCIs, knowledge dynamics and economic geography	cultural and creative industry (34); knowledge (25); networks (18); dynamics (15); creativity (13); technology (13); clusters (10); economy (7); geography (7); proximity (7); R&D (5); urban (5)
2	Market competition and strategy	performance (14); competition (11); strategy (9); software (7); evolution (7); product (6); markets (5); strategies (5)
3	Video game industry dynamics	video game industry (45); video game developers (11); value creation (10); entrepreneurship (9); industry (9); communities (8); collaboration (7); creation (7); consumers (6); platform (6); user innovation (6); impact (6); information (6); design (5); adoption (5); ecosystem (5); open innovation (5)
4	Labour practices	labour (11)
5	Firm dynamics, policies and intellectual property	firms (14); intellectual property rights (7); policy (6)
6	Organization, management and innovation within the video games industry	video games (59); innovation (52); work (12); organisations (9); culture (7); management (7); exploration (7); capabilities (6); identity (5); labor mobility (5); market (5); exploitation (5); video game development (5)

Source: Authors' own elaboration.

[30] To obtain the keywords co-occurrences network structure, UNITO also merged synonyms. For instance, keywords such as "video game", "video-games" and "videogames" have been merged under the single keyword "video games".

A closer look at **Cluster 1** reveals how the topic of the clustering within the video game industry is marginal and only partially developed within the literature analysed. This is signalled by the small number of occurrences of the keywords "urban", "geography", "clusters" and "proximity". The relative marginality of the clustering theme also emerges from the network mapping, as the corresponding nodes are placed at the periphery of the network structure.

To further analyse the selected literature, UNITO employed a bi-dimensional thematic diagram,[31] where clusters of keywords are represented as bubbles based on each cluster's "density" and "centrality" scores. Following the methodology proposed by *Callon et al. (1991)*, cluster's "centrality" measures the relevance of a theme within the literature and its degree of interaction with other clusters (i.e., the importance of external links), while "density" is a metric of the theme's internal strength and development (i.e., the importance of internal links) *(Cobo et al., 2015)*. The themes derived from the clusters are plotted in a diagram with four quadrants based on the values of density (y-axis) and centrality (x-axis).

Figure 3 illustrates the thematic map based on the authors' keywords from the sample of 182 studies. The themes are analysed according to their quadrant placement: the upper-right quadrant displays "**Motor themes**"; the lower-right quadrant the "**Basic and transversal themes**"; the lower-left quadrant the "**Emerging or declining themes**"; and the upper-left quadrant the "**Niche theme**", which are highly developed but rather isolated (*Aria et al., 2020, Kipper et al., 2020*).[32]

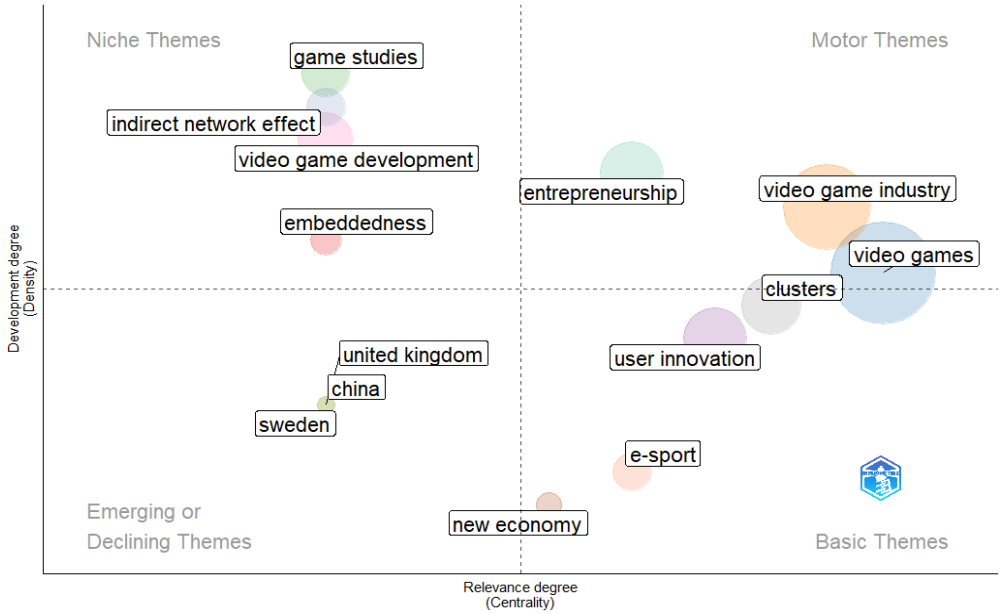

Figure 3 - Thematic map analysis

[31] This specific thematic diagram is also known as the strategic, or Callon, diagram (Callon et al., 1991; Cobo et al., 2011).

[32] Each bubble is labelled using the name of the most significant keyword in the associated theme, which corresponds also to the most frequent one. The volume of the spheres is proportional to the sum of the occurrences of all the keywords that fall into the same cluster.

Notes: The thematic map is based on clustering and network analysis of the authors' keywords in publications collection. The methodology is inspired by the proposal of Callon et al. (1991) and Cobo et al. (2011). The size of the bubbles is proportional to the overall keywords' occurrences within the cluster. Authors' own elaboration using the R's *Bibliometrix* package (Aria & Cuccurullo, 2017).

Themes falling into the "**Motor themes**" category in the upper-right quadrant are characterised by both high centrality and high-density scores compared to all the others. Not surprisingly, topics such as "video games" and "video game industry" are clearly well-developed and highly interconnected. Another relevant theme is "entrepreneurship", which appears as an essential topic for the whole organisation of the research on the video games industry.

In the lower-right quadrant, "**Basic themes**" are characterised by high centrality but low density. "Cluster", "user innovation", "e-sport", and "new economy" are relevant and transversal themes for the research investigating the video games sector. Nevertheless, these themes are not completely developed within the literature. For instance, and in line with findings from the co-occurrences network, research treating the theme of video game clusters is relatively dated and constitutes a small part of the overall collection of selected articles (e.g., *Darchen 2016, 2017; de Vann et al., 2013*).

Interestingly, the other keywords that fall in the "clusters" bubble consist of core topics in the field of innovation studies. In particular, in the literature collection, researchers have explored the theme of "intellectual property" within the setting of the video games sector (*Kaiser et al., 2023; Snowball at el., 2021*). Similarly, the video games industry represents an interesting case study for the investigation of the topics of "digital economy" (*Massimino et al., 2017; Niculaescu et al., 2023*), and "new product development" (*Soeiro, 2017*).

Themes located in the lower-left quadrant, labelled as "**Emerging or declining themes**", exhibit lower centrality and lower density. These topics are generally weakly developed and marginal. In this category **UNITO** found keywords related to the specific case studies and geographical regions of China, the UK and Sweden. This distribution may indicate that research on the video games sector has historically focused significantly on these areas, such as in the case of the UK (*Vallance, 2014; Anderton, 2017*), or is currently increasing its focus on these particular geographical regions, such as in the case of China (*Gong and Hassik, 2023; Yang and Chan, 2021; Zhao, 2023*).

Finally, the "games studies", "indirect network effects", "video games development" and "embeddedness" topics are among the "**Niche themes**" of the upper-left quadrant of the diagram. In this category **UNITO** found keywords related to the themes of developers' communities, the labour and cultural aspects of the game development activity, such as the "crunch" culture, and the literature focusing on platforms within the gaming sector. Although these themes are well developed, they are also highly isolated, signalling a more limited importance for the broader research field.

4.3 Coverage of video game industry clusters

As the video game industry is a dynamic and rapidly evolving sector characterised by both technological innovation and creative excellence, one of the most notable features of this industry is the formation of clusters, which are vital to the industry's innovation, competitiveness, and growth (*Paris, 2010*). Moreover, there is sound evidence on the key economic significance of clusters and their tendency to foster innovation, both in manufacturing or the creative industries (*Bertello et al., 2023*). However, video games clusters have received less academic attention than industrial districts, or other creative industries. In this context, UNITO aims to fill this gap by focusing on a specific subset of the literature collection explored so far.

More precisely, **UNITO** analysed the content of the articles that more closely target the topic of the clustering dynamics within the video games industry. In this way, **UNITO** reviewed 51 articles, paying particular attention to the methodological angles adopted, the specific geographical areas investigated, the main clustering forces discussed, and the crucial themes addressed.[33]

4.3.1 Methodologies adopted and geographical focus

The examination of the subset of the 51 articles reveals an interesting variety in terms of both countries and regions investigated, as well as research methodologies adopted. **Figure 4** reports the distribution of the subset of studies concerning the clustering in the video games sector, by country analysed and methodology adopted.

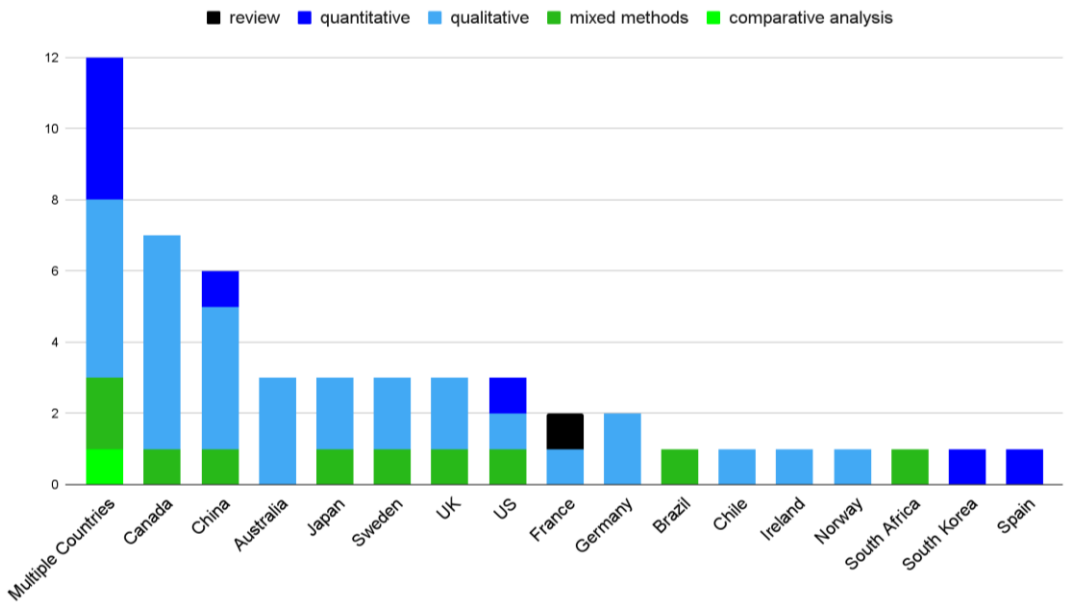

Figure 4 - Articles reviewed by methodology adopted and geographical focus of the analysis

[33] The adopted methodology is not without limitations, as relevant research on clusters may have escaped to literature search query.

Notes: The figure shows the count of the reviewed studies in the content analysis by countries analysed and research methodology adopted. Studies have been counted only once and assigned to only one category of both country and methodology based on the prevailing framework developed and geographical focus chosen. Authors' own elaboration.

Overall, concerning the methodological approaches encountered, the large majority of the studies employ **empirical qualitative** approaches based on data collected through interviews. Generally, such interviews are conducted with video game development studios and their workers (e.g., among others: *Vallance, 2014; Vang and Tschang, 2013; Parker and Jenson, 2017; Cohendet et al., 2018*), industry stakeholders *(Siemiatycki et al., 2016; Pottie-Sherman and Lynch, 2019; Cohendet et al., 2021; Gong et al., 2023*), as well as with governmental agencies (*Baeza-González, 2021*), institutional informants (*Barnes and Coe, 2011*) and policy advisors *(Darchen, 2016, 2017; Yang and Chan, 2021*). To investigate the agglomeration dynamics and the characteristics of the video games clusters, other typical qualitative approaches encountered in this literature subset consist in case study analysis (e.g., *Jorgensen et al., 2017; Lange and Streit, 2013; Miorner and Trippl, 2017) and surveys (e.g., Hanzawa and Yamamoto, 2017; and Snowball et al., 2021*).

Quantitative methods, instead, are commonly deployed in articles analysing different countries simultaneously (*Mendez-Ortega and Arauzo-Carod, 2020, 2019; Belyaeva et al., 2022; Xu et al., 2023*), and focusing on the evolution of the whole industry, often at the global level and over a long time period (*Balland et al., 2013; De Vaan et al., 2013*). This wider geographical perspective is dictated by the fact that granular quantitative data are generally scarce, limited, and difficult to gather, while aggregate data at the national level are collected and updated regularly by international organisations (*De Vaan et al., 2013*). To overcome these common data constraints, some of the articles analysed leverage on original data contained in freely accessible web repositories maintained by online communities of video games enthusiasts—such as MobyGames (*De Vaan et al., 2013; de Vaan and Stark, 2015*).

Moreover, there are some quantitative empirical studies that adopt a narrower focus on a single country. Specifically, *De Vaan et al. (2019)* investigate the US video games market, trying to assess the level of entry of video games producers vis-à-vis the potential barrier represented by the existing social capital within a specific regional area. Adopting a micro-geography perspective of product innovation, *Jang et al. (2017)* analyse the sub-clusters of mobile games developing companies located in the Seoul Metropolitan Area. The authors uncover various product innovation activities, influenced by heterogeneous agglomeration effects.

Similarly, *Mendez-Ortega and Arauzo-Carod (2019)* focus on the concentration of software, video game development and editing electronics (SVE) companies, at different stages of maturity, located in the metropolitan area of Barcelona, suggesting that the clustering patterns of SVE firms are distinct from the ones displayed by the less technological creative industries. Finally, focusing on *China, Xu et al. (2023)* explore the spatial evolution of electronic games sports (EGS) in Wuhan, providing a regional and industrial policy perspective in support of the future development of this industry.

Overall, it emerges that there is little comparative research among different countries. In fact, in the subset of the reviewed articles, only 12 offer a comparison between several countries.[34] Among these, the foundational work of *Izushi and Aoyama (2006)* provides a cross-country comparative analysis across the main geographical hubs of the gaming industry of that time. Focusing on the UK, the US and Japan, the authors explore the economic, social, and technological factors that are expected to drive the process of cross-sectoral skill transfer, which ultimately enables the formation and evolution of the video game industry in the respective countries.

Similarly, *Darchen and Tremblay (2015)* offer a comparison between two gaming industry hubs, Montreal and Melbourne respectively. Firstly, the paper analyses whether these two hubs can be considered creative clusters, and secondly it examines the cross-fertilization with other creative fields located in the same metropolitan areas, the benefits of spatial clustering, and the role of specific policies in the maturation of these video games clusters. On the same line, by combining economic geography with international business perspectives, *Cohendet et al. (2018)* develop an original framework to understand how, in creative clusters, newly established multinational companies cooperate with pre-existing local actors to build a common infrastructure of innovation (i.e., “local commons”).

The authors, in particular, analyse how this dynamic contributes to both the local and global development of the video game industry of France, the UK, Canada, Australia, which are all instances of clusters that successfully leveraged these cooperative efforts. The remaining articles generally adopt a global, and thus not particularly fine-grained, perspective *(Balland et al., 2013; De Vaan et al., 2013; de Vaan and Stark, 2015; Belyaeva et al., 2022*), or, alternatively, a regional viewpoint. In this second case, for instance, *Jorgensen et al. (2017)* retrace the formation of the Nordic game industry analysing the transition from the hobbyist subculture of the demoscene in Finland, Norway and Sweden into a formal and established business.

[34] The label “Multiple Countries” in Fig.49 identifies those articles that treat simultaneously several countries and/or clusters and video games hubs.

Some studies, instead, provide comparative case studies across industries, rather than across countries. This approach consists in confronting some specificities of the development and localization of the video games industry against other industries. Specifically, *Mendez-Ortega and Arauzo-Carod (2020)* confront the location patterns of the software and video games industry in the metropolitan clusters of Barcelona, Lyon and Hamburg. They find that in all three hubs analysed, video games clusters display the tendency to co-locate with firms from other creative industries. However, it emerges that the three cities examined show very distinct concentration patterns.

Finally, two articles adopt an interesting comparative approach, consisting in analysing the video games sector against industries that do not belong to the CCIs category. This is the case of the research conducted by *Miorner (2022)*, who compares the process of industrial change and reconfiguration of the regional innovation system (RIS) in the digital games industry, located in the Swedish Scania region, and the automotive industry, established in West Sweden.

These two empirical case studies support the proposed conceptual framework, for which three primary structure-agency dynamics (i.e., regional imaginaries, power relations and directionality) play a crucial role in RIS reconfiguration and new path development. In a similar way, *Binz and Gong (2022)* investigate the legitimation process in regional path development by providing a comparison between the potable water reuse industry in Los Angeles and the video games industry in Hamburg. Despite the fact that the focus of this paper is not strictly on CCIs, this work offers an interesting analysis of the video game hub of Hamburg, whose evolution happened in the context of an already highly developed region endowed with a complex web of knowledge spaces and capabilities.

4.3.2 Clusters analysed in the reviewed literature

Among the first to analyse the video games industry and its geographical distribution*, Johns (2006)* reported how the games industry originated and concentrated in three major economic regions: Western Europe, Japan, and the USA. At present, the key publishers in the industry are still mostly located in the US and Japan (*Parker et al., 2014*).

Nonetheless, the review of the recent research focusing on the clustering within the video games industry reveals numerous other clusters outside these major, and already extensively explored, clusters. **UNITO** provided a geographical overview, and present the key features, of the clusters explored in this specialised subset of literature. Figure 5 displays the worldwide distribution of the clusters analysed in the literature reviewed, generally located at both the city and regional level.[35]

[35] The map reports the cities, or regions, analysed in the literature and considered as clusters for the video games industry. The visualisation does not take into account national clusters that emerge, nonetheless, from the content analysis and as evidenced by Figure 4. In addition, Table 6A in Appendix reports the number of articles examining the respective clusters.

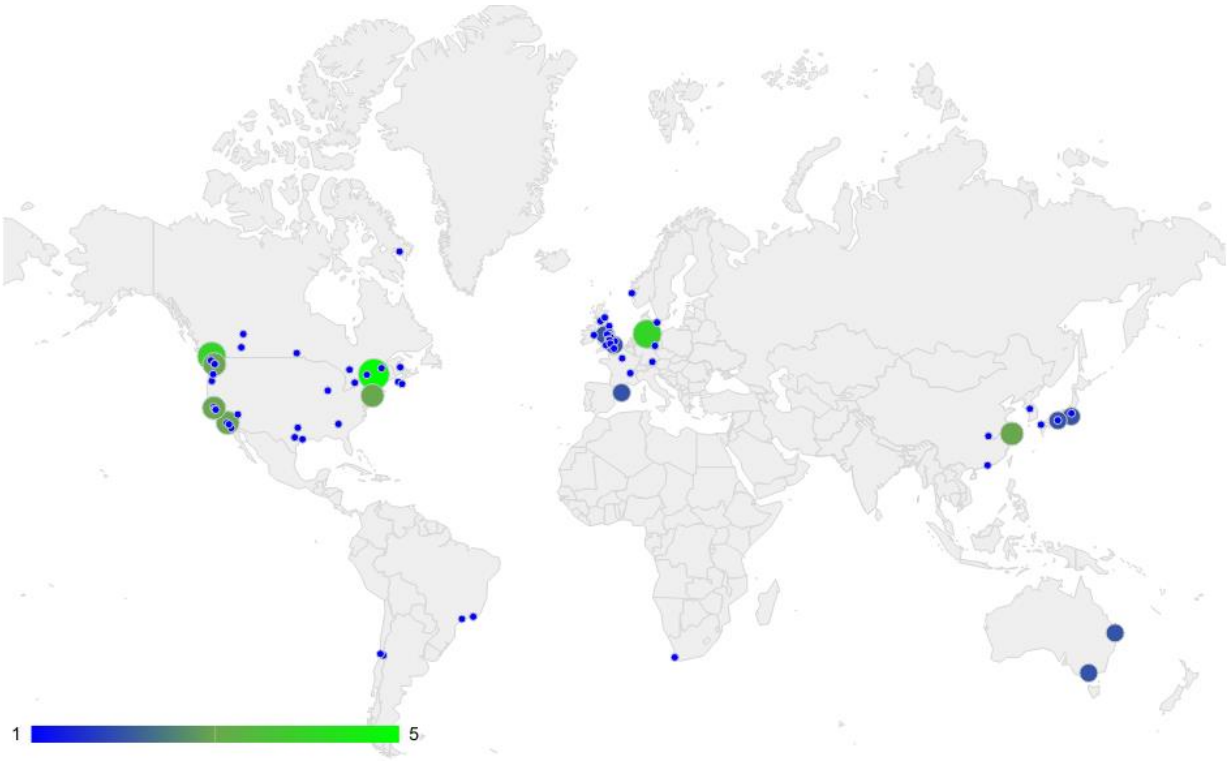

Figure 5 - Worldwide metropolitan and regional video games clusters investigated

Notes: The dots, and their size and colour, represent the frequency of appearance of the cities, or regions, analysed in the literature. ***Source:*** Authors' own elaboration using *Google Sheets.*

a. Clusters outside Europe

Concerning the countries analysed, **Canada emerges as the most extensively explored hub for video games development**. In fact, the country has long attracted the attention of academics and policymakers, especially after the landmark relocation of the French video game company Ubisoft in Montreal at the end of the 1990s (*Pilon and Tremblay, 2013; Darchen and Tremblay, 2015*), which spurred the development of the sector in the country. In the literature subset, Montreal appears to be by far the most analysed and cited cluster *(Grandadam et al., 2013; Parker and Jenson, 2017; Tremblay, 2016)*. This is because of Montreal's video games sector's rapid and spectacular evolution, which, in only two decades, transformed the city into a leading global creative hub in the industry (Cohendet et al., 2021).

