Patterns and drivers of cluster formation in the videogame industry: a systematic literature review

Enrico Bertacchini, Cecilia Maronero, Pier Paolo Patrucco

Department of Economics and Statistics "Cognetti de Martiis", University of Turin

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Extended abstract

There is widespread agreement that cultural and creative industries exhibit a propensity to cluster in urban areas. The literature has extensively explored the conditions and mechanisms conducive to cluster formation (Lorenzen and Frederiksen, 2008; Gong and Hassink, 2017; Chapain and Sagot-Duvauroux, 2020). However, the relative importance of these factors across specific cultural and creative sectors remains insufficiently understood.

This paper examines the clustering patterns and drivers within the videogame industry. Employing a systematic review of 36 scholarly articles and about 90 documented cases of videogame industry clusters worldwide, the study addresses three questions: (i) Which videogame industry clusters have been addressed? (ii) What are their structural characteristics? (iii) What are the main drivers of their formation?

To address the first question, we characterize the study cases in terms of geographic location, type of urban area, size of the cluster and period of emergence. To address the second questions, adopting a theoretical framework inspired by Brenner and Mühlig (2013), we disentangle the dynamics of cluster formation into 18 factors and mechanisms grouped in three key dimensions: prerequisites, triggering factors, and augmenting processes.

The table below (Table 1) presents an overview of the gaming industry clusters we address in our systematic literature review, across different cities worldwide. It includes details such as the year of emergence, observation periods, cluster scale, size, and population characteristics of the respective cities. Let's briefly introduce the main descriptive elements that stem from this overview.

The gaming clusters analyzed have emerged over different decades, ranging from the 1980s (e.g., Liverpool City Region) to the 2010s (e.g., Cape Town). Observation periods vary, with some spanning multiple decades (e.g., Brisbane, 1980s to 2012/2014) and others being more recent (e.g., Hamburg, 2015-2016).

Most clusters are categorized as "city-level," indicating they are concentrated within a specific urban area. However, Liverpool City Region is classified as "regional-level," suggesting a broader geographic spread. Moreover, the clusters analysed vary significantly in size: while "big" clusters like Montreal and Hamburg demonstrate a well-established industry presence, with Montreal being particularly renowned for its gaming sector, medium-sized clusters such as Brisbane may reflect a

moderate industrial specialization of the region in the videogame industry. Finally, smaller clusters, including Liverpool City Region and Cape Town, can be the result of a still emerging process or of niche markets in the gaming industry.

We can also provide insights about the dimension of the different clusters considering the number of studios located in each area in the various years. For example, Brisbane had 38 studios in 2014, while Hamburg had 87 companies in 2015. Such data points provide insights into the growth and density of each cluster and may be usefully correlated with further data about the factor affecting the growth and development of the clusters.

Finally, all listed clusters fall into the "Large city" category, with populations ranging from approximately 1.55 million (Liverpool City Region) to 4.71 million (Cape Town). This suggests that gaming industry clusters tend to develop in large urban environments where factors such as talent, institutions and infrastructure, and market opportunities are more readily available. Although preliminary, such a descriptive evidence can support the idea that clustering in the gaming industry follows a Jacobsian path (Jacobs, 1969) rather than the more traditional Marshallian dynamics.

It can be also interesting to note that the presence of a gaming cluster in a city does not necessarily correlate with its population size. For example, Cape Town, with the largest population (4.71 million), hosts a small cluster, while Montreal, with a smaller population (1.8 million), has one of the largest clusters. Also, the historical evolution of clusters indicates that gaming industry development is often influenced by local policies, investment, and talent availability. Montreal, for example, has benefited from government incentives that have fostered its gaming ecosystem. Cities with a longer observation period, such as Brisbane, demonstrate sustained industry presence, possibly suggesting stability and resilience in their gaming sectors.

Table 2 instead show the historical evolution of clusters according to their geographical location and their size.

Years	Small	Medium	Large	Very Large	Megacity	Total	Countries
1980s	0	2	3	3	3	11	Australia, Canada, Japan, UK, US
1990s	0	5	7	2	1	15	Australia, Canada, Finland, France, Germany, Japan, South Korea, UK, US
2000s	0	3	3	3	2	11	Canada, Chile, China,Germany, Japan, Ireland, Spain, Sweden
2010s	1	2	4	0	3	10	Brazil, Canada, China, Norway, South Africa
Total	1	12	17	8	9	47	

As we have already discussed, the data suggests that larger urban areas have been a key focus throughout the decades, emphasizing the role of scale and urban infrastructure in the studied phenomena. While the total number of cases fluctuates across time periods, the overall trend indicates a broadening of geographical representation, with an increasing number of countries becoming part of the analysis.

While in the '80s the presence of videogame clusters is limited number of countries, such as Australia, Canada, Japan, the UK, and the US, over time, the geographical scope expanded to include European nations like Finland, France, Germany, and the Netherlands in the 1990s, followed by further diversification in the 2000s with the inclusion of Chile, China, and Ireland. By the 2010s, new locations such as Brazil, Norway, and South Africa became part of the study, highlighting a growing global interest in the industry.

The 1990s emerge as the decade with the highest number of cases, followed closely by the 1980s and 2000s, while the 2010s show a slight decline. This fluctuation suggests that certain periods have seen a stronger growth dynamic in urban centres: it will be interesting to understanding whether this is due for instance to economic, technological, or policy-driven factors. Despite these variations, the representation of different city sizes remains relatively balanced across decades, with no single category dominating in a particular period.

The two tables presented describing the structural characteristics of our sample of clusters highlights the diversity of gaming clusters worldwide, illustrating differences in scale, size, and development timelines. Our paper aims to further explore such variety understanding the factors contributing to cluster growth and evolution. More specifically we will classify a wide variety of factors deriving from Brenner and Mühlig's (2013) framework into three embracing dimensions: 1) pre-requisites, 2) triggering events and 3) self-augmenting processes.

Let us briefly describe the three different dimensions:

1) Prerequisites represent foundational elements essential for cluster formation, such as labor pooling dynamics, universities, social and cultural capital, local demand, and policies. These factors create the necessary conditions for industry growth;
2) Triggering mechanism are instead key events or forces that initiate cluster development, including the establishment of technology parks, the development of crucial innovations, specific policy interventions, and the location of firms leading in the sector. These triggers set the clusters into motion and support their evolution and growth.
3) Self-augmenting factors, finally, involve mechanisms that sustain and reinforce cluster growth over time, such as