Additionally, among the many Canadian clusters, it can be identified Vancouver as the second most prominent centre of video games development. The city represents an interesting case study as it underwent a remarkable shift from a staples economy—based on the extraction and processing of natural resources, primarily of forestry, fishing and mining—to a media and creative cluster (*Barnes and Coe, 2011; Siemiatycki et al., 2016)*. The economic reorganisation of Vancouver and its entrepreneurial success stories eventually led to the formation of the reference cluster in British Columbia.

In this way, Vancouver managed to attract established players in the video game industry, such as Electronic Arts (EA) that ultimately established its Canadian division in the city. The subsequent process of new firms creation through splitting from the original company, Digital Software Incorporated (DSI), ultimately positioned Vancouver as a global video games cluster (Barnes and Coe, 2011). However, *Siemiatycki et al. (2016)* highlight the recent slowdown in Vancouver's creative economy, including video games related activities.

Interestingly, *Parker and Jenson (2017)* highlight the presence of a series of small and peripheral clusters in the Canadian video games sector. The authors, in fact, provide a fine-grained analysis of the national video games development scene, with the aim to map, along the well-known hubs of Montreal, Vancouver and Toronto, also under-studied Canadian clusters located in remote regions and cities. It emerges indeed that there are several small groups and developers located in peripheral and isolated locations, such as Yarmouth, Nova Scotia, and Pangnirtung, Nunavut.

Traditionally, Japan and the US have played an hegemonic role in the games industry ever since its inception, therefore becoming the main global centres of the production and distribution of video games (*Baeza-González, 2021*).[36]

Concerning Japan, *Aoyama and Izushi (2003)*, in examining the emergence of the video game industry in the region, identified in the unique combination of creative resources from the animation industry and the technological knowledge accumulated in the consumer electronics the primary force behind the success of the Japanese video games sector. The primacy of Japan is confirmed by *De Vaan et al. (2013)*, who first assessed the annual population of video games producers for the ten largest regions, between the inception of the industry in the early 1970s up to 2007.

Among the top global clusters, the Kanto region, and Tokyo in particular, is by far the largest hub, which reached a peak of 219 companies in 1998, followed by Osaka with a peak of 29 companies in the same year (*De Vaan et al., 2013*). The Kansai region is the second most vibrant cluster of video games production, in particular around the cities of Osaka and Kyoto, where Nintendo is located (*Ernkvist and Ström, 2018*). Outside these two major clusters, recent literature identifies and investigates the nascent video games hub of Fukuoka (*Hanzawa and Yamamoto, 2017*).

The US represents the other traditionally leading country in the video games sector *(S. Adams, 2021*). In particular, as reported by *De Vaan et al. (2013)*, San Francisco, Los Angeles, New York, Seattle and Dallas emerge as the central clusters of video games production. Over time, San Francisco and Los Angeles became the reference clusters, while New York and Seattle also developed significant hubs. This present geographical distribution is the result of a structural shift with the past concentration of the arcade business in Chicago, where the four leaders in that industry (Gottlieb, Williams, Bally/Midway, and Chicago Coin) were initially located (de Vaan et al.,

[36] With some notable exceptions, such as the central clusters of Canada discussed at the beginning of the section, together with France and the UK.

2019). Some of these companies, such as Williams and Bally/Midway, successfully managed to transition from arcade games into digital arcade games, although this segment only boomed in the early 1980s and was eventually surpassed by the home gaming segment later *(Williams 2004; Ernkvist 2008)*. Ultimately, San Francisco and Los Angeles became the main clusters of home gaming *(de Vaan et al., 2019)*.

However, despite being traditionally the reference regions for the video games industry, these two powerhouses are overall not extensively examined on the literature subset as compared to other clusters worldwide.

For instance, in analysing further the specialised stream of literature, **Australia emerges as an active country in the video games industry.** Nonetheless, the Australian video game industry represents a "niche player", mainly due to its smaller population of video games companies compared to the big and traditional hubs of Canada and the US (*Darchen, 2017a*). Notably, the cities of Melbourne and Brisbane constitute the two main clusters for the gaming sector *(Parker et al., 2014; Darchen, 2016; Darchen, 2017*). Specifically, Melbourne constitutes the bigger hub, where game developers are more centrally located in the business district or in South Bank.

Generally, they work on more complex desktop games, which often require in-presence collaborative work compared to apps for mobile phones *(Darchen, 2016a)*. In Brisbane, instead, the advent of the internet and new platforms enabled the specialisation of small companies gravitating in the mobile games business. However, *Darchen (2016, 2017)* argues that the two Australian cities show only limited overlap with the typical creative clusters. According to this author, the analysed agglomerations of video games companies—with the notable exception of central Melbourne and the Brisbane inner-city suburb of Fortitude Valley—emerge more as a result of their embeddedness in the technology sector, which makes it possible for game developers to operate at the geographic periphery of the two main urban agglomerations *(Parker et al., 2014; Darchen, 2016)*.

Thus, the literature tends to define these two cities as "networked communities" rather than spatially bound clusters of companies *(Darchen, 2016a, 2017a)*. This is in opposition to larger and more mature creative clusters, such as Montreal, as in the Australian context the inner-city is not the only place from which successful games are produced *(Parker et al., 2014; Darchen, 2017*).

Interestingly, there is a considerable number of recent studies focusing on the **Chinese video games industry** (*Gong and Hassink, 2019; Gong and Xin, 2019; Jiang and Fung, 2019; Yang and Chan, 2021; Gong et al., 2023; Xu et al., 2023*). In fact, in recent years, the Chinese economy has spectacularly evolved and the country has become one of the main global technology powerhouses.

This remarkable development is also reflected in the video games sectors, with the presence of major industry players, such as Tencent, among the current global market leaders (*Yang and Chan, 2021). Concerning the localization of video games companies, Shanghai represents a prominent hub (Gong and Hassink, 2019; Gong and Xin, 2019), together with Shenzhen (Yang and Chan, 2021) and Wuhan (Xu et al., 2023)*.

The emergence of the Chinese video game industry has been heavily determined by the government's neo-techno-nationalist policies, aimed at promoting domestic technological capabilities and cultural exports, while limiting foreign competition (*Yang and Chan, 2021*). In practice, this ambition translated into heavy infrastructure investment—for instance, in the creation of technology parks, such as Optics Valley, the R&D and production centre of optical fibres and cables in Wuhan (*Xu et al., 2023*)—regulatory barriers, and support for domestic companies to foster internal growth and position the industry as a global competitor (*Yang and Chan, 2021*).

Another remarkable Asian player in the video games sector is represented by South Korea and its main metropolitan hub of Seoul. Among the studies analysed, Jang et al. (2017) adopt a microgeography perspective to examine Seoul's local districts of video games, and how product innovation is influenced by firms' agglomeration dynamics. The authors analyse whether video game firms locate to form sub-clusters and whether they asymmetrically benefit from product innovation agglomerations at the individual and sub-cluster levels. First, the authors find that firms specialising in specific product innovation activities tend to form sub-clusters within a bigger industrial cluster. Secondly, it also emerges how the relationships between specific product innovation activities and commercial performances vary across individual firms and sub-clusters within the macro cluster.

Finally, **GAME-ER** identifies a stream of research displaying a tendency to focus on countries and regions occupying a more peripheral position in the context of the global video games industry. For example, among the Latin American countries, Brazil and Chile have recently received some academic attention (*Baeza-González, 2021; Diniz and Abrita, 2021*).

Brazil emerges as an active, although still minor, hub in the global video games industry. Nonetheless, Brazil hosts a significant number of video games companies that tend to colocate and concentrate mainly in the major cities of Sao Paulo and Rio de Janeiro (*Diniz and Abrita, 2021*).

Chile, and specifically the clusters located in Santiago de Chile and Viña del Mar, appear to be young and small video games centres. Despite the peripheral position of Chile in the video games industry, these clusters have been nonetheless successful in developing in the early 2000s successful adaptations of popular video games. Therefore, Chilean companies managed to develop connections with global big publishers operating in the industry (*Baeza-González, 2021*).

Focusing on **South Africa**, *Snowball et al. (2021)* analyse the video games cluster located in Cape Town, finding a unique ability of companies located in this cluster to combine innovation capabilities in digital technology, creative inputs and diversified workforce.

b. European clusters

The review of the subset of the identified articles concerning the clustering within the video games sector reveals how this phenomenon has been analysed in a more limited way in Europe. More precisely, as evidenced in Figure 6, extant literature has generally analysed the bigger and highly structured metropolitan clusters of **London, Liverpool, Paris, Helsinki and Hamburg.**

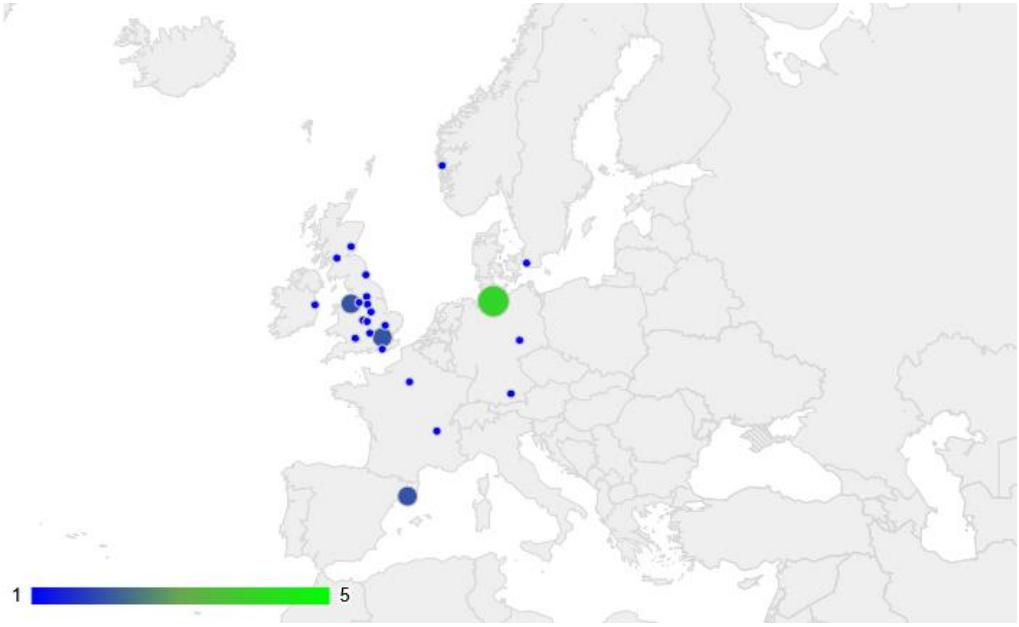

Figure 6 - European metropolitan and regional video games clusters investigated

Notes: The dots, and their size and colour, represent the frequency of appearance of the cities, or regions, analysed in the literature. **Source:** Authors' own elaboration using *Google Sheets.*

Consistently, **GAME-ER** observes that the video games hub of Hamburg has been extensively analysed on the subset of selected articles as well *(Binz and Gong, 2022; Gong, 2020; Gong and Binz, 2023; Mendez-Ortega and Arauzo-Carod, 2020*). However, **GAME-ER** also finds a very limited coverage of the other developed and well-known European clusters of London and Paris (De Vaan et al., 2013) and Helsinki (*Lehtonen et al., 2020*).

In contrast with previous research on European clusters (*Nesta, 2014; Plum and Hassink, 2014*), the studies included in the present analysis reveal how there are numerous emerging video games clusters. Generally, the clusters that emerge from the present review of the literature appear to be localised in cities of smaller size. Moreover, they are often the product of targeted regional innovation and industrial policies aiming at moving away these cities from declining, albeit traditional, manufacturing activities.

In this respect, the **Swedish region of Scania**, and its main video games cluster of Malmo, have been analysed in detail by *Miorner and Trippl (2017)* and *Miorner (2022)*. Particularly, the authors focus their attention on the process of new path development and adaptation of the region towards the new technological and creative sector of digital games. In the Scandinavian region, **Norway**, and

specifically Bergen, represent the other cluster for the gaming industry as documented by *Hovig (2016)*. The author focuses in particular on the practices of game developers and their embeddedness with the local context, challenging the view of the video game industry as a "weightless industry". Specifically, the video game cluster of Bergen, although connected with the global industry, appears to be shaped by the local context through a co-evolutionary dynamic between actors, practices, and the local environment.

In **Germany**, outside the traditionally prominent cluster of Hamburg, *Lange and von Streit (2013)* explore the two clusters of Munich and Leipzig. The paper analyses the governance structures put in place to facilitate the development of the software and games industry in the two cities and discusses how political institutions can adapt to provide more flexible governance for the creative industries. Specifically, rather than universal governance approaches, the authors suggest that context-specific support structures are best suited for the video games industry. Secondly, the authors highlight the importance of informal social networks among managers and entrepreneurs in an industrial context that tends to operate at the city-regional scale. In addition, *Lange and von Streit (2013)* recognize that the fast-paced market dynamics of the video games industry have outpaced the ability of the city of Leipzig to establish appropriate steering structures.

Moving to **France**, the video games cluster of Lyon, situated outside the centralising cluster of Paris, has emerged as a reference hub for the gaming industry. Although Lyon already held an international reputation for its high-tech industries of pharmaceuticals and bioengineering, the city was not specialised in computer-related activities. The creation of a local video games industry was the result of an ambitious urban renewal project, named Confluence, and the establishment and creation of worldwide leader firms in computer games—Electronic Arts and Infogrames, respectively (*Mendez-Ortega and Arauzo-Carod, 2020*).

In **Spain**, Barcelona is a main cultural hub for a number of creative industries, including video games *(Mendez-Ortega and Arauzo-Carod, 2020, 2019*). Similarly to the case of Lyon, the Barcelona hub emerged after the development of the urban development strategy called 22@, driven by the local city council and a combination of both public and private actors. This policy pushed the transformation of the vast urban area of Poblenou into a highly attractive venue for new firms of the knowledge economy and high-tech (*Mendez-Ortega and Arauzo-Carod, 2020*).

For what concerns the **United Kingdom**, the city of Liverpool is host to a vibrant video game cluster (Anderton, 2017; Tsang, 2021), which strengthened its position after the change in the city leadership in 2010. The author suggests that the video games industry showed particular resilience to local political changes as it easily managed to leverage on private initiatives. Moreover, *Tsang (2021)* identifies other relevant “mini-clusters” of game development companies in Glasgow, Dundee, Newcastle, Leeds, Sheffield, Nottingham, Cambridge, Manchester, Birmingham, Coventry, Bristol, Oxford, and Brighton.

Finally, from the analysis of the literature, the city of Dublin emerges as an interesting cluster (*Murphy et al., 2015*). Murphy's contribution analyses the location decision-making process of companies in the media and computer game sectors. In particular, firms are faced with the task of assessing the relative importance of both "hard" factors—such as market accessibility, availability of skilled workers, tax regimes, infrastructure, etc.—and "soft" factors—such as creative environment, urban amenities and "buzz", quality of life, diversity and openness (*Florida, 2004*). The author suggests that, despite policymakers having been promoting policies aiming at boosting the soft factors, hard factors remain the primary localization determinants for companies active in the video games industry. In fact, the hard factors that are key for video games companies in considering Dublin as a location for their operations are the availability of skilled labour and the quality of communications infrastructure.

4.3.3 Key features in video games industry clusters

Project-based industries, such as the video game industry, rely on a very different set of resources compared to manufacturing industries (*De Vaan et al., 2013*). Similarly, video games clusters leverage a combination of human capital, financial resources, technological infrastructure, and supportive policies to create dynamic ecosystems. In the present section, **UNITO** build upon the innovation literature analysed in the previous Section 3, and on the framework provided, to outline the main features and dynamics that characterise the identified video games clusters.

a. Main actors

Among the different actors that populate and give rise to video games clusters, large anchor firms seem to play a key role in the formation and growth of clusters in this specific industry (*Johns, 2006*). These are generally big and established companies that serve as a focal point around which smaller firms, service providers, and other entities collaborate. **Anchor firms** tend to facilitate networking and collaboration within the cluster, while they also drive innovation, attract talent, and create a network of suppliers and partners, thus fostering a thriving ecosystem. Moreover, anchor firms are able to attract skilled professionals, both locally and from around the world. Their presence enhances the overall talent pool in the given region, making the resulting cluster more attractive to other companies too (*Cohendet et al., 2018*).

They often collaborate with smaller firms on specific projects, providing opportunities for these companies to grow and innovate, or they may partner with academic institutions, fostering a culture of continuous learning and development. For instance, Blizzard Entertainment, headquartered in Irvine, California, often engages in collaborations with local universities and startups, thus enhancing the collaborative environment within the local cluster. Similarly, companies like Ubisoft, in Montreal, have drawn numerous game developers and creative professionals to the area, boosting the local pool of talents and skills (*Balland et al., 2013; Cohendet et al., 2010*). Furthermore, anchor firms generally invest heavily in research and development, thus driving technological advancements and setting industry standards. Their R&D activities can lead to spillovers, where

smaller firms and startups benefit from the innovations and new technologies developed by anchor firms.

Anchor firms also contribute significantly to the local economy not only through job creation, but also through investment and infrastructure development. In fact, their stability and growth provide a reliable economic foundation for the cluster, encouraging more businesses to set up operations nearby. As an example, Electronic Arts (EA) in Silicon Valley has been a major economic driver, fostering the growth of numerous related businesses and startups (Izushi and Aoyama, 2006). Similarly, within the Tokyo cluster, Sony and Nintendo have set standard design in game development and technology, influencing smaller developers and start-ups *(Izushi and Aoyama, 2006*). Moreover, *Cohendet et al. (2021)* highlight the central role played by Ubisoft in Montreal in its transition from a business ecosystem towards an innovation ecosystem in the gaming sector. Finally, in the Japanese console video game industry, *Hanzawa and Yamamoto (2017)* note an interesting feature of industrial and urban agglomerations. The authors point out how this agglomeration of companies can facilitate innovation by enabling "redundancy"—a diverse range of similar outputs, not necessarily commercially successful—and spreading the costs of knowledge verification, which are critical for innovation.

Also knowledge **brokers** play a crucial role in the formation and development of video game clusters, as evidenced by *Darchen and Tremblay (2015)* and *Kerr (2017)*. Knowledge brokers bridge innovation gaps between academia, industry, and start-ups and small firms in particular, often providing mentorship and advisory services to SMEs. By linking research institutions with game developers, knowledge brokers ensure that innovations and technological advancements are spread and applied in practical settings. This cross-pollination of knowledge helps in generating creative solutions and innovative game concepts (Aoyama and Izushi, 2003a).

The generation of spinoffs is another interesting element in this industry. In this context, several important companies in the video games sector originally emerged as spinoffs of bigger firms. For instance, *Barnes and Coe (2011)* explore the many cases of spinoff creation through the process of “firm fission” in the Vancouver cluster. The first one followed the successful acquisition of the first founded video game company of the city, Digital Software Incorporated (DSI), by Electronic Arts (EA). The second one happened when, after the acquisition of DSI in 1991 and the creation of EA Canada, dissatisfied former DSI employees created a new company, Radical Entertainment. The third, consists in the creation, in 1997, of two more companies, Barking Dog and Relic, by some of the same employees that were the founders of Radical Entertainment. This example underscores how the process of new firm creation greatly enhances the dynamism of an industry. Likewise, *Darchen (2016)* investigates the similar “spinoff effects” in the cluster of Melbourne in the early 1990s. In that period, individuals in the cluster would often begin their career at Melbourne House, the main catalyst in establishing the local video game industry, and then move on to create their own companies, such as in the many cases of *Taurus (1994), Blue Tongue (1995) or Tantalus (1994).*

Therefore, **spinoffs** contribute to the clustering dynamics within the video games industry. Regarding the geographical proximity of spinoffs to their parent companies, *De Vaan et al. (2013)* empirically test the idea that spinoffs are generally expected to locate relatively close to their parent companies, thereby contributing to regional clustering. Their research reveals that the average distance between a spinoff and its parent firm is quite substantial, approximately 800 km. However, a significant 71% of all spinoffs are located within a radius of 150 km from their parent company, and 90% of spinoffs remain within the same country as their parent. The most frequent international relocations of spinoffs occur between the USA, the UK, and Australia.

Additionally, **single developers and small development studios play a pivotal role** (Darchen, 2016a, 2017a). In fact, it emerges how the industry is supported by "mini clusters" (Tsang, 2021) of small, and sometimes isolated, developers, such as the many ones identified by Parker and Jenson (2017) located in dispersed and peripheral areas in Canada. Finally, other stakeholders may also drive the formation and development of video games clusters. In this respect, *Belyaeva et al. (2022)* underscore the importance of the availability of an economically active population, especially stakeholders from 15 to 34 years. The authors suggest that these stakeholders are key in the exploitation of social and economic resources that are crucial for the video games industry, such as the import and development of ICT services, the attraction of skills and the level of employment in knowledge-intensive services, the development of an ICT infrastructure and appropriate business models.

Finally, when looking at the evolution of this specific industry, it is also possible to apply an "industry life-cycle" approach to map the evolution of video game clusters through separate stages where different specific resources play a key role in supporting the activities of clusters *(Izushi and Aoyama, 2006; Zackariasson and Wilson, 2012*). In this respect, it could be argued that the video games industry presents four main stages in its evolution: (1) emergence phase, it is the initial stage that involves the concentration of pioneering firms and talent in a specific location. Factors such as the presence of a leading company, favourable policies, or a strong academic institution can drive cluster formation; (2) growth phase, for which, as more companies and talent are attracted, the cluster begins to grow. This stage is characterised by increased collaboration, investment, and innovation. Successful clusters often see the rise of supporting industries and services; (3) maturity phase, where the cluster reaches a high level of stability and reputation. It becomes a significant player in the global market, attracting international firms and talent. The ecosystem is well-developed, and the cluster can sustain continuous innovation; and finally (4) the renewal or decline phase, where over time clusters must adapt to changing market conditions and technological advancements. In order to be successful, clusters must be able to continuously renew themselves through innovation and diversification and policy makers are crucial resources also in this stage. Failure to adapt can lead to stagnation or decline.

b. *Different types of proximity*

As discussed in the previous sections, location and geographical proximity are among the key dimensions to understand clusters. For example, Canada constitutes a remarkable case where proximity to the US movie industry played a vital role in its emergence and flourishing *(Darchen & Tremblay, 2015; Pilon & Tremblay, 2013a*). Moreover, certain places, in particular urban areas, still attract a critical mass of companies and talent, as well as diversified and related sectors that support the development of clusters through complementarities (*Chapain et al., 2010*). In this respect, *Hovig (2016)* notes how the local context is vital in the formation of common community practices, where specific knowledge held within the community is produced through the interaction between actors, their practices, and the local context.

From this perspective, **part of the literature analysed explores the heterogeneous influence of geographical proximity on the formation and development of video games clusters.** For instance, *Balland et al. (2013)* thoroughly investigate how geographical, and also cognitive, proximities interact in the development of this industry. More precisely, the authors show how, for the video games sector specifically, geographical proximity becomes an important driver of cluster formation as the industry matures. The increasing effect of geographical proximity in the later stages of the industry life-cycle also suggests that firms are more likely to partner with firms over short geographical distances, and this is also explained because of the increasing technological complexity of video game development *(Sorenson et al., 2006)*. Conversely, institutional regimes and policies are less powerful in driving ties formation as the video game business evolves. Similarly, the authors also find that cognitive proximity between firms—in the form of similarities in video game genre portfolios—is not a determinant of cluster formation in the first generations of companies, but it becomes a relevant factor for later generations *(Balland et al., 2013)*.

De V*aan et al. (2013)*, instead, offer a more nuanced perspective on the effect of localization externalities. They conclude that localization externalities in clusters can be both positive and negative, but the positives tend to outweigh the negatives once the cluster size surpasses a critical threshold. This evidence underscores a key distinction between traditionally organised manufacturing industries and project-based industries when it comes to spatial clustering dynamics.

Focusing more specifically on the case of the US video games industry, *Vang and Tschang (2013)* provide a comprehensive analysis of the factors shaping the spatial organisation of video games companies. Their analysis suggests that the industry's distribution and interactions are driven by firms' use of in-house capabilities and distance networking, as well as localised entrepreneurial traits, proximity to universities, and spin-off effects. Specifically, the spatial organisation of the US video games industry does not follow the typical urban cluster model described in the literature on creative industries.

In fact, the size of a cluster does not necessarily correlate with the performance or innovativeness of the firms within it, and there are successful video game studios that operate independently, outside of major industry clusters. Interestingly, *Jang et al. (2017)* provide a micro-geography perspective on product innovation in smaller local clusters and explore whether firms co-locate to form sub-clusters.

The authors note that firms specialising in specific product innovation activities tend to co-locate to form sub-clusters within an industrial cluster (micro-dependence). The relationship between specific product innovation activities and sales performance varies across individual firms and sub-clusters within an industrial cluster (micro-heterogeneity). More recent findings by *Méndez-Ortega and Arauzo-Carod (2019)* suggest that smaller and younger firms in the video games industry exhibit stronger clustering behaviour compared to the larger and older firms, co-locating generally in core metropolitan areas. However, the clustering patterns of video game firms do not extend to the full range of the other creative industries, suggesting heterogeneity in locational preferences among high-tech creative activities.

Therefore, **UNITO** highlights how, from the one side, physical location and specific places are still relevant and crucial in the formation of clusters. In this respect, technology hubs are critical infrastructure components that support videogame clusters. These hubs provide physical spaces and resources that foster innovation and collaboration among game developers and start-ups, such as in the case of Game Hub Scandinavia. These hubs often house advanced technological tools and equipment, such as high-performance computing resources, virtual reality (VR) and augmented reality (AR) development kits, and specialised software. Access to such technology is crucial for developers to push the boundaries of what is possible in game design and development. Technology hubs frequently organise hackathons, coding bootcamps, and networking events that attract talent and foster skill development. These events help developers stay abreast of the latest trends and techniques in the industry. More generally, by bringing together diverse companies and professionals in a shared space, technology hubs encourage a culture of collaboration and innovation. Informal interactions and spontaneous brainstorming sessions can lead to creative solutions and new game concepts (*Darchen and Tremblay, 2015*).

Other forms of proximity may act as substitutes, or enhancers, for geographical colocation in network formation (*Breschi et al., 2010; Balland et al., 2015*). In fact, the structural characteristics of video game clusters make them closer to technological clusters and "assemblages" *(Boix et al., 2015*),[37] rather than traditional industrial clusters. This is reflected in the fact that a substantial part

[37] Video game clusters typically include a mix of large multinational companies, small and medium-sized enterprises (SMEs), indie developers, academic institutions, research centres and knowledge brokers. This diversity fosters an innovation ecosystem where different entities can collaborate and innovate. In this context, cross-pollination, cognitive proximity of companies and talent leads to a fertile ground for new ideas, technologies, and game design. As in "assemblages" (Boix et al., 2015), these clusters attract top talent from around the world, creating a "fluid" and global

of the literature takes a broader perspective, thus accounting for cognitive forms of proximity. In this vein, according to *Cohendet et al. (2021)*, the traditional rationale for which successful clusters stem from advantages of geographical agglomeration, or the features of the local space and organised proximities, does not completely hold in the case of the Montreal video games hub. The authors suggest that the development of the video games cluster in Montreal developed in successive transformations, transitioning from the medium of a local common platform *(Grandadam et al., 2013)* into an open ecosystem of innovation where diverse formal and informal stakeholders come together as a community.

From this point of view, cognitive proximity becomes the key agglomeration force, especially in industries characterised by shared community practices, as in the case of the video game industry *(Darchen, 2016b)*. For example, *Darchen (2017)*, in analysing the mobile games industry in Brisbane, concludes that the agglomeration of video game companies does not show the typical attributes of a creative cluster. Companies result less spatially bounded and function as a "networked community" embedded in the technology sector *(Parker and Jenson, 2017)*. In this specific cluster there is more limited cross-fertilization with other creative fields but increasing knowledge exchange among independent developers through local events, conferences, and new technologies. Additionally, *Gong and Hassink (2017)* highlight how while most of the prior research assumes that cultural industries tend to be spatially concentrated, in the video games sector the development of ICT makes the sharing of norms and values more decentralised.

Moreover, cognitive proximity is relevant also at the team level. *De Vaan and Stark (2015)* examine the role of the social factors explaining why some creative teams are able to produce distinctive and critically acclaimed cultural products. They suggest that creative success in video game development is facilitated when cognitively distant groups have overlapping membership. This organisational structure is defined as “structural folding”, and it is the force that drives cognitively heterogeneous groups to come together. This facilitates the production of distinctive, critically acclaimed, and game-changing video games through the generative tension created by such intersections of cognitively distant groups.

c. Complementarities and relatedness

Video games clusters interact with and complement other creative and innovative clusters, both in terms of technology and economics, thereby fostering cross-sector collaborations and innovation. Video game clusters frequently exhibit analogous characteristics with respect to creative processes, technological innovation, and impact as those observed in clusters dedicated to domains such as digital media, animation, and software development (*Potts et al., 2008; Cohendet et al., 2021*).

value chain less bound to physical proximity than in traditional industrial clusters, offering a combination of career opportunities, networking, and a conducive environment for professional growth.

Cross-fertilization between video game clusters and other related industries involved the diffusion and adoption of the same technologies (*O'Connor and Oakley, 2015*). Video games clusters frequently utilise sophisticated technologies in the domains of graphics, animation, artificial intelligence, and virtual reality, which can be integrated with technologies employed in other creative industries such as film, animation, and digital media (*Lê et al., 2013*). As a practical example, the advancement of real-time rendering and interactive storytelling techniques in video games can influence and enhance the immersive experience of virtual reality (VR) environments used in film or architectural visualisation.

Also, the economic activities and skills developed within video games clusters, such as game design, software development, and digital distribution, can be seen to overlap with and support other creative industries. Cross-sector collaborations have the potential to result in the creation of new products and services that combine elements of video games with other creative fields, such as music, film, fashion, or advertising. This can lead to the development of innovative hybrid experiences.

Specifically, the literature has identified strong complementarities between the video games industry and other creative industries. For instance, *Tschang (2010)* notes how the video games industry can leverage on the toys and the film industry's intellectual property. Similarly, *Pilon and Tremblay (2013)*, analysing the video games cluster of Montreal, highlight technological synergies and economic spillovers with the US film industry. In addition, cross-sector complementarities can lead to innovative products and services, enhancing competitiveness and creativity in both industries, due to, for instance, shared technology infrastructures and hubs, as well as the attraction of talent, expertise and shared skills in digital animation, special effects, and immersive technologies that benefits the two clusters because of labour market pooling.

d. Inheritance and new path development

The presence of previous specialised and potentially complementary industries, thus the so-called "inheritance", plays a distinct role in the formation of clusters. That is, as evidenced by *Adams (2021)*, the presence, within a region, of highly specialised firms in specific creative or technology sectors is found to greatly influence the formation of subsequent thriving video games clusters. In this respect, one of the most known instances is Japan.

In fact, the seminal work of *Aoyama and Izushi (2003)* finds that in the emergence, and worldwide success, of the Japanese video games industry, it was essential the contemporary presence of a strong animation and cartoon sector together with the technological knowledge accumulated in the consumer electronics sector.

However, part of the analysed literature identifies instances that contradict the idea of the pivotal role of inheritance. In this respect, *Siemiatycki et al. (2016)* provides a different viewpoint departing from the specific case of Vancouver. The author suggests that Vancouver's video games cluster, and more generally its transition to a "new economy" hub, was not the result of inherent place-based

characteristics. Instead, the authors suggest that this evolution was a contingent process mainly driven by external factors, and further argue that Vancouver's subsequent decline was driven by both external and internal factors that undermined the resilience of the local video games industry.

On a similar note, *Miörner and Trippl (2017)* analyse the digital games sector in Sweden's Scania region to understand how key actors can convert a restrictive regional environment into a conducive one for new industrial path development. Their findings reveal that the actors involved in the process employed various modes of change, navigating across different spatial scales to mobilise resources and kickstart change at the regional level. Interestingly, a few key individuals, including both local insiders and returning outsiders, played a crucial role in the transformation processes. Still concerning the remarkable case of new path development of the Scania video games cluster, *Miörner (2022)* provides more recent findings. More specifically, the author examines how factors such as regional imaginaries, power relations, and directionality, shape the reconfiguration capacity of regional innovation systems. Additionally, results suggest that actors tend to improvise and choose strategies that work within existing structures, rather than trying to dismantle barriers, thus relying on the reinterpretation and redefinition of existing structures.

e. Resource pooling

The growth of video game clusters relies heavily on various dynamics of resources pooling. One of the essential needs is to gather specific human resources and skilled labour. Clusters can attract and foster talent, including game designers, programmers, artists, and marketers. In this respect, the presence of educational institutions providing specialised training programs, within or near clusters, are crucial to meet industry needs. *Darchen (2016)* notes how in the case of Brisbane, the emergence of a video game cluster between 1988 and 1993 coincided with the establishment of local university programmes in computer sciences, which began to provide the necessary skilled workforce. In that context, the majority of game developers in Brisbane had a background in computer programming or hold a degree in informatics. Therefore, universities and research centres within clusters contribute to the continuous development of technology and provide a considerable stream of new talents and skills (*Vang and Tschang, 2013*).

Furthermore, in the case of the video games sector, there are also instances of the importance of particular subcultures in nurturing human capital with unique skills and sensibilities. This is the case of the role played by the demoscene subculture in the formation of the Nordic game industry between 1990 and 2005. As analysed by *Jorgensen et al. (2017)*, the demoscene provided a crucial pool of skilled talent that enabled the rapid growth of early Nordic game companies. Although the transition from hobbyist to professional game development was not simple, without the demoscene the early Nordic game companies would have had difficulty finding interested and qualified employees *(Jorgensen et al., 2017)*.

A second key asset consists in the access to venture capital, government grants, and other funding resources. Clusters often have a robust financial ecosystem that supports start-ups and fosters innovation. For instance, with respect to the video game industry in Atlantic Canada, *Pottie-Sherman and Lynch (2019)* highlight how the provincial governments have played a key role by providing the financial incentives and support to help establish, and then sustain, the video game industry in the region. In return, video game firms in Atlantic Canada are actively promoting the region and its unique attributes to link local firms with the wider gaming industry. Meanwhile, universities and colleges have been crucial in nurturing local talent and cultivating a regional gaming culture.

Finally, advanced technological infrastructure, including high-speed internet, pioneering hardware, and software tools, is essential for game development and distribution. Probably the most notable examples of the importance of technology for the video game industry is represented by Japan (*Izushi & Aoyama, 2006; De Vaan et al., 2013*) and the US (*S. B. Adams, 2021; de Vaan et al., 2019*), as pioneers in the industry, and recently by China (*Gong and Hassink, 2019; Gong and Xin, 2019; Jiang and Fung, 2019; Yang and Chan, 2021; Gong et al., 2023; Xu et al., 2023*), as a latecomer technological powerhouse.

f. Institutions and policies

A considerable stream of the analysed literature recognizes the fundamental role played by public institutions through the formulation of targeted policies aiming at fostering the video games sector. This is particularly relevant for the clusters that lack any form of inheritance. In this context, the literature on industrial clusters has already underscored the relevance of supportive government policies and incentives, tax waivers, grants, and infrastructure development, which can significantly influence the growth and sustainability of clusters.

The Vancouver case analysed by *Barnes and Coe (2011)* provides another example of supportive policies and active institutional involvement. This Canadian cluster, shaped by key institutions like government subsidies and labour unions, has rapidly transformed from a resource-based economy to a media cluster. Likewise, *Tremblay (2016)* with respect to the Montreal Metropolitan video games cluster, concludes that the role of intermediary organisations and specialised collective governance bodies have been crucial for business innovation in the industry.

In Europe, the role of institutional support is particularly important in the cases of the already mentioned case of new path development of Scania towards the video games sector (*Miorner and Trippl, 2017; Miorner, 2022)*. Additionally, in the case of the UK, Anderton (2017) underscores how, for the Liverpool video games cluster, local political events have had an influence on the cluster, especially during uncertain times of change of leadership. The ad hoc policies implemented in the cities of Barcelona and Lyon are another example of the centrality of the role played by the public sector and the local institutions (*Mendez-Ortega and Arauzo-Carod, 2020, 2019*). Moreover, the market for British video games also greatly benefited from the work of the BBC, and the launch of

the BBC Computer Literacy Project in the 1980s, which aimed at boosting the development of microcomputing technology in the country *(Tsang, 2021)*.

Institutional support is also key to legitimate industries which are new to a region, and thus outside its traditional industrial sectors. This is the case of the Hamburg video game industry, whereas highlighted by *Binz and Gong (2022)*, key legitimation and support efforts came from state and city actors. For the video game sector, legitimation hinged on system reconfiguration and institutional work driven by actors from both the industry itself and related sectors, operating at various scales. Specifically, the institutional work tended to be more intense when the industry faced moral scrutiny and had to draw on socio-technical schemes validated elsewhere, such as international narratives around successful age-labelling systems, industry associations, and funding schemes.

Recently, the Chinese government has emerged as a particularly active actor, determined in developing its primacy in the market of video games. In this respect, the papers analysed highlight the policies aiming at supporting the sector and the creation of technology parks to foster cluster creation and development (*Yang and Chan, 2021; Xu et al., 2023*).

5. CONCLUSIONS

The overall aim of the present report is to establish the knowledge base for the **GAME-ER** project to develop its future conceptual and empirical assessments in the subsequent tasks of the different work packages (WPs). Specifically, this deliverable intended to: (i) provide an overview of the relevant policy and academic research on the video games sector within the cultural and creative industries (CCIS), (ii) identify relevant analytical dimensions to investigate cluster formation and their characterization, and (iii) provide key insights through a detailed scoping review of the existing academic research on video game clusters.

The first part of the deliverable, corresponding to Section 2, reviewed the key reports and policy documents that aimed to map and assess the video games industry at the European level. In doing so, the section contextualises the video game industry within the CCIs highlighting its increasing recognition, in particular in Europe. Despite the increasing relevance of the video games sector, the analysis presented in Section 2 reveals varied industry classification models and significant challenges in measuring the industry's perimeter. More generally, the territorial dimension of the video game industry in Europe has been rarely addressed in a systematic way. The reviewed documents highlight how within Europe national differences in the configuration and dynamics of the video game industry exist, but the implication in terms of spatial organization and clustering dynamics has not been sufficiently explored. Moreover, it emerges how traditional methods of mapping the industry's spatial organisation have been limited in identifying smaller and emerging video games clusters, thus often resulting in underreporting and misclassification. Nonetheless, recent data-driven approaches and methodologies show promise in providing more accurate mappings, thereby enhancing **GAME-ER** overall understanding of the industry's spatial structure and its potential to become a crucial section for local and regional development.

The second part of the deliverable offers an interpretative framework, leveraging on the extensive and multidisciplinary literature on clusters. Precisely, Section 3 provides an overview of key analytical dimensions in the innovation, regional and creative industries research fields. The section examines various approaches in explaining cluster formation and their characterization, considering several crucial factors, such as agglomeration economies, spin-off dynamics, the types of resources pooled within clusters, proximity factors, and the role of innovation, all of which shape clustering in innovative and creative sectors. Therefore, this section aims to provide an initial interpretative framework for the **GAME-ER** project partners to build upon in their analysis of clusters.

The third part provides a comprehensive examination of the scholarly research on the video game industry as a CCI. Therefore, Section 4 adopts a scoping literature review approach to assess the extent to which video game clusters have been analysed in academic research, and to draw insights into the clusters that have been analysed so far. Specifically, the review identifies 51 studies addressing specific video game clusters globally.

Looking more closely at the European clusters identified, the review shows how the existing literature has predominantly focused on the larger and well-structured metropolitan clusters. Conversely, smaller city and regional clusters have received only some minor attention. Additionally, this section offers a discussion of the central actors, the key features, and patterns characterising video game clusters. The analysis of the literature also confirms that comparative analysis of video game clusters has been rarely performed.

Within the future developments of the **GAME-ER** project, each part contributes to the next steps of subsequent WPs. More specifically, Section 2 offers insights for the development of Europe-wide quantitative spatial mapping of gaming companies at the regional level and related clusters (T2.2). The analysis of the literature on the factors characterising clusters of innovative and creative industries developed in Section 3, along with the findings presented in Section 4 through the review of the video game clusters analyzed in the academic literature, will inform the qualitative research activities of WP3 and WP4 on the case studies of the **GAME-ER** project. Finally, the deliverable will guide WP5 in its development and delivery of the Interactive Methodological Toolkit and the formulation of cluster policy recommendations.

6. REFERENCES

Adams, S. B. (2021). From orchards to chips: Silicon Valley's evolving entrepreneurial ecosystem.

Entrepreneurship & Regional Development 33 (1-2), 15–35.

Agrawal, A., I. Cockburn, and J. McHale (2006). Gone but not forgotten: Knowledge flows, labor mobility, and enduring social relationships. *Journal of Economic Geography 6* (5), 571–591.

Anderton, D. (2017). Changing leadership in peripheral city region development: The case of Liverpool's high technology sectors. *Local Economy 32* (4), 352–373.

Antonelli, C. (2006). Localized technological change and factor markets: Constraints and inducements to innovation. *Structural Change and Economic Dynamics 17* (2), 224–247.

Antonelli, C., P. P. Patrucco, and F. Quatraro (2011). Productivity Growth and Pecuniary Knowledge Externalities: An Empirical Analysis of Agglomeration Economies in European Regions. *Economic Geography 87* (1), 23–50.

Antonietti, R. and R. Boschma (2021). Social capital, resilience, and regional diversification in Italy.

Industrial and Corporate Change 30 (3), 762–777.

Aoyama, Y. and H. Izushi (2003). Hardware gimmick or cultural innovation? Technological, cultural, and social foundations of the Japanese video game industry. *Research Policy 32* (3), 423–444.

Aria, M. and C. Cuccurullo (2017). bibliometrix: An r-tool for comprehensive science mapping analysis.

Journal of informetrics 11 (4), 959–975.

Aria, M., M. Misuraca, and M. Spano (2020). Mapping the evolution of social research and data science on 30 years of social indicators research. *Social indicators research 149*, 803–831.

Arksey, H. and L. O'Malley (2005). Scoping studies: Towards a methodological framework.

International Journal of Social Research Methodology 8 (1), 19–32.

Baeza-González, S. (2021). Techno-dependencies in video games production: A Chilean case study.

Geoforum 121, 115–128.

Bagnasco, A. (2012). Trust and Social Capital. In *The Wiley-Blackwell Companion to Political Sociology*, Chapter 22, pp. 252–262. John Wiley & Sons, Ltd.

Balland, P.-A., R. Boschma, and K. Frenken (2015). Proximity and Innovation: From Statics to Dynamics. *Regional Studies 49* (6), 907–920.

Balland, P.-A., M. De Vaan, and R. Boschma (2013). The dynamics of interfirm networks along the industry life cycle: The case of the global video game industry, 1987–2007. *Journal of Economic Geography 13* (5), 741–765.

Baptista, R. and P. Swann (1998). Do firms in clusters innovate more? *Research Policy 27* (5), 525–540.

Barnes, T. and N. M. Coe (2011). Vancouver as Media Cluster: The Cases of Video Games and Film/TV. In *Media Clusters*, Chapter Media Clusters. Edward Elgar Publishing. Section: Media Clusters.

Basaraba, N. (2023). The emergence of creative and digital place-making: A scoping review across disciplines. *New Media & Society 25* (6), 1470–1497.

Bathelt, H. and J. S. Boggs (2003). Toward a Reconceptualization of Regional Development Paths: Is Leipzig's Media Cluster a Continuation of or a Rupture with the Past? *Economic Geography 79* (3), 265–293.

Bathelt, H. and P. Cohendet (2014). The creation of knowledge: Local building, global accessing and economic development—toward an agenda. *Journal of Economic Geography 14* (5), 869–882.

Bathelt, H., D. F. Kogler, and A. K. Munro (2010). A knowledge-based typology of university spin-offs in the context of regional economic development. *Technovation 30* (9), 519–532.

Bathelt, H., A. Malmberg, and P. Maskell (2004). Clusters and knowledge: Local buzz, global pipelines and the process

of knowledge creation. *Progress in Human Geography 28* (1), 31–56.

Beaudry, C. and A. Schiffauerova (2009). Who's right, Marshall or Jacobs? The localization versus urbanization debate. *Research Policy 38* (2), 318–337.

Becattini, G., M. Bellandi, and L. D. Propris (2009). *A Handbook of Industrial Districts*. Cheltenham, UK ; Northampton, MA: Edward Elgar Pub.

Becker, H. S. (1982). *Art Worlds* (First Edition ed.). Berkeley: University of California Press.

Belyaeva, Z., A. Petrosyan, and S. R. Shams (2022). Stakeholder data analysis in the video gaming industry: Implications for regional development. *EuroMed Journal of Business 17* (3), 333–349.

Benghozi, P.-J. and I. Lyubareva (2014). When organizations in the cultural industries seek new business models: A case study of the french online press. *International Journal of Arts Management 16* (3), 6–19.

Berg, S.-H. (2015). Creative Cluster Evolution: The Case of the Film and TV Industries in Seoul, South Korea. *European Planning Studies 23* (10), 1993–2008.

Bertacchini, E. E. and P. Borrione (2013). The Geography of the Italian Creative Economy: The Special Role of the Design and Craft-based Industries. *Regional Studies 47* (2), 135–147.

Bertello, A., P. De Bernardi, and F. Ricciardi (2023). Open innovation: Status quo and quo vadis

- an analysis of a research field. *Review of Managerial Science*. Bessant and Tidd
(2011). Innovation and Entrepreneurship.

Beugelsdijk, S. (2007). The Regional Environment and a Firm's Innovative Performance: A Plea for a Multilevel Interactionist Approach. *Economic Geography 83* (2), 181–199.

Binz, C. and H. Gong (2022). Legitimation dynamics in industrial path development: New-to-the- world versus new-to-the-region industries. *Regional Studies*.

Bocquet, R. and C. Mothe (2015). Can a governance structure foster cluster ambidexterity through knowledge management? An empirical study of two French SME clusters. *Knowledge Management Research & Practice 13* (3), 329–343.

Boix, R., J. L. Hervás-Oliver, and B. De Miguel-Molina (2015). Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages*. *Papers in Regional Science 94* (4), 753–773.

Boix, R., L. Lazzeretti, F. Capone, L. D. Propris, and D. Sánchez (2012). The geography of creative industries in Europe: Comparing France, Great Britain, Italy and Spain. In *Creative Industries and Innovation in Europe*. Routledge.

Boschma, R. A. (2005a). Does geographical proximity favour innovation? *Économie et institutions* (6-7), 111–128.

Boschma, R. (2005b). Proximity and innovation: a critical assessment. *Regional studies*, *39*(1), 61-74.

Boschma, R. A. and A. L. J. ter Wal (2007). Knowledge Networks and Innovative Performance in an Industrial District: The Case of a Footwear District in the South of Italy. *Industry and Innovation 14* (2), 177–199.

Boschma, R. A. and R. Wenting (2007). The spatial evolution of the British automobile industry: Does location matter? *Industrial and Corporate Change 16* (2), 213–238.

Boyack, K. W. and R. Klavans (2010). Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? *Journal of the American Society for information Science and Technology 61* (12), 2389–2404.

Brenner, T., U. Cantner, and H. Graf (2013). Introduction: Structure and Dynamics of Innovation Networks. *Regional Studies 47* (5), 647–650.

Breschi, S., C. Lenzi, F. Lissoni, and A. Vezzulli (2010). The Geography of Knowledge Spillovers: The Role of Inventors' Mobility Across Firms and in Space. In R. Boschma and R. Martin (Eds.), *The Handbook of Evolutionary Economic Geography*. Edward Elgar Publishing.

Breschi, S. and F. Lissoni (2001). Knowledge spillovers and local innovation systems: a critical survey.

Industrial and corporate change 10 (4), 975–1005.

Breschi, S. and F. Malerba (2001). The Geography of Innovation and Economic Clustering: Some Introductory Notes. *Industrial and Corporate Change 10* (4), 817–833.

Broadus, R. N. (1987). Toward a definition of "bibliometrics". *Scientometrics 12*, 373–379.

Buenstorf, G. and C. Guenther (2011). No place like home? Relocation, capabilities, and firm survival in the German machine tool industry after World War II. *Industrial and Corporate Change 20* (1), 1–28.

Buenstorf, G. and S. Klepper (2009). Heritage and Agglomeration: The Akron Tyre Cluster Revisited. *The Economic Journal 119* (537), 705–733.

Burlina, C., P. Casadei, and A. Crociata (2023). Economic complexity and firm performance in the cultural and creative sector: Evidence from Italian provinces. *European Urban and Regional Studies 30* (2), 152–171.

Callon, M., J. P. Courtial, and F. Laville (1991). Co-word analysis as a tool for describing the network of interactions between basic and technological research: The case of polymer chemistry. *Scientometrics 22*, 155–205.

Casadei, P., M. Bloom, R. Camerani, M. Masucci, J. Siepel, and J. V. Ospina (2023). Mapping the state of the art of creative cluster research: A bibliometric and thematic analysis. *European Planning Studies 31* (12), 2531–2551. Publisher: Routledge _eprint: https://doi.org/10.1080/09654313.2022.2158722.

Casadei, P. and N. Lee (2019). Global cities, creative industries and their representation on social media: A micro-data analysis of Twitter data on the fashion industry. *Environment and Planning A: Economy and Space 52* (6), 1195–1220.

Cassi, L. and A. Plunket (2014). Proximity, network formation and inventive performance: In search of the proximity paradox. *The Annals of Regional Science 53* (2), 395–422.

Caves, R. E. (2000). *Creative Industries: Contracts Between Art and Commerce*. Harvard University Press.

Chapain, C., P. Cooke, L. D. Propris, S. MacNeill, and J. Mateos-Garcia (2010). Creative clusters and innovation.

Chapain, C. and D. Sagot-Duvauroux (2020). Cultural and creative clusters – a systematic literature review and a renewed research agenda. *Urban Research & Practice 13* (3), 300–329. Publisher: Routledge

_eprint: https://doi.org/10.1080/17535069.2018.1545141.

Chapain, C. and K. Stachowiak (2017). Innovation Dynamic in the Film Industry: The Case of the Soho Cluster in London. In C. Chapain and T. Stryjakiewicz (Eds.), *Creative Industries in Europe: Drivers of New Sectoral and Spatial Dynamics*, pp. 65–94. Cham: Springer International Publishing.

Cobo, M. J., A. G. López-Herrera, E. Herrera-Viedma, and F. Herrera (2011). Science mapping software tools: Review, analysis, and cooperative study among tools. *Journal of the American Society for information Science and Technology 62* (7), 1382–1402.

Cohen, W. M. and D. A. Levinthal (2000). Absorptive Capacity: A New Perspective on Learning and Innovation *. In *Strategic Learning in a Knowledge Economy*. Routledge.

Cohendet, P., D. Grandadam, C. Mehouachi, and L. Simon (2018). The local, the global and the industry common: The case of the video game industry. *Journal of Economic Geography 18* (5), 1045–1068

Cohendet, P., D. Grandadam, and L. Simon (2010). The Anatomy of the Creative City. *Industry and Innovation 17* (1), 91–111.

Cohendet, P. and L. Simon (2007). Playing across the playground: Paradoxes of knowledge creation in the videogame firm. *JOURNAL OF ORGANIZATIONAL BEHAVIOR 28* (5), 587–605.

Cohendet, P., L. Simon, and C. Mehouachi (2021). From business ecosystems to ecosystems of innovation: The case of the video game industry in Montréal. *Industry and Innovation 28* (8), 1046–1076.

Cohendet, P., and Mehouachi, C. (2018). Des territoires géographiques à l'écosystème stratégique: Dynamiques de structuration du secteur du jeu vidéo en France. *Revue française de gestion*, (3), 155-173.

Coleman (1990). *Foundations of Social Theory*.

Coleman, S. and N. Dyer-Witheford (2007). Playing on the digital commons: Collectivities, capital and contestation in videogame culture. *MEDIA CULTURE & SOCIETY 29* (6), 934.

Comunian, R., C. Chapain, and N. Clifton (2010). Location, location, location: Exploring the complex relationship between creative industries and place. *Creative Industries Journal 3* (1), 5–10.

Crossick, G. (2006). *Knowledge Transfer Without Widgets: The Challenge of the Creative Economy: A Lecture to the Royal Society of Arts in Leeds on 31 May 2006*. Goldsmiths College.

Cruz, S. C. S. and A. A. C. Teixeira (2010). The Evolution of the Cluster Literature: Shedding Light on the Regional Studies–Regional Science Debate. *Regional Studies 44* (9), 1263–1288.

Darchen, S. (2016). "Clusters" or "communities"? Analysing the spatial agglomeration of video game companies in Australia. *Urban Geography 37* (2), 202–222. Publisher: Routledge _eprint: https://doi.org/10.1080/02723638.2015.1067981.

Darchen, S. (2017). Creative clusters? Analysis of the video game industry in Brisbane, Australia (1980s-2014). *International Journal of Knowledge-Based Development 8* (2), 168–182. Publisher: Inderscience Publishers.

Darchen, S. and D.-G. Tremblay (2015). Policies for Creative Clusters: A Comparison between the Video Game Industries in Melbourne and Montreal. *European Planning Studies 23* (2), 311–331. Publisher: Routledge _eprint: https://doi.org/10.1080/09654313.2013.865712.

DCMS (1998). Creative Industries Mapping Documents 1998. Technical report.

DCMS (2001). Creative Industries Mapping Documents 2001. Technical report.

De Vaan, M., R. Boschma, and K. Frenken (2013). Clustering and firm performance in project-based industries: The case of the global video game industry, 1972–2007. *Journal of Economic Geography 13* (6), 965–991.

de Vaan, M., K. Frenken, and R. Boschma (2019). The Downside of Social Capital in New Industry Creation. *Economic Geography 95* (4), 315–340.

de Vaan, M. and D. Stark (2015). Game Changer: The Topology of Creativity. *American Journal of Sociology* .

de Vaan, M., B. Vedres, and D. Stark (2015). Game Changer: The Topology of Creativity.

American Journal of Sociology 120 (4), 1144–1194.

Delgado, M., M. E. Porter, and S. Stern (2010). Clusters and entrepreneurship. *Journal of Economic Geography 10* (4), 495–518.

D'Este, P., F. Guy, and S. Iammarino (2013). Shaping the formation of university–industry research collaborations: What type of proximity does really matter? *Journal of Economic Geography 13* (4), 537–558.

DEV, Asociación española de empresas productoras y desarrolladoras de videojuegos y software de entretenimiento, DEV. and E. E. e. I. ICEX (2018). Libro Blanco del Desarrollo Español de Videojuegos 2018. Technical report.

Dhanaraj, C. and A. Parkhe (2006). Orchestrating Innovation Networks. *Academy of Management Review 31* (3), 659–669.

Diniz, RG. and MB. Abrita (2021). THE GAMING INDUSTRY IN THE BRAZILIAN TERRITORY: A STUDY BASED ON RECENT DATA AND INDICATORS. *REVISTA FORMACAO*

ONLINE 28 (53), 719–748.

Donthu, N., S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of business research 133*, 285–296.

DSIT, Innovation and Technology, U. D. f. S. (2024). Identifying and describing UK innovation clusters. Technical report.

Durmaz, B., S. Platt, and T. Yigitcanlar (2010). Creativity, culture tourism and place-making: Istanbul and London film industries. *International Journal of Culture, Tourism and Hospitality Research 4* (3), 198–213.

Eck, N. J. v. and L. Waltman (2009). How to normalize co-occurrence data? an analysis of some well-known similarity measures. *Journal of the American society for information science and technology 60* (8), 1635–1651.

EGDF (2019). 2019 EUROPEAN VIDEO GAMES INDUSTRY INSIGHT REPORT. Technical report. EGDF (2020). 2020 EUROPEAN VIDEO GAMES INDUSTRY INSIGHT REPORT. Technical report. EGDF (2021). 2021 EUROPEAN VIDEO

GAMES INDUSTRY INSIGHT REPORT. Technical report

Enrietti, A., A. Geuna, C. R. Nava, and P. P. Patrucco (2022). The birth and development of the Italian automotive industry (1894–2015) and the Turin car cluster. *Industrial and Corporate Change 31* (1), 161–185.

Ernkvist, M. (2008). Down many times, but still playing the game: Creative destruction and industry crashes in the early video game industry 1971-1986.

Ernkvist, M. and P. Ström (2018). Differentiation in digital creative industry cluster dynamics: The growth and decline of the Japanese video game software industry. *Geografiska Annaler: Series B, Human Geography 100* (3), 263–286.

EU Commission (2010). Unlocking the potential of cultural and creative industries. Website, Publications Office of the European Union.

EU Commission, ECORYS, and KEA (2023). *Understanding the Value of a European Video Games Society: Final Report*. Publications Office of the European Union.

EU Commission and D. Power (2011). The European Cluster Observatory : Priority sector report: Creative and cultural industries. Technical report, Publications Office of the European Union.

European Commission (2021). Creative Europe 2021-2027: Monitoring report. Technical report, Ufficio delle pubblicazioni dell'Unione europea.

European Commission, IDEA Consult, KEA, and IMEC-SMIT VUB. (2017). Mapping the creative value chains: A study on the economy of culture in the digital age : Final report. Technical report, Publications Office, LU.

Evans, G. (2009). Creative Cities, Creative Spaces and Urban Policy. *Urban Studies 46* (5-6), 1003–1040.

Florida (2002). *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life*.

Florida, R., C. Mellander, and K. Stolarick (2010). Music Scenes to Music Clusters: The Economic Geography of Music in the US, 1970–2000. *Environment and Planning A: Economy and Space 42* (4), 785–804.

FORFAS (2011). The Games Sector in Ireland: An Action Plan for Growth. https://enterprise.gov.ie/en/publications/the-games-sector-in-ireland-an-action-plan-for-growth.html.

Frenken, K., F. Van Oort, and T. Verburg (2007). Related Variety, Unrelated Variety and Regional Economic Growth. *Regional Studies 41* (5), 685–697.

Garcia and Bakhshi (2016). The Geography of Creativity in the UK - Creative clusters, creative people and creative networks. Technical report.

Garnsey, E. and P. Heffernan (2005). High-technology clustering through spin-out and attraction: The Cambridge case. *Regional Studies 39* (8), 1127–1144

Gertler, M. S. (1995). "Being There": Proximity, Organization, and Culture in the Development and Adoption of Advanced Manufacturing Technologies. *Economic Geography 71* (1), 1–26.

Gertler, M. S. (2003). Tacit knowledge and the economic geography of context, or The undefinable tacitness of being (there). *Journal of Economic Geography 3* (1), 75–99.

Gill, R., Pratt, A. C., & Virani, T. E. (Eds.). (2019). *Creative hubs in question: Place, space and work in the creative economy*. Springer.

Giuliani, E. (2007). The selective nature of knowledge networks in clusters: Evidence from the wine industry. *Journal of Economic Geography 7* (2), 139–168.

Glaeser, E. L., H. D. Kallal, J. A. Scheinkman, and A. Shleifer (1992). Growth in Cities.

Journal of Political Economy 100 (6), 1126–1152.

Glaeser, E. L. and J. Scheinkman (2000). Non-Market Interactions.

Gong, H. (2020). Multi-scalar legitimation of a contested industry: A case study of the Hamburg video games industry. *Geoforum 114*, 1–9.

Gong, H. and C. Binz (2023). Cumulative causation in regional industrial path development

– A conceptual framework and case study in the videogame industry of Hamburg and Shanghai.

Geoforum 141, 103729.

Gong, H. and R. Hassink (2017). Exploring the clustering of creative industries. *European Planning Studies 25* (4), 583–600. Publisher: Routledge _eprint: https://doi.org/10.1080/09654313.2017.1289154.

Gong, H. and R. Hassink (2019). Developing the Shanghai online games industry: A multi-scalar institutional perspective. *Growth and Change 50* (3), 1006–1025.

Gong, H. and X. Xin (2019). Buzz and tranquility, what matters for creativity? A case study of the online games industry in Shanghai. *Geoforum 106*, 105–114.

Gong, H., Z. Yu, and R. Hassink (2023). Differentiated knowledge bases and catch-up in creative industries – A case of the online game industry in China. *Geoforum 141*, 103730.

Graf, H. (2006). Networks in the Innovation Process. *Books*.

Grandadam, D., P. Cohendet, and L. Simon (2013). Places, Spaces and the Dynamics of Creativity: The Video Game Industry in Montreal. *Regional Studies 47* (10), 1701–1714. Publisher: Routledge _eprint: https://doi.org/10.1080/00343404.2012.699191.

Griffith, R., S. Redding, and J. Van Reenen (2003). R&D and Absorptive Capacity: Theory and Empirical Evidence. *The Scandinavian Journal of Economics 105* (1), 99–118.

Haefliger, S., P. Jäger, and G. von Krogh (2010). Under the radar: Industry entry by user entrepreneurs. *RESEARCH POLICY 39* (9), 1198–1213.

Hanzawa, S. and D. Yamamoto (2017). Recasting the agglomeration benefits for innovation in a hits-based cultural industry: Evidence from the Japanese console videogame industry. *Geografiska Annaler: Series B, Human Geography 99* (1), 59–78.

Heebels, B. and R. Boschma (2011). Performing in Dutch book publishing 1880–2008: The importance of entrepreneurial experience and the Amsterdam cluster. *Journal of Economic Geography 11* (6), 1007–1029.

Hervas-Oliver, J.-L., G. Gonzalez, P. Caja, and F. Sempere-Ripoll (2015). Clusters and Industrial Districts: Where is the Literature Going? Identifying Emerging Sub-Fields of Research. *European Planning Studies 23* (9), 1827–1872.

Hodgson, D. and L. Briand (2013). Controlling the uncontrollable: 'Agile' teams and illusions of autonomy in creative work. *WORK EMPLOYMENT AND SOCIETY 27* (2), 308–325.

Hotho, S. and K. Champion (2011). Small businesses in the new creative industries: Innovation as a people management challenge. *Management Decision 49* (1), 29–54.

Høvig, Ø. S. (2016). Co-evolutionary dynamics and institutions: Innovation in a guild community in Norway. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography 70* (3), 152–161.

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research Policy 35* (5), 715–728.

Howkins (2005). Enhancing creativity.

Hracs, B. J. (2015). Cultural Intermediaries in the Digital Age: The Case of Independent Musicians and Managers in Toronto. *Regional Studies 49* (3), 461–475.

Interreg Europe (2024). Cultural and Creative Industries - A Policy Brief from the Policy Learning Platform for a smarter Europe. Technical report.

Izushi, H. and Y. Aoyama (2006). Industry Evolution and Cross-Sectoral Skill Transfers: A Comparative Analysis of the Video Game Industry in Japan, the United States, and the United Kingdom. *Environment and Planning A: Economy and Space 38* (10), 1843–1861. Publisher: SAGE Publications Ltd.

Jacobs, J. (1969). *The Economy of Cities*. Random House.

Jang, S., J. Kim, and M. von Zedtwitz (2017). The importance of spatial agglomeration in product innovation: A microgeography perspective. *Journal of Business Research 78*, 143–154.

Jiang, Q. and A. Y. Fung (2019). Games With a Continuum: Globalization, Regionalization, and the Nation-State in the

Development of China's Online Game Industry. *Games and Culture 14* (7-8), 801–824.

John St., C. H. and R. W. Pouder (2006). Technology Clusters versus Industry Clusters: Resources, Networks, and Regional Advantages. *Growth and Change 37* (2), 141–171.

Johns, J. (2006). Video games production networks: Value capture, power relations and embeddedness. *Journal of Economic Geography 6* (2), 151–180.

Jørgensen, K., U. Sandqvist, and O. Sotamaa (2017). From hobbyists to entrepreneurs: On the formation of the Nordic game industry. *Convergence 23* (5), 457–476.

Kaiser, F., A. Cuntz, and C. Peukert (2023). Batman forever? The role of trademarks for reuse in the US comics industry*. *RESEARCH POLICY 52* (8).

KEA and DG EAC EU Commission (2006). The Economy of Culture in Europe: A Study Prepared for the European Commission (Directorate-General for Education and Culture). Technical report, EC.

KEA and PPMI (2019). Culture and creative sectors in the European Union – Key future developments, challenges and opportunities. Technical report.

Kerr, A. (2017). *Global Games: Production, Circulation and Policy in the Networked Era*. New York: Routledge.

Kipper, L. M., L. B. Furstenau, D. Hoppe, R. Frozza, and S. Iepsen (2020). Scopus scientific mapping production in industry 4.0 (2011–2018): a bibliometric analysis. *International Journal of Production Research 58* (6), 1605–1627.

Klepper, S. (2010). The origin and growth of industry clusters: The making of Silicon Valley and Detroit. *Journal of Urban Economics 67* (1), 15–32.

Kovacs, A., B. Van Looy, and B. Cassiman (2015). Exploring the scope of open innovation: a bibliometric review of a decade of research. *Scientometrics 104*, 951–983.

Kraus, S., M. Breier, W. M. Lim, M. Dabić, S. Kumar, D. Kanbach, D. Mukherjee, V. Corvello, J. Piñeiro- Chousa, E. Liguori, et al. (2022). Literature reviews as independent studies: guidelines for academic practice. *Review of Managerial Science 16* (8), 2577–2595.

Landoni, P., C. Dell'era, F. Frattini, AM. Petruzzelli, R. Verganti, and L. Manelli (2020). Business model innovation in cultural and creative industries: Insights from three leading mobile gaming firms. *TECHNOVATION 92–93*.

Landry, C. (2001). *The Creative City: A Toolkit for Urban Innovators*. Earthscan.

Lange, B. and A. von Streit (2013). Governance of creative industries: A comparison of the characteristics and challenges in the software/games industry in Munich and Leipzig. *Zeitschrift für Wirtschaftsgeographie 57* (1-2), 122–138

Lazzeretti, L., R. Boix, and F. Capone (2008). Do Creative Industries Cluster? Mapping Creative Local Production Systems in Italy and Spain. *Industry & Innovation 15* (5), 549–567.

Lazzeretti, L., F. Capone, A. Caloffi, and S. R. Sedita (2019). Rethinking clusters. Towards a new research agenda for cluster research. *European Planning Studies 27* (10), 1879–1903.

Lazzeretti, L., F. Capone, and N. Innocenti (2017). Exploring the intellectual structure of creative economy research and local economic development: A co-citation analysis. *European Planning Studies 25* (10), 1693–1713.

Lê, PL., D. Massé, and T. Paris (2013). Technological Change at the Heart of the Creative Process: Insights From the Videogame Industry. *INTERNATIONAL JOURNAL OF ARTS MANAGEMENT 15* (2), 45–59.

Lehtonen, M. J., A. Ainamo, and J. Harviainen (2020). The four faces of creative industries: Visualising the game industry ecosystem in Helsinki and Tokyo. *Industry and Innovation 27* (9), 1062–1087. Publisher: Routledge _eprint: https://doi.org/10.1080/13662716.2019.1676704.

Lorenzen, M. and L. Frederiksen (2007). Why do Cultural Industries Cluster? Localization, Urbanization, Products and Projects. In P. Cooke and L. Lazzeretti (Eds.), *Creative Cities, Cultural Clusters and Local Economic Development*. Edward Elgar Publishing.

Ma, JF., YB. Lu, and S. Gupta (2019). User innovation evaluation: Empirical evidence from an online game community. *DECISION SUPPORT SYSTEMS 117*, 113–123.

Malmberg, A. and P. Maskell (1997). Towards an explanation of regional specialization and industry agglomeration. *European Planning Studies 5* (1), 25–41.

Malmberg, A. and P. Maskell (2002). The Elusive Concept of Localization Economies: Towards a Knowledge-Based Theory of Spatial Clustering. *Environment and Planning A: Economy and Space 34* (3), 429–449.

Mansfield, E., M. Schwartz, and S. Wagner (1981). Imitation Costs and Patents: An Empirical Study.

The Economic Journal 91 (364), 907–918.

Marchand, A. and T. Hennig-Thurau (2013). Value Creation in the Video Game Industry: Industry Economics, Consumer Benefits, and Research Opportunities. *Journal of Interactive Marketing 27* (3), 141–157.

Marshall, A. (1920). *Principles of Economics* (8th ed.). Macmillan and Co.

Martinez-Garcia, A., P. Horrach-Rossello, and C. Mulet-Forteza (2023). Mapping the intellectual and conceptual structure of research on coda in the 'social sciences' scientific domain. a bibliometric overview. *Journal of Geochemical Exploration 252*, 107273

Mas-Tur, A., N. Roig-Tierno, S. Sarin, C. Haon, T. Sego, M. Belkhouja, A. Porter, and J. M. Merigó (2021). Co-citation, bibliographic coupling and leading authors, institutions and countries in the 50 years of technological forecasting and social change. *Technological Forecasting and Social Change 165*, 120487.

Maskell, P. and A. Malmberg (1999). The Competitiveness of Firms and Regions: 'Ubiquitification' and the Importance of Localized Learning. *European Urban and Regional Studies 6* (1), 9–25.

Massimino, B., JV. Gray, and KK. Boyer (2017). The Effects of Agglomeration and National Property Rights on Digital Confidentiality Performance. *PRODUCTION AND OPERATIONS MAN- AGEMENT 26* (1), 162–179.

Méndez-Ortega, C. and J.-M. Arauzo-Carod (2019). Locating Software, Video Game, and Editing Electronics Firms: Using Microgeographic Data to Study Barcelona. *Journal of Urban Technology 26* (3), 81–109. Publisher: Routledge _eprint: https://doi.org/10.1080/10630732.2019.1613866.

Méndez-Ortega, C. and J.-M. Arauzo-Carod (2020). Do software and video game firms share location patterns across cities? Evidence from Barcelona, Lyon and Hamburg. *The Annals of Regional Science 64* (3), 641–666.

Menzel, M.-P. and J. Kammer (2019). Industry evolution in Varieties of Capitalism: A comparison of the Danish and US wind turbine industries. *Industrial and Corporate Change 28* (6), 1381–1403.

Meyer, M., D. Libaers, B. Thijs, K. Grant, W. Glänzel, and K. Debackere (2014). Origin and emergence of entrepreneurship as a research field. *Scientometrics 98*, 473–485.

Miörner, J. (2022). Contextualizing agency in new path development: How system selectivity shapes regional reconfiguration capacity. *Regional Studies*.

Miörner, J. and M. Trippl (2017). Paving the way for new regional industrial paths: Actors and modes of change in Scania's games industry. *European Planning Studies*.

Mommaas, H. (2009). Spaces of Culture and Economy: Mapping the Cultural-Creative Cluster Landscape. In L. Kong and J. O'Connor (Eds.), *Creative Economies, Creative Cities*, Volume 98, pp. 45–59. Dordrecht: Springer Netherlands.

Morrison, A. and R. Boschma (2019). The spatial evolution of the Italian motorcycle industry (1893–1993): Klepper's heritage theory revisited. *Industrial and Corporate Change 28* (3), 613–634.

Munn, Z., M. D. J. Peters, C. Stern, C. Tufanaru, A. McArthur, and E. Aromataris (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology 18* (1), 143.

Murgado-Armenteros, E. M., M. Gutiérrez-Salcedo, F. J. Torres-Ruiz, and M. J. Cobo (2015). Analysing the conceptual evolution of qualitative marketing research through science mapping analysis. *Sciento- metrics 102*, 519–557

Murphy, E., L. Fox-Rogers, and D. Redmond (2015). Location Decision Making of "Creative" Industries: The Media and Computer Game Sectors in Dublin, Ireland. *Growth and Change 46* (1), 97–113.

NESTA, J. Mateos-Garcia, H. Bakhshi, and M. Lenel (2014). A Map of the UK Games Industry. Technical report.

Niculaescu, CE., I. Sangiorgi, and AR. Bell (2023). Venture capital financing in the eSports industry.

RESEARCH IN INTERNATIONAL BUSINESS AND FINANCE 65.

Nooteboom, B., W. Van Haverbeke, G. Duysters, V. Gilsing, and A. van den Oord (2007). Optimal cognitive distance and absorptive capacity. *Research Policy 36* (7), 1016–1034.

Nucciarelli, A., F. Li, KJ. Fernandes, N. Goumagias, I. Cabras, S. Devlin, D. Kudenko, and P. Cowling (2017). From value chains to technological platforms: The effects of crowdfunding in the digital game industry. *JOURNAL OF BUSINESS RESEARCH 78*, 341–352.

O'Connor and Oakley (2015). *The Routledge Companion to the Cultural Industries*.

O'Donnell, C. (2011). This is not a Software Industry. In *The Video Game Industry*. Routledge.

Öztürk, O., R. Kocaman, and D. K. Kanbach (2024). How to design bibliometric research: an overview and a framework proposal. *Review of managerial science*, 1–29.

Paris, T. (2010). *Les métropoles créatives* (No. halshs-00973160).

Parker, F. and J. Jenson (2017). Canadian Indie Games Between the Global and the Local.

Canadian Journal of Communication 42 (5), 867–891.

Parker, R., S. Cox, and P. Thompson (2014). How technological change affects power relations in global markets: Remote developers in the console and mobile games industry. *ENVIRONMENT AND PLANNING A-ECONOMY AND SPACE 46* (1), 168–185.

Parkman, I. D., S. S. Holloway, and H. Sebastiao (2012). Creative industries: Aligning entrepreneurial orientation and innovation capacity. *Journal of Research in Marketing and Entrepreneur- ship 14* (1), 95–114.

Parmentier, G. and V. Mangematin (2014). Orchestrating innovation with user communities in the creative industries. *TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 83*, 40–53.

Patrucco, P. P. (2005). The emergence of technology systems: Knowledge production and distribution in the case of the Emilian plastics district. *Cambridge Journal of Economics 29* (1), 37–56.

Patrucco, P. P. (2014). *The Economics of Knowledge Generation and Distribution: The Role of Interactions in the System Dynamics of Innovation and Growth*. Routledge.

Peticca-Harris, A., J. Weststar, and S. McKenna (2015). The perils of project-based work: Attempting resistance to extreme work practices in video game development. *ORGANIZATION 22* (4), 570–587.

Pilon, S. and D.-G. Tremblay (2013). The Geography of Clusters: The Case of the Video Games Clusters in Montreal and in Los Angeles. *Urban Studies Research 2013*, e957630. Publisher: Hindawi.

Plum, O. and R. Hassink (2014). Knowledge bases, innovativeness and competitiveness in creative industries: The case of Hamburg's video game developers. *Regional Studies, Regional Science 1* (1), 248–268. Publisher: Routledge _eprint: https://doi.org/10.1080/21681376.2014.967803.

Porter, M. E. (1990). *Competitive Advantage of Nations: Creating and Sustaining Superior Performance*. Simon and Schuster.

Porter, M. E. (1998). Clusters and the new economics of competition. *Harvard business review 76* (6), 77–90.

Pottie-Sherman, Y. and N. Lynch (2019). Gaming on the edge: Mobile labour and global talent in Atlantic Canada's video game industry. *Canadian Geographies / Géographies canadiennes 63* (3), 425–439.

Potts, J., S. Cunningham, J. Hartley, and P. Ormerod (2008). Social network markets: A new definition of the creative industries. *Journal of Cultural Economics 32* (3), 167–185.

Pratt, A. C. (2008). Creative Cities: The Cultural Industries and the Creative Class. *Geografiska Annaler: Series B, Human Geography 90* (2), 107–117.

QMetrics, F. Alternativas, and N. Data (2022). The Measuring CCS Consortium publishes the Final Report.

Rey-Martí, A., P. Sendra-Pons, D. Garzón, and A. Mas-Tur (2022). A comprehensive conceptual and bibliometric study of person-centered methodologies. *Quality & Quantity*, 1–19.

Rizzo, U. (2015). Why do scientists create academic spin-offs? The influence of the context. *The Journal of Technology Transfer 40* (2), 198–226.

Rugafiori (1999). Imprenditori e manager nella storia d'Italia.

Rysman, M. (2009). The Economics of Two-Sided Markets. *JOURNAL OF ECONOMIC PERSPECTIVES 23* (3), 125–143.

Salvador, E. and P.-J. Benghozi (2023). The evolving place of the cultural and creative industries in the public policy orientation. *Reseaux 238239* (2), 283–328.

Salvador, E., P.-J. Benghozi, and J.-P. Simon (2021). Strategies in the cultural and creative industries: static but flexible vs dynamic and liquid. The emergence of a new model in the digital age. *Revue d'économie industrielle 174* (2), 117–157.

Santagata, W. (2002). Cultural Districts, Property Rights and Sustainable Economic Growth. *International Journal of Urban and Regional Research 26* (1), 9–23.

Santagata, W. (2009). White Paper on Creativity. Towards an Italian model of development, 2009. Technical report.

Santos, L., A. L. Sousa, and L. Teixeira (2022). PRISMA GUIDELINES FOR SYSTEMATIC AND SCOPING REVIEWS: CULTURAL MAPPING OF CREATIVE INDUSTRIES. *European Conference*

on Research Methodology for Business and Management Studies 21 (1), 216–219.

Saxenian, A. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128, With a New Preface by the Author*. Harvard University Press.

Scott, A. J. (1999). The US Recorded Music Industry: On the Relations between Organization, Location, and Creativity in the Cultural Economy. *Environment and Planning A: Economy and Space 31* (11), 1965–1984.

Scott, A. J. (2006). Creative Cities: Conceptual Issues and Policy Questions. *Journal of Urban Affairs 28* (1), 1–17.

Siemiatycki, E., T. Hutton, and T. Barnes (2016, February). Trouble in paradise: Resilience and Vancouver's second life in the "new economy". *Urban Geography 37* (2), 183–201. Publisher: Routledge _eprint: https://doi.org/10.1080/02723638.2015.1068526.

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for information Science 24* (4), 265–269.

SNIV, Syndicat National du Jeu Vidéo (2022). 2022 ANNUAL SURVEY OF VIDEO GAMES IN FRANCE. Technical report.

Snowball, J., D. Tarentaal, and J. Sapsed (2021). Innovation and diversity in the digital cultural and creative industries. *JOURNAL OF CULTURAL ECONOMICS 45* (4), 705–733.

Soeiro, FC., M. Santos, and J. Alves (2016). Network-based innovation: The case for mobile gaming and digital music. *EUROPEAN BUSINESS REVIEW 28* (2), 155–175.

Sorenson, O. and P. G. Audia (2000). The Social Structure of Entrepreneurial Activity: Geographic Concentration of Footwear Production in the United States, 1940–1989. *American Journal of Sociology 106* (2), 424–462.

Sorenson, O., J. W. Rivkin, and L. Fleming (2006). Complexity, networks and knowledge flow.

Research Policy 35 (7), 994–1017.

Storper, M. (1995). The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies. *European Urban and Regional Studies 2* (3), 191–221.

Storper, M. and A. J. Venables (2004). Buzz: Face-to-face contact and the urban economy.

Journal of Economic Geography 4 (4), 351–370.

Ter Minassian, H. and M. Boutet (2015). Video Games in Daily Routines. *ESPACES-POPULATIONS- SOCIETES* (1-2).

Thompson, P. and M. Fox-Kean (2005). Patent Citations and the Geography of Knowledge Spillovers: A Reassessment. *American Economic Review 95* (1), 450–460.

Throsby, C. D. (2001). *Economics and Culture*. Cambridge University Press.

Throsby, D. (2008). The concentric circles model of the cultural industries. *Cultural Trends 17* (3), 147–164.

Tremblay, DG. (2016). Innovation in the IT sector: Intermediary organisations as a knowledge sharing strategy? *INTERNATIONAL JOURNAL OF KNOWLEDGE-BASED DEVELOPMENT 7* (4), 336–

356.

Trigilia, C. (2007). *La costruzione sociale dell'innovazione: Economia, società e territorio*. Firenze University Press.

Tsang, D. (2021). Innovation in the British Video Game Industry since 1978. *Business History Review 95* (3), 543–567.

Tschang, F. T. (2007). Balancing the Tensions Between Rationalization and Creativity in the Video Games Industry. *Organization Science 18* (6), 989–1005.

Tschang, F. T. (2010). Hong Kong's New Creative Industries: The Example of the Video Games Sector. In Innovation Policy and the Limits of Laissez-faire: Hong Kong's Policy in Comparative Perspective (pp. 267-300). London: Palgrave Macmillan UK.

Turok, I. (2003). Cities, Clusters and Creative Industries: The Case of Film and Television in Scotland. *European Planning Studies 11* (5), 549–565.

Ukie (2023). The Economic Impacts of Video Game Technology Spillover.

UNCTAD (2010). Creative Economy Report 2010. Technical report.

UNESCO (1996). Report of the World Commission on Culture and Development—UNESCO Digital Library. https://unesdoc.unesco.org/ark:/48223/pf0000104333

UNESCO (2013). Creative Economy Report 2013. Special Edition: Widening local development pathways Technical report.

Vallance, P. (2014). Creative knowing, organisational learning, and socio-spatial expansion in UK videogame development studios. *Geoforum 51*, 15–26.

Vang, J. and T. Tschang (2013). Unpacking the spatial organization of the US videogames industry: Lessons for research on experience industry clusters. In *Handbook on the Experience Economy*, Chapter Handbook on the Experience Economy, pp. 405–423. Edward Elgar Publishing.

Watson, A. (2008). Global music city: Knowledge and geographical proximity in London's recorded music industry. *Area 40* (1), 12–23.

Wenting, R. (2008). Spinoff dynamics and the spatial formation of the fashion design industry, 1858–2005. *Journal of Economic Geography*, *8*(5), 593-614.

Wilke, U. and A. Pyka (2024a). Assessing the relevance of different proximity dimensions for knowledge exchange and (co-)creation in sustainability-oriented innovation networks. *Sustainability Science*.

Wilke, U. and A. Pyka (2024b). Sustainable innovations, knowledge and the role of proximity: A systematic literature review. *Journal of Economic Surveys n/a*(n/a).

Williams, D. C. (2004). *Trouble in River City: The social life of video games*. University of Michigan.

Williams, S. and E. Currid-Halkett (2011). The Emergence of Los Angeles as a Fashion Hub: A Comparative Spatial Analysis of the New York and Los Angeles Fashion Industries. *Urban Studies 48* (14), 3043–3066.

WIPO (2024). World Intellectual Property Report 2024: Making Innovation Policy Work for Development.

Wolf, T., U. Cantner, H. Graf, and M. Rothgang (2019). Cluster ambidexterity towards exploration and exploitation: Strategies and cluster management. *The Journal of Technology Transfer 44* (6), 1840–1866.

Xi, X., BX. Xi, CL. Miao, RJ. Yu, J. Xie, R. Xiang, and F. Hu (2022). Factors influencing technological innovation efficiency in the Chinese video game industry: Applying the meta-frontier approach. *TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 178*.

Xu, J., H. Wang, W. Liao, and C. Saun Fong (2023). From closure to gradual release of egs industry: Empirical evidence from the spatial evolution and causal mechanism in the main town area of wuhan, china. *3c Empresa: investigación y pensamiento crítico 12* (2), 15–38.

Yang, C. and D. Y.-T. Chan (2021). Market Expansion of Domestic Gaming Firms in Shenzhen, China: Dilemma of

Globalisation and Regionalisation. *Tijdschrift voor Economische en Sociale Geografie 112* (3), 256–273.

Zackariasson, P. and T. L. Wilson (2012). *The Video Game Industry: Formation, Present State, and Future*. Routledge. Google-Books-ID: oQKFmX9m25sC.

Zhao, MY. (2023). Fragmented Control of Platform Game Work in China. *ECONOMIC AND LABOUR RELATIONS REVIEW 34* (2), 328–342.

Zhu, F. and M. Iansiti (2012). ENTRY INTO PLATFORM-BASED MARKETS. *STRATEGIC MANAGEMENT JOURNAL 33* (1), 88–106.

7. APPENDIX

7.1 Database search rationale

UNITO preferred search strategy has been defined in the following fashion. **UNITO** was interested in articles treating two interrelated concepts: the video games industry and clustering. More precisely, on the second concept, **UNITO** was interested not only in the clustering and geographical agglomeration dynamics of firms operating in the video games sector, but also in the cultural and creative aspects and in the implications for the regional innovation systems. For these reasons **UNITO** included several relevant keywords related to these topics. The following Table 8 provides the conceptual structure behind **UNITO** preferred bibliographic search.

Table 8 - Conceptual structure of the search strategy

Search strategy				
Video games-related keywords		**Regional distribution and cluster-related keywords**		**Gambling-related keywords**
Terms connected by OR		Terms connected by OR		Terms connected by OR
“video game* industry”; "video game*"; “video-game*”; "videogame*"; “gaming”; “online game*”; “digital game*”; "computer game*"; “software game*”; “mobile game*”; “e-sport”; “esport”; “eSport”	AND	“cultural and creative industr*”; “creative industr*”; “cultural industr*”; “CCIs”; “developer*”; "cluster*"; "regional cluster*"; "industrial cluster*"; "spatial cluster*"; “spatial*”; "region*"; "spatial distribution*"; "geograph* distribution*"; “regional distribution*”; “district*”; “innovation system*”; “regional innovation system*”; “regional development”; “hub*”; “agglomerat*”; “concentrat*"; “locat*”; “co-locat*”	NOT	"gambl*"; "casino*";“slot machine*”;“slot-machine*”;“bingo*”

Source: Authors’ own elaboration.

In what follows, **UNITO** report the preferred search query specification:

TS=(("video game industry" OR "video game*" OR "video-game*" OR "videogame*" OR "gaming" OR "online game*" OR "digital game*" OR "computer game*" OR "software game*" OR "mobile game*" OR "e-sport" OR "esport" OR "eSport") AND ("cultural and creative industr*" OR "creative industr*" OR "cultural industr*" OR "CCIs" OR "developer*" OR "cluster*" OR "regional cluster*" OR "industrial cluster*" OR "spatial cluster*" OR "spatial*" OR "region*" OR "spatial distribution*" OR "geograph* distribution*" OR "regional distribution*" OR "district*" OR "innovation system*" OR "regional innovation system*" OR "regional development" OR "hub*" OR "agglomerat*" OR "concentrat*" OR "locat*" OR "co-locat*" OR "territorial dynamic*" OR "territor*" OR "scene*" OR "communit*") NOT ("gambl*" OR "casino*" OR "slot machine*" OR "slot-machine*" OR "bingo*"))*

Figure 7 reports the scoping review flowchart, which represents the key inclusion and exclusion criteria adopted in the process of identification, screening and selection of records.

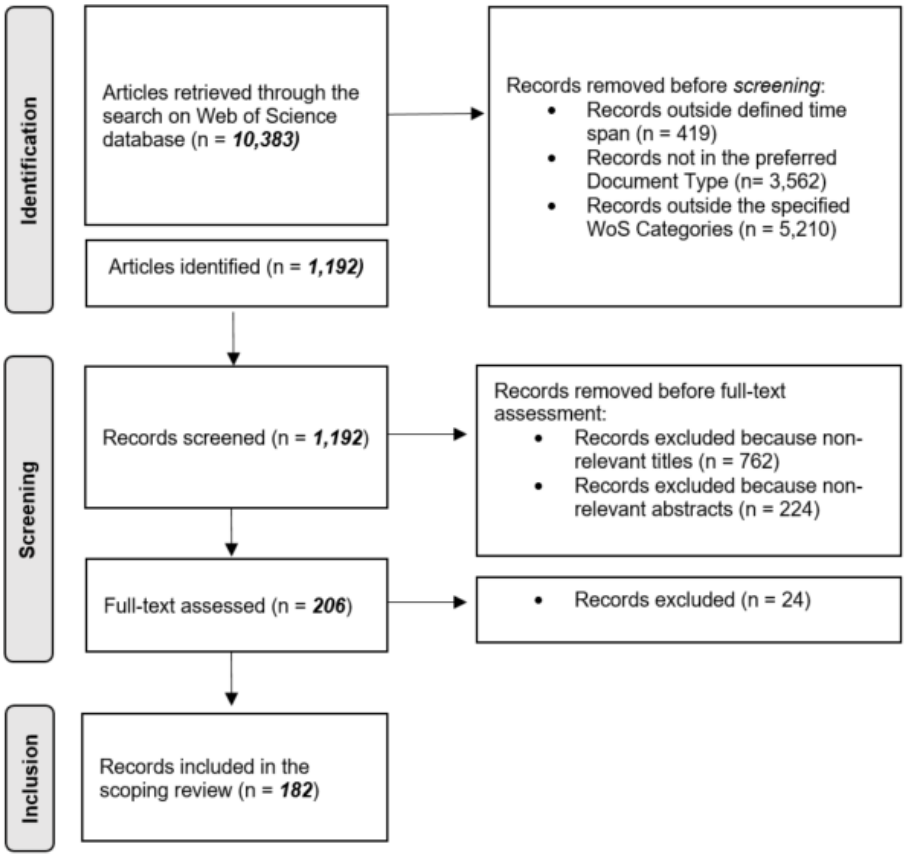

Figure 7 - Scoping review flowchart

Source: Authors' own elaboration.

7.2 Descriptive analysis of the identified literature

In this section, **UNITO** proceed with a bibliometric analysis of the identified literature collection. First, **UNITO** provided an overall descriptive analysis aiming at exploring the publishing trend, the main disciplinary areas where the literature on the video game industry have flourished, and the core journals, authors, and their countries of affiliation. **UNITO** then took a more in-depth exploration of the main themes addressed in this set of academic contributions by means of a thematic analysis.

7.2.1 Descriptive analysis

A descriptive summary of the selected studies is reported in Table 9. The 182 documents in **UNITO** collection have been published between 2003 and 2023 and have been retrieved from 108 distinct academic journals. Concerning the type of document, 173 are academic articles, 7 are book chapters, 1 is a book and 1 is a review article. In the collection of studies, **UNITO** counts 318 authors affiliated to 218 different institutions worldwide. In this field of research, the majority of the studies are the result of collaborations between multiple authors (the average number of coauthors is slightly more than 2); however, 48 studies are single-authored efforts.

Table 9 - Descriptive summary of the selected studies

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2003:2023
Journals	108
Documents	182
Annual Growth Rate %	17.22
Document Average Age	6.36
Average citations per doc	24.2
Average citations per year per doc	2.681
References	9266
DOCUMENT TYPES	
article	173
book chapter	7
book	1
review	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	444
Author's Keywords (DE)	661
AUTHORS	

Authors	318
Author Appearances	411
Authors of single-authored docs	45
AUTHORS COLLABORATION	
Single-authored docs	48
Documents per Author	0.572
Co-Authors per Doc	2.26
International co-authorships %	30.22

Source: Authors' own elaboration.

The video games industry literature has been steadily growing in the past years. Figure 8 reports the scientific production over time. The graph shows how the academic research investigating the video games industry remained constant, and relatively limited, until 2012. However, from 2013 the number of publications treating this topic witnessed a sharp increase. In fact, the academic production over time reports three peaks: the first in 2015 with 16 publications, the second in 2019 with 19 articles, and the third in 2023 with 24 articles published. This trend may suggest a renewed interest among researchers in the exploration of the specificities of the video games industry within the borders of the CCIs research stream.

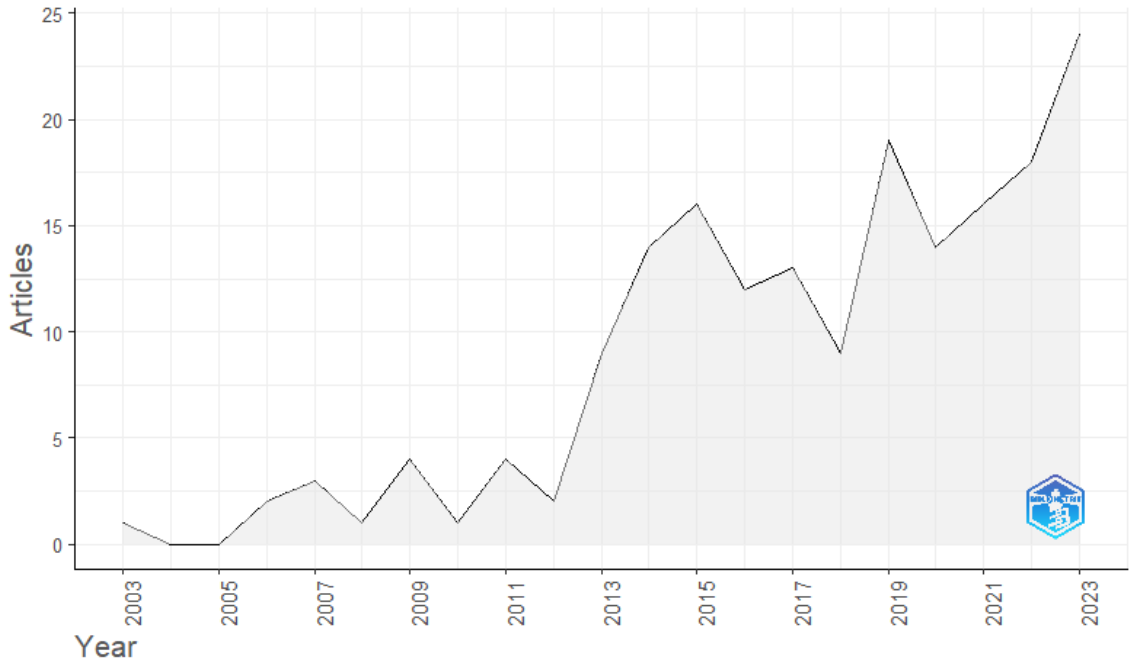

Figure 8 - Annual academic production

Notes: The graph reports the single number of studies published per publication year. Authors' own elaboration generated using *Biblioshiny*.

The identified articles were also classified in terms of research domains, based on the topics addressed and the journals in which they have been published.[38] Overall, the majority of the publications belong to the broad research fields of economics and management. Analysing more closely the specialised subfields of research, **UNITO** found that most of the studies belong to economic geography, economics and management of innovation, management (in particular the research specialised on organisations) and economic sociology. The business research domain is also present, although it has witnessed a steady increase only in recent years, from 2014. Interestingly, only a limited share of the articles belongs to the cultural economics research domain, despite the fact that the first research efforts on creative clusters originated in this subfield of economics.

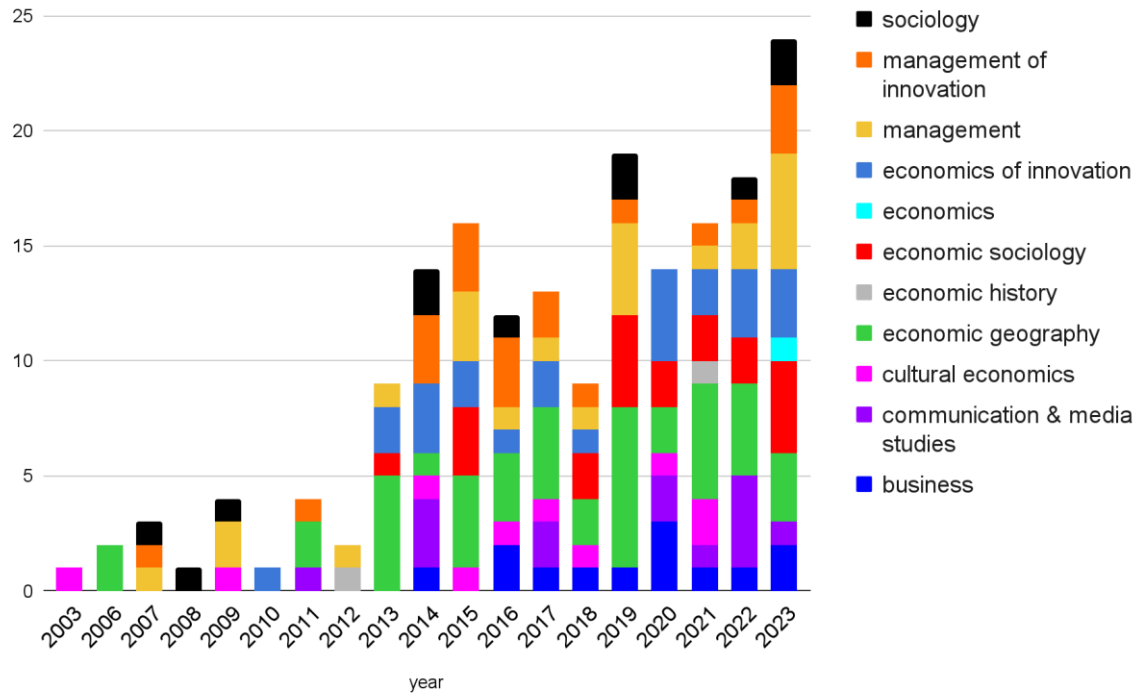

Figure 9 - Articles published over time by research domain

Source: Authors' own elaboration.

[38] The articles in the literature collection were also classified by type of methodological approach adopted: conceptual study, literature review and empirical analysis (quantitative, qualitative or mixed methods. See Section 5 (Appendix).

7.2.2 Methodologies adopted in the identified literature

Qualitative methods greatly prevail in the video games industry research. Interestingly, quantitative research started to grow from 2013 onward, while research using mixed methods remained relatively limited over the period under investigation, except for a peak in 2021 (5 articles published used both quantitative and qualitative methodologies). Papers presenting theoretical models and other conceptual studies (such as reviews) remain limited and stable over time.

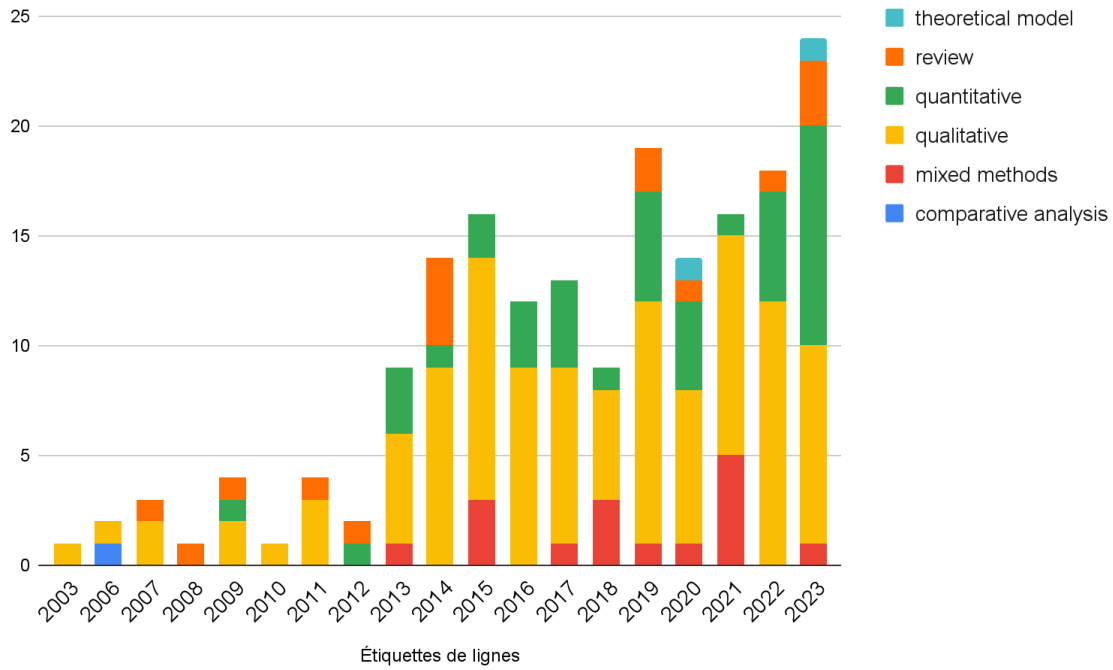

Figure 10 - Studies published over time by methodology adopted

Source: Authors' own elaboration.

7.2.3 Geographical distribution of the articles identified

The analysis of the geographical distribution of the publications in the collection provides relevant insights on the research activity concerning the video games industry. Table 10 reports the top 20 most productive countries (of affiliation of authors) per number of articles published. Country productivity is reported based on the total number of publications made by the affiliated authors, thus the ranking counts both single country publications (SCP) and multiple country publications (MCP). The majority of the publications on the topics come from the UK (27 documents), the US (22 documents), Canada (17 documents), Sweden (15), France and Germany (with both 11 documents). Together these prolific countries count more than half of all publications.

Table 10 - Top 20 countries per number of studies published

Country	Articles	Freq	SCP	MCP	MCP_Ratio
UNITED KINGDOM	27	0.1534	20	7	0.259
USA	22	0.1250	15	7	0.318
CANADA	17	0.0966	11	6	0.353
SWEDEN	15	0.0852	11	4	0.267
FRANCE	11	0.0625	8	3	0.273
GERMANY	11	0.0625	6	5	0.455
AUSTRALIA	8	0.0455	4	4	0.500
CHINA	8	0.0455	4	4	0.500
ITALY	5	0.0284	4	1	0.200
KOREA	5	0.0284	5	0	0.000
NETHERLANDS	4	0.0227	1	3	0.750
POLAND	4	0.0227	4	0	0.000
CZECH REPUBLIC	3	0.0170	3	0	0.000
IRELAND	3	0.0170	3	0	0.000
JAPAN	3	0.0170	2	1	0.333
SINGAPORE	3	0.0170	3	0	0.000
SPAIN	3	0.0170	3	0	0.000
SWITZERLAND	3	0.0170	2	1	0.333
AUSTRIA	2	0.0114	1	1	0.500
BRAZIL	2	0.0114	2	0	0.000

Notes: Authors' own elaboration. Number of articles per country of affiliation of the authors listed in the publication. SCP = single country publications, MCP = multiple country publications.

Not limited to the top 20 most productive countries of affiliation, Figure 11 displays the worldwide scientific production calculated on the frequency of the authors' appearance by all countries of affiliation in the literature collection.[39] The considerable concentration of the academic research on the video games industry in some countries rather than others might reflect specific policies towards CCIs, or the relatively longer tradition and knowledge accumulated by the respective institutions and research centres in this specific field of research. In this respect, the first publications appeared are the ones whose authors are affiliated with American, English or Canadian universities *(Aoyama and Izushi, 2003; Izushi and Aoyama, 2006; Johns, 2006; Coleman and Dyer-Witheford, 2007; Cohendet and Simon, 2007*), while research performed by authors affiliated with continental European universities started to appear only at a later stage (*Lê at al., 2013; de Van et al;, 2013; Lange and Streit, 2013; Minassian and Boutet, 2015*).

[39] Each time an article includes authors affiliated to institutions in different countries, or includes an author with multiple affiliations, the appearance counter for each country's affiliation increases by 1. For example, if an article has co-authors from the US, Canada, and France, each of these three countries' appearance count will be increased by 1. Therefore, each article is attributed to the countries of all its co-authors, resulting in multiple counts equal to the number of authors. For this reason, the total count of the country's scientific production may exceed the total number of articles in the presence of co-authored studies (Aria & Cuccurullo, 2017).

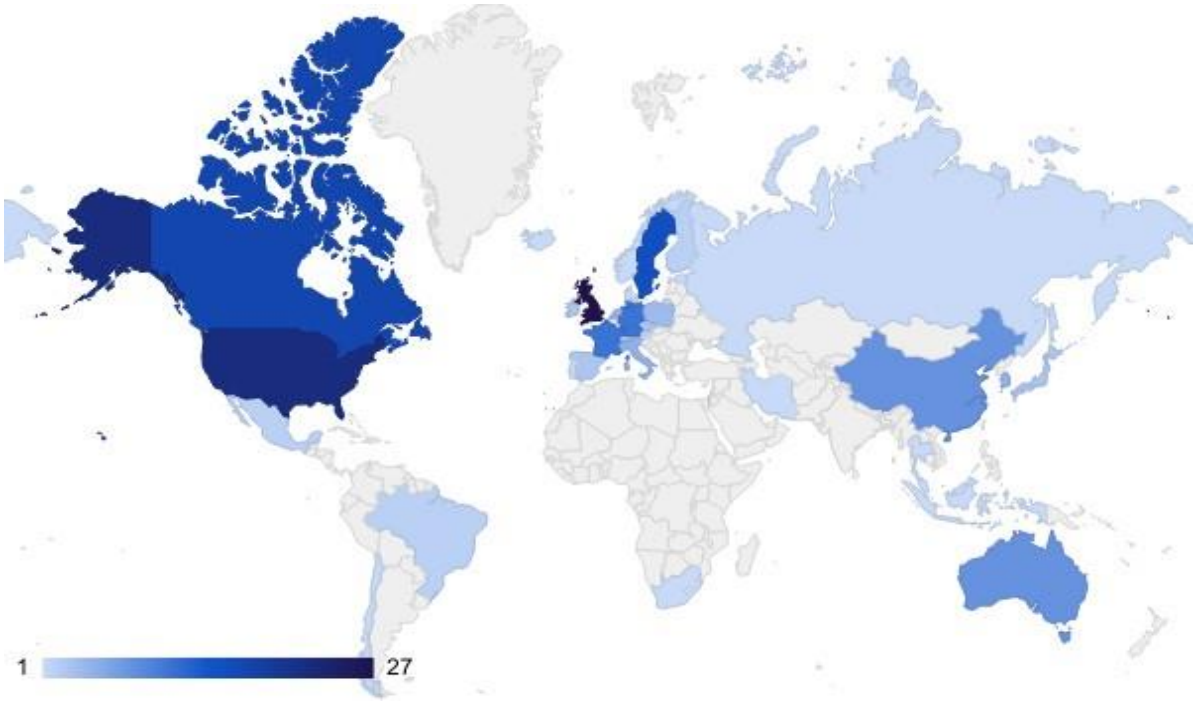

Figure 11 - Country scientific production

Notes: The map shows the academic production per country of affiliation of the authors. Country's scientific productivity is calculated as the sum of the single country publications and multiple country publications. High-productivity countries are in dark blue, while lower-productivity countries are in light blue; countries for which there is no data are coloured in grey. Source: Own elaboration using *Google Geomap*.

Overall, the good number of studies conducted by authors affiliated to European research institutions reflects that the video games industry, and some specific European clusters (see Section 4.4), have attracted the interest of academics. However, there appears to be still a gap in the research as compared to other countries traditionally at the forefront of the research on this topic, such as the US, Canada and Australia, and recently China, whose interest in the video games industry has experienced a significant growth starting from 2019 (Jiang and Fung, Xi et al., 2022; 2019; Gong et al., 2023).

7.2.4 Analysis of the core journals, most influential authors and articles

Concerning the core journals in the collection, Table 11 reports the most relevant outlets in terms of number of studies published in the timespan considered. Overall, the majority of the journals publish research in the domain of economics, entrepreneurship, business and management (*Journal of Business Research, European Journal of Management, Creativity and Innovation Management), with a sharp focus on empirical studies on technology and innovation (Research Policy, Technological Forecasting & Social Change, Technovation*).

Numerous and relevant sources focus on media studies (Television & New Media, Convergence, Games and Cultures, New Media & Society, Media, Culture & Society), as well as on economic geography and regional studies (Geoforum, Journal of Economic Geography, Regional Studies, Entrepreneurship and Regional Development, Environment and Planning), organisation and communication (International Journal of Communication, Canadian Journal of Communication, Critical Studies in Media Communication, Culture and Organization). The degree of variety in the core journals' aims and scopes signals the high interdisciplinarity of the research on the video games industry.

Table 11 - Top 20 journals per number of studies published

Sources	Articles
RESEARCH POLICY	9
TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	8
TELEVISION & NEW MEDIA	7
CONVERGENCE-THE INTERNATIONAL JOURNAL OF RESEARCH INTO NEW MEDIA TECHNOLOGIES	6
GAMES AND CULTURE	6
GEOFORUM	6
JOURNAL OF BUSINESS RESEARCH	4
JOURNAL OF ECONOMIC GEOGRAPHY	4
INTERNATIONAL JOURNAL OF COMMUNICATION	3
MEDIA CULTURE & SOCIETY	3
NEW MEDIA & SOCIETY	3
REGIONAL STUDIES	3
TECHNOVATION	3
CANADIAN JOURNAL OF COMMUNICATION	2
CREATIVITY AND INNOVATION MANAGEMENT	2
CRITICAL STUDIES IN MEDIA COMMUNICATION	2
CULTURE AND ORGANIZATION	2
ENTREPRENEURSHIP AND REGIONAL DEVELOPMENT	2
ENVIRONMENT AND PLANNING A-ECONOMY AND SPACE	2
EUROPEAN MANAGEMENT JOURNAL	2

Source: Authors' own elaboration.

To identify the relationship between journals and to assess how they serve specific research groups, **UNITO** performed the analysis of the patterns of co-citation between journals *(Martinez-Garcia et al., 2023*). More specifically, co-citation is the frequency with which two documents (or, as in this case, journals) are cited together in the citation references of other documents (journals) (Small, 1973). In this particular analysis, the relation between journals is established by a third journal, and not the specific journal under examination (*Boyack and Klavans 2010; Meyer et al. 2014; Kovacs et al., 2015*). Figure 12 reports the co-citations mapping of the journals in the literature collection. As the total number of journals in the collection is 4,824, **UNITO** considered only sources above the minimum threshold of 20 citations received to focus on the most relevant ones.

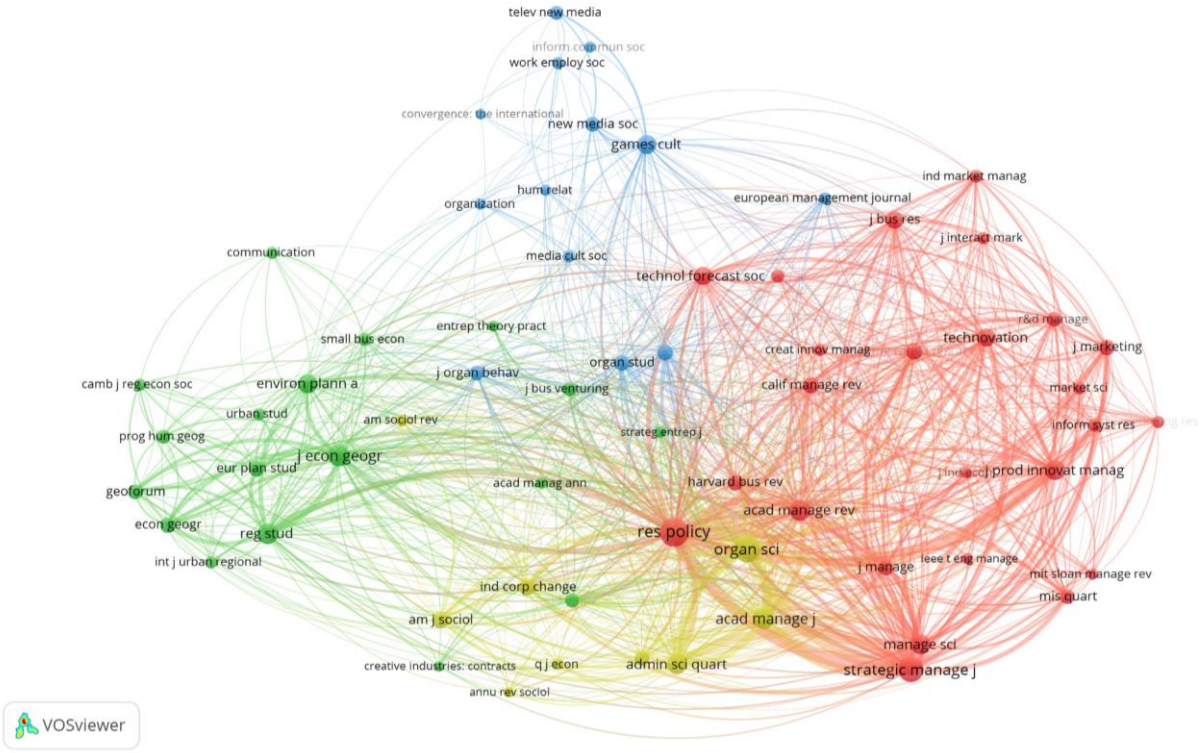

Figure 12 - Co-citation network of journals

Notes: Network of co-citations of journals in the collection of selected studies (reported: 67 journals, min. 20 citations received. In addition, two items not relevant for the analysis were deleted: a source generally labeled as "thesis" and the website "Gamasutra", now called "Game Developer"). Node's size is proportional to the number of citations received. Authors' own elaboration made with *VOSviewer*.

The network representation highlights the presence of four clusters and shows a dense web of connections between the different journals, frequently occurring across different clusters. The biggest cluster is the red one, which gathers journals publishing research in the fields management, business and economics, and in particular the subfields of economics of knowledge, technology and innovation. The blue cluster displays reference outlets for researchers investigating the cultural dimension of the video games industry and provides a communication and media perspective on the gaming industry.

The green cluster is the one reporting the key journals that publish research in the economic geography, regional and urban development fields. Finally, the yellow cluster groups together journals in the economic and sociology domain devoted to management and organisation research. Despite the four clearly identifiable clusters, it is interesting to note that several journals that, based on their aims and scope, would logically be expected to belong to one cluster are instead positioned inside an alternative one. This is the case, for instance, of the European Management Journal, the Journal of Organizational Behavior and Organization Studies. These outlets are inside the blue cluster (communication and media studies) although they generally cover the areas of management and organisational research. Similarly, Small Business Economics, the Journal of Business Venturing, and Industry and Innovation are journals that usually cover the research areas of business,

entrepreneurship and innovation, while in this mapping they are positioned in the green cluster (economic geography studies). Focusing on the position of the nodes in **UNITO** representation, Research Policy, Strategic Management Journal, Organizational Science and Technological Forecasting and Social Change appear to be among the largest and more central items, indicating that they have been cited more by the other journals publishing research related to the video game industry and represent a reference destination for the research on this creative sector.

Focusing on the most influential authors in the video games research, Figure 13 displays the most productive researchers per number of articles authored. Patrick Cohendet, Huiwen Gong and Laurent Simon are among the top authors investigating the topic, with six publications each, followed by Alexander Styhre, Mathijs De Vaan and Johanna Weststar with five publications each. These highly productive authors are active in the research fields of economics and management of innovation and technology (i.e., P. Cohendet, L. Simon), management and organisation of culture and creativity (A. Styhre), regional studies and economic geography (H. Gong, M. De Vaan) and communication and media studies (J. Weststar).

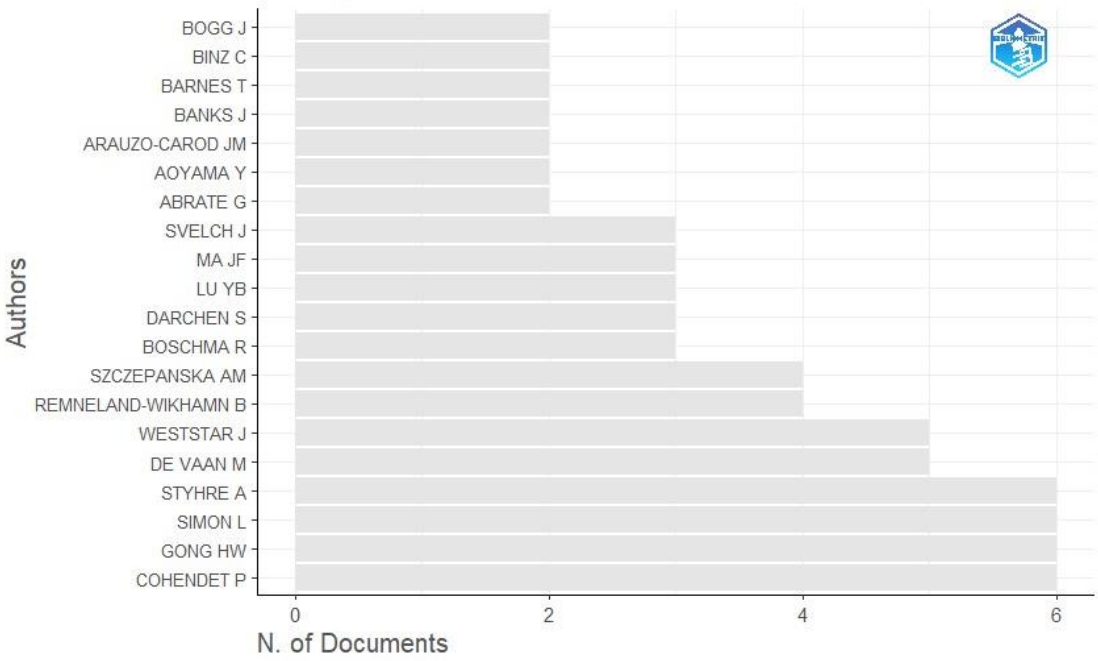

Figure 13 - Top 20 most productive authors

Notes: The graph reports the most productive authors per number of publications (co)authored. Own elaboration using *Biblioshiny*.

The top 20 most influential works in the bibliographic collections are reported in Table 4. These articles have collected 50 or more total citations each. In the selected sample, the articles that received more than 100 citations each are the ones by Rysman, 2009, Zhu and Iansiti, 2012, Hotho and Champion, 2011, Tschang, 2007, Balland et al., 2013, Johns, 2006, de Vaan and Stark, 2015, (Cohendet & Simon, 2007), Aoyama and Izushi, 2003, and Parmentier and Mangematin, 2014.

Table 12 - Top 20 most influential articles per number of total citations received

Author	Year	Title	Journal	TC	TCpY
Rysman M.	2009	The Economics of Two-Sided Markets	Journal of Economic Perspectives	522	32.62
Zhu F., Iansiti M.	2012	Entry into platform-based markets	Strategic Management Journal	318	24.46
Hotho S., Champion K.	2011	Small businesses in the new creative industries: innovation as a people management challenge	Management Decision	190	13.57
Tschang F. T.	2007	Balancing the Tensions Between Rationalization and Creativity in the Video Games Industry	Organization Science	171	9.50
Balland P.A., De Vaan M., Boschma R.	2013	The dynamics of interfirm networks along the industry life cycle: The case of the global video game industry, 1987–2007	Journal of Economic Geography	163	13.58
Johns J.	2006	Video games production networks: value capture, power relations and embeddedness	Journal of Economic Geography	150	7.89
De Vaan M., Stark D., Vedres B.	2015	Game Changer: The Topology of Creativity	American Journal of Sociology	129	12.90
Cohendet P., Simon L.	2007	Playing across the playground: paradoxes of knowledge creation in the videogame firm	Journal of Organizational Behavior	128	7.11
Aoyama Y., Izushi I.	2003	Hardware gimmick or cultural innovation? Technological, cultural, and social foundations of the Japanese video game industry	Research Policy	119	5.41
Parmentier G., Mangematin V.	2014	Orchestrating innovation with user communities in the creative industries	Technological Forecasting and Social Change	102	9.27
Haefliger S., Jäger P., Von Krogh G.	2010	Under the radar: Industry entry by user entrepreneurs	Research Policy	86	5.73

Hodgson D., Briand L.	2013	Controlling the uncontrollable: 'Agile' teams and illusions of autonomy in creative work	Work, Employment and Society	84	7.00
Nucciarelli A., Li F., Fernandes KJ, Goumagias N., Cabras I., Devlin S., Kudenko D., Cowling P.	2017	From value chains to technological platforms: The effects of crowdfunding in the digital game industry	Journal of Business Research	76	9.50
Jang S., Kim J., Von Zedtwitz M.	2017	The importance of spatial agglomeration in product innovation: A microgeography perspective	Journal of Business Research	59	7.38
Grandadam D., Cohendet P., Simon L.	2013	Places, Spaces and the Dynamics of Creativity: The Video Game Industry in Montreal	Regional Studies	58	4.83
Izishi H., Aoyama Y.	2006	Industry Evolution and Cross-Sectoral Skill Transfers: A Comparative Analysis of the Video Game Industry in Japan, the United States, and the United Kingdom	Environment and Planning A: Economy and Space	56	2.95
De Vaan M., Boschma R., Frenken K.	2013	Clustering and firm performance in project-based industries: the case of the global video game industry, 1972–2007	Journal of Economic Geography	55	4.58
Landoni P., Dell'era C., Frattini F., Petruzzelli A.M., Verganti R., Manelli R.	2020	Business model innovation in cultural and creative industries: Insights from three leading mobile gaming firms	Technovation	52	10.40
Ma JF., Yaobin L., Gupta S.	2019	User innovation evaluation: Empirical evidence from an online game community	Decision Support Systems	52	8.67
Peticca-Harris A., Weststar J., McKenna S.	2015	The perils of project-based work: Attempting resistance to extreme work practices in video game development	Organization	50	5.00

Source: Authors' own elaboration.

The high number of citations received by these documents is explained by the fact that several articles are more than a decade old, and they represent the first original research efforts focusing specifically on the video games sector. Therefore, they are considered the knowledge foundations of the research on the topic. Interestingly, among the most influential publications, there is only a limited number of articles investigating the geography of the video games industry and the clustering dynamics of this creative sector. In fact, the highly cited works of *Balland et al. (2013)* and *Johns (2006)* explore the evolution and geographical concentration of the video game industry from a global or macro-regional viewpoint respectively. *Cohendet and Simon (2007)*, instead, focus on the social interactions within developers and the knowledge production inside the Montreal cluster of video games. Finally, *Izushi et al. (2006)* provide a comparative analysis of Japan, the US and the UK, focusing on the evolution of the gaming industry and the transfer of skills across sectors.

The analysis of the influential works in the literature collection suggests a substantial lack of fine-grained research aiming at investigating the clustering dynamics of the video games sector. In particular, research is still limited at the regional and local level, and, at the European level, very few studies have analyzed this phenomenon beyond the largest hubs and metropolitan areas (*Lange and Von Streit, 2013; Murphy et al., 2015; Hovig, 2016*).

7.3 Additional bibliometric analyses

7.3.1 Bibliographic coupling

To provide an additional analysis of the current research front (*Zupic & Cater, 2015*) and to investigate documents' similarity (*Khare & Jain, 2022*), Figure 13 displays the network of bibliographically coupled articles in the collection. Bibliographic coupling occurs when two works cite a common third work in their references (*Kessler, 1963*). The greater the number of citations shared between two articles, the stronger their "coupling strength", meaning that they draw upon a common knowledge base and can thus be considered as being the expression of the same scholarly community (*Kessler 1963; Martyn 1964*). Additionally, if two documents are coupled it means that there is a high probability that they discuss the same topic, and it is likely that they are conceptually similar (*Mas-Tur et al., 2021*).

Based on this methodology, **UNITO** sought to identify the communities of scholars investigating the video games industry (*Biggi and Giuliani, 2021*). The network visualisation of bibliographically coupled articles in Figure 7 reveals 6 clusters of works investigating: (Cluster 1, in dark blue) value chains, economics of platforms and innovation ecosystems, and entrepreneurship; (Cluster 2, in light blue) various topics in the fields of communication and media studies. (Cluster 3, in red) market characteristics, developers' communities, skills and work practices; (Cluster 4, in green) economics of innovation, mobility of labour, and industrial network dynamics and clusters; (Cluster 5, in purple) regional industrial development; (Cluster 6, in yellow) small businesses and management of innovation and creativity within the video games sector. Interestingly, some clusters are strictly

intertwined, suggesting a high degree of overlap in terms of topics addressed. As a result, several studies in different clusters tend to be close to each other in the network visualisation. This is the case, in particular, for a number of nodes in Cluster 6 and Cluster 4, the nodes in the upper part of Cluster 5 and the bottom nodes belonging to Cluster 1. Similarly, Cluster 2 and Cluster 3 are also closely related.

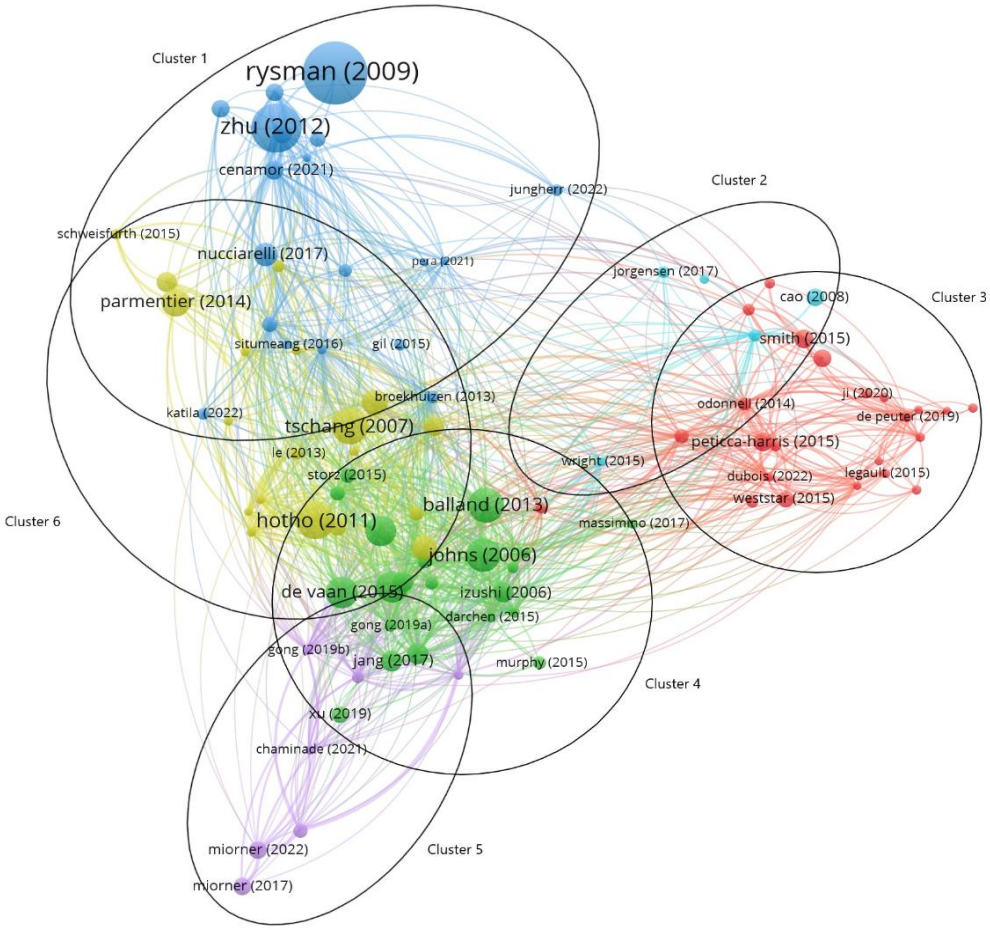

Figure 14 - Bibliographic coupling of documents

Notes: Network visualisation of the bibliographic coupling of the documents selected (94 documents displayed with min. 10 citations received). Own elaboration using *VOSviewer*. The nodes' size is proportional to the number of citations received, and different colours identify the clusters.

7.3.2 Co-citation analysis

The co-citation network between cited references is reported in Figure 15.

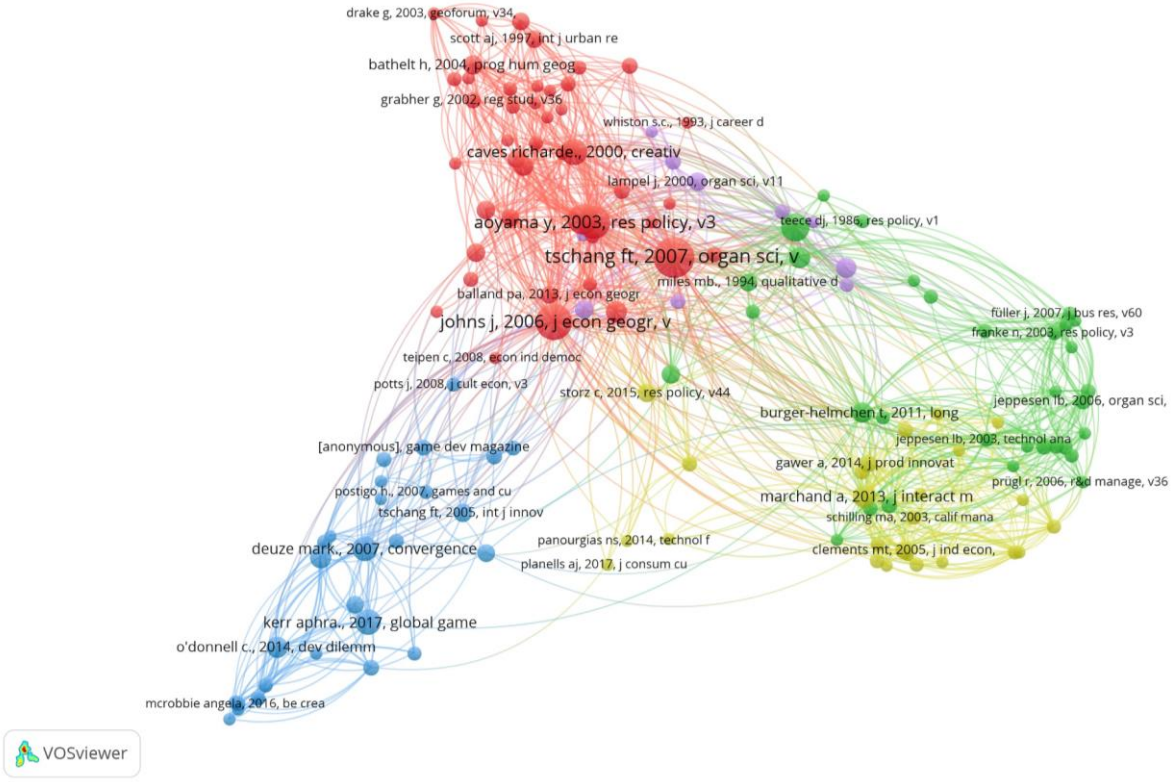

Figure 15 - Co-citation network of cited references

Notes: Network of co-citations of cited references in the collection of selected studies (139 cited references displayed, min. 5 citations of a cited reference). Own elaboration using *VOSviewer*.

Figure 16 displays a three-field plot (Sankey diagram) reporting cited references on the left, authors in the middle, and WoS Keywords Plus on the right. The diagram illustrates the transition between the intellectual roots, represented by the most relevant cited references (CR), to the most prolific authors (AU) and the research themes they have addressed, represented by the database keywords (ID). The rectangular diagrams of different colours represent the most frequent and relevant elements (*Aria and Cuccurullo, 2017*).

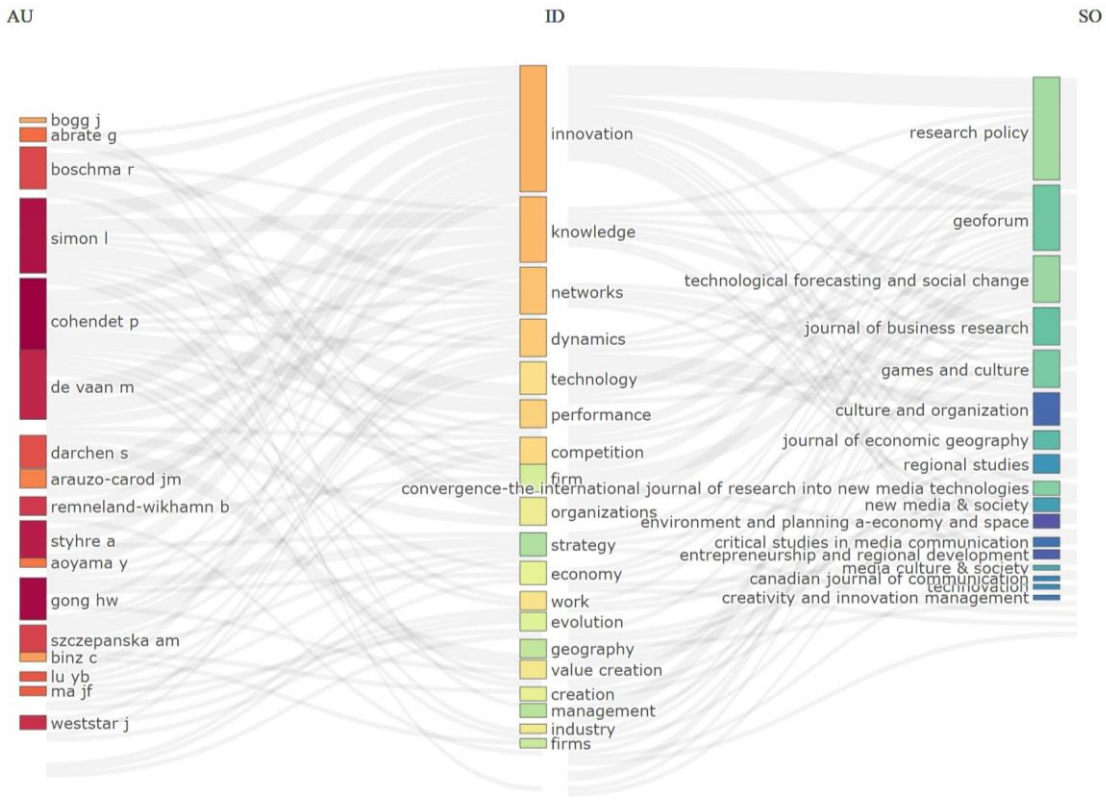

Figure 16 - Three-field plot of authors, keywords and journals

Source: Own elaboration using *Biblioshiny*.

7.3.3 Collaboration analysis

The analysis of the social structure of a research field aims at exploring the interactions among the research actors involved, focusing in particular on the collaborations among countries, institutions and authors (*Donthu et al., 2021*).

Figure 17 displays the country collaboration network. The nodes in the network are the countries of affiliation of the authors in the collection, node's size is proportional to the number of publications, and collaborations are represented by the links connecting the nodes. The colours assigned to the nodes do not denote clusters, but they are assigned based on the average year of publication of the studies authored by researchers affiliated to an institution base in that country (the oldest publication years in dark blue and the latest publication years in yellow).

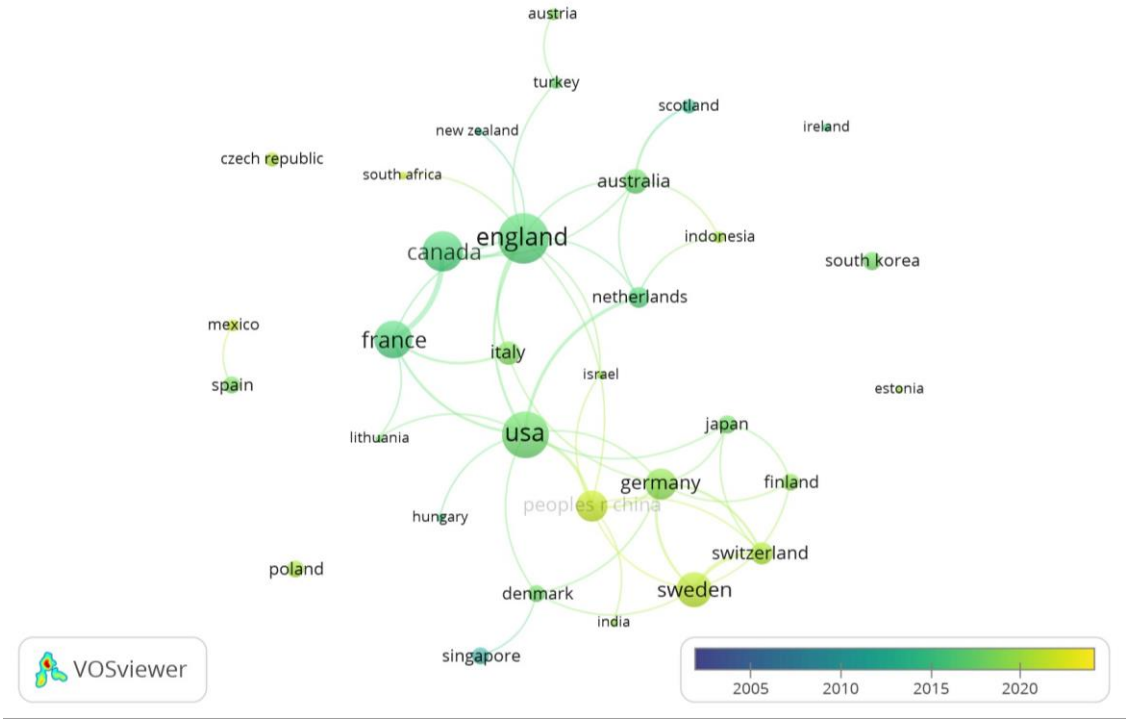

Figure 17 - Country collaboration network

Notes: Collaboration network of countries of affiliation visualisation (32 countries displayed, 1 min. document published and min. 10 citations received) time overlay specification. The figure has been generated with *VOSviewer*. **Source:** Own elaboration.

The graph displays a central network of interconnected countries and a periphery of more isolated nodes. England, Canada, the US, France and Australia occupy a central position in the cluster visualisation and their colour also indicates that their publications are among the oldest and foundational instances of research in the video games sector, dating approximately around 2015. In the central part of the network there are also several European countries, notably Italy, Germany, Sweden, Finland, Denmark, and the Netherlands.

These nodes are of different shades of green and yellow, thus representing more recent research efforts in the exploration of the video game industry. Still focusing on the European countries of affiliation in the literature collection, among the isolated nodes and of different colours there are Czechia, Poland, Ireland, Spain, and Estonia. Interestingly, countries sharing the same language show collaboration bonds. This is the case of France and Canada, Canada and England, Spain and Mexico.

Figure 18 reports the collaboration network visualisation between the institutions of affiliation of the authors of the studies in collection. The graph shows several interconnected nodes. The node size is proportional to the number of studies published by affiliation of their authors, while the colour indicates the average year of publication of the articles authored by the respective affiliated authors.

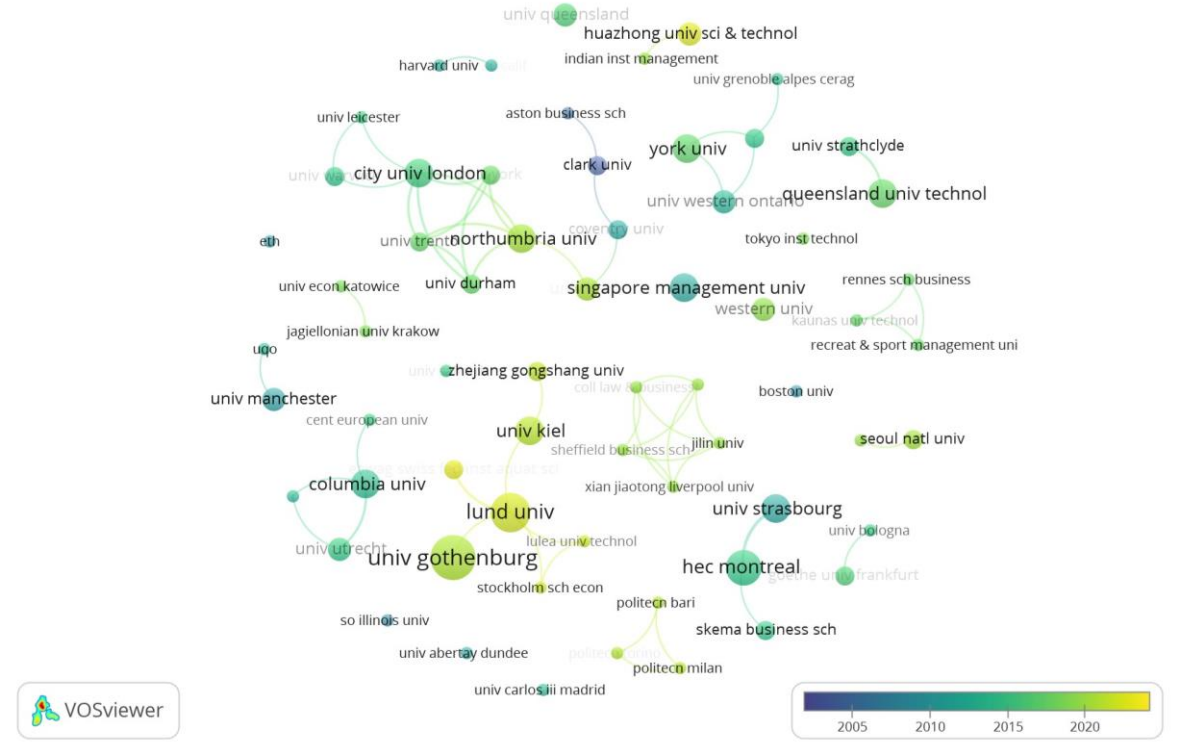

Figure 18 - Collaboration network of the institutions of affiliation

Notes: Collaboration network of institutions of affiliation (64 institutions displayed, min. 1 document published, and min. 30 citations received). The figure has been generated with *VOSviewer*.

The figure displays a spherical network structure made of small clusters of affiliated institutions. The collaboration pattern seems to develop primarily at the national level. For instance, the graph displays a cluster of UK-based collaborating institutions (City University London, University of Durham, University of Leicester, University of York, University of Warwick) and of Sweden-based institutions (Lund University, Lulea University of Technology, University of Gothenburg, Stockholm School of Economics).

7.4 Video game industry clusters

UNITO identified and explored the features of the clusters analysed in our subset of 51 articles, which have been extracted from the identified literature collection of 182 documents. Table 13 reports the number of articles examining the respective clusters:

Table 13 - Article count by video game clusters analysed in the literature

Video game hub	Count	Country	Article
Atlanta	1	US	VANG J, 2013, ELGAR ORIG REF
Atlantic Canada	1	CANADA	POTTIE-SHERMAN Y, 2019, CAN GEOGR-GEOGR CAN
Austin	1	US	VANG J, 2013, ELGAR ORIG REF
Barcelona	2	SPAIN	MENDEZ-ORTEGA C, 2020, ANN REGIONAL SCI; MÉNDEZ-ORTEGA C, 2019, J URBAN TECHNOL
Bellevue, WA	1	US	VANG J, 2013, ELGAR ORIG REF
Bergen	1	NORWAY	HOVIG OS, 2016, NORSK GEOGR TIDSSKR
Birmingham	1	UK	TSANG D, 2021, BUS HIST REV
Brighton	1	UK	TSANG D, 2021, BUS HIST REV
Brisbane	2	AUSTRALIA	DARCHEN S, 2016, URBAN GEOGR; DARCHEN S, 2017, INT J KNOWL-BASED DE
Bristol	1	UK	TSANG D, 2021, BUS HIST REV
Calgary	1	CANADA	PARKER F, 2017, CAN J COMMUN
Cambridge	1	UK	TSANG D, 2021, BUS HIST REV
Cape Town	1	SOUTH AFRICA	SNOWBALL J, 2021, J CULT ECON
Chicago	1	US	VANG J, 2013, ELGAR ORIG REF
Coventry	1	UK	TSANG D, 2021, BUS HIST REV
Dallas	1	US	DE VAAN M, 2013, J ECON GEOGR
Dublin	1	IRELAND	MURPHY E, 2015, GROWTH CHANGE
Dundee	1	UK	TSANG D, 2021, BUS HIST REV
Edmonton	1	CANADA	PARKER F, 2017, CAN J COMMUN
Eugene, OR	1	US	VANG J, 2013, ELGAR ORIG REF
Fukuoka	1	JAPAN	HANZAWA S, 2017, GEOGR ANN B
Glasgow	1	UK	TSANG D, 2021, BUS HIST REV
Halifax	1	CANADA	PARKER F, 2017, CAN J COMMUN

Hamburg	4	GERMANY	BINZ C, 2022, REG STUD; GONG HW, 2020, GEOFORUM; GONG HW, 2023, GEOFORUM; MENDEZ-ORTEGA C, 2020, ANN REGIONAL SCI
Helsinki	1	FINLAND	LEHTONEN MJ, 2020, IND AND INNOV
Houston, TX	1	US	VANG J, 2013, ELGAR ORIG REF
Irvine, CA	1	US	VANG J, 2013, ELGAR ORIG REF
Kansai	2	JAPAN	ERNKVIST M, 2018, GEOGR ANN B; HANZAWA S, 2017, GEOGR ANN B
Kanto	1	JAPAN	ERNKVIST M, 2018, GEOGR ANN B
Kirkland, WA	1	US	VANG J, 2013, ELGAR ORIG REF
Las Vegas	1	US	VANG J, 2013, ELGAR ORIG REF
Leeds	1	UK	TSANG D, 2021, BUS HIST REV
Leipzig	1	GERMANY	LANGE B, 2013, Z WIRTSCHAFTSGEOGR
Liverpool	2	UK	ANDERTON D, 2017, LOCAL ECON; TSANG D, 2021, BUS HIST REV
London	2	UK	DE VAAN M, 2013, J ECON GEOGR; TSANG D, 2021, BUS HIST REV
Los Angeles	3	US	DE VAAN M, 2019, ECON GEOGR; DE VAAN M, 2013, J ECON GEOGR; VANG J, 2013, ELGAR ORIG REF
Lyon	1	FRANCE	MENDEZ-ORTEGA C, 2020, ANN REGIONAL SCI
Malmo	1	SWEDEN	MIÖRNER J, 2017, EUR PLAN STUD
Manchester	1	UK	TSANG D, 2021, BUS HIST REV
Melbourne	2	AUSTRALIA	DARCHEN S, 2016, URBAN GEOGR; DARCHEN S, 2015, EUR PLAN STUD
Miramichi	1	CANADA	PARKER F, 2017, CAN J COMMUN

Montreal	5	CANADA	COHENDET P, 2021, IND INNOV; DARCHEN S, 2015, EUR PLAN STUD; GRANDADAM D, 2013, REG STUD; PARKER F, 2017, CAN J COMMUN; TREMBLAY DG, 2016, INT J KNOWL-BASED DE
Munich	1	GERMANY	LANGE B, 2013, Z WIRTSCHAFTSGEOGR
New York	3	US	DE VAAN M, 2019, ECON GEOGR; DE VAAN M, 2013, J ECON GEOGR; VANG J, 2013, ELGAR ORIG REF
Newcastle	1	UK	TSANG D, 2021, BUS HIST REV
Nottingham	1	UK	TSANG D, 2021, BUS HIST REV
Osaka	1	JAPAN	DE VAAN M, 2013, J ECON GEOGR
Ottawa	1	CANADA	PARKER F, 2017, CAN J COMMUN
Oxford	1	UK	TSANG D, 2021, BUS HIST REV
Pangnirtung	1	CANADA	PARKER F, 2017, CAN J COMMUN
Paris	1	FRANCE	DE VAAN M, 2013, J ECON GEOGR
Portland, OR	1	US	VANG J, 2013, ELGAR ORIG REF
Quebec City	1	CANADA	PARKER F, 2017, CAN J COMMUN
Redmond, WA	1	US	VANG J, 2013, ELGAR ORIG REF
Redwood City, CA	1	US	VANG J, 2013, ELGAR ORIG REF
Rio de Janeiro	1	BRAZIL	DINIZ RG, 2021, REV FORM ONLINE
San Diego	1	US	VANG J, 2013, ELGAR ORIG REF
San Francisco	3	US	DE VAAN M, 2019, ECON GEOGR; DE VAAN M, 2013, J ECON GEOGR; VANG J, 2013, ELGAR ORIG REF
San Jose, CA	1	US	VANG J, 2013, ELGAR ORIG REF
San Rafael, CA	1	US	VANG J, 2013, ELGAR ORIG REF
Santa Monica, CA	1	US	VANG J, 2013, ELGAR ORIG REF
Santiago de Chile	1	CHILE	BAEZA-GONZÁLEZ S, 2021, GEOFORUM
São Paulo	1	BRAZIL	DINIZ RG, 2021, REV FORM ONLINE

Scania	2	SWEDEN	MIÖRNER J, 2022, REG STUD; MIÖRNER J, 2017, EUR PLAN STUD
Seattle	3	US	DE VAAN M, 2019, ECON GEOGR; DE VAAN M, 2013, J ECON GEOGR; VANG J, 2013, ELGAR ORIG REF
Seoul	1	SOUTH KOREA	JANG S, 2017, J BUS RES
Shanghai	3	CHINA	GONG HW, 2023, GEOFORUM; GONG HW, 2019, GROWTH CHANGE; GONG HW, 2019, GEOFORUM
Sheffield	1	UK	TSANG D, 2021, BUS HIST REV
Shenzhen	1	CHINA	YANG C, 2021, TIJDSCHR ECON SOC GE
Sudbury	1	CANADA	PARKER F, 2017, CAN J COMMUN
Tokyo	3	JAPAN	DE VAAN M, 2013, J ECON GEOGR; HANZAWA S, 2017, GEOGR ANN B LEHTONEN MJ, 2020, IND AND INNOV
Toronto	1	CANADA	PARKER F, 2017, CAN J COMMUN
Vancouver	4	CANADA	BARNES T, 2011, NEW HORIZ REG SCI; PARKER F, 2017, CAN J COMMUN; SIEMIATYCKI E, 2016, URBAN GEOGR; DE VAAN M, 2013, J ECON GEOGR
Victoria	1	CANADA	PARKER F, 2017, CAN J COMMUN
Vina del Mar	1	CHILE	BAEZA-GONZÁLEZ S, 2021, GEOFORUM
Winnipeg	1	CANADA	PARKER F, 2017, CAN J COMMUN
Wuhan	1	CHINA	XU JJ, 2023, 3C EMPRESA
Yarmouth, Canada	1	CANADA	PARKER F, 2017, CAN J COMMUN

Notes: **UNITO** considered as a video game hub the cities and regions investigated in the reviewed literature. **Source:** Authors' own elaboration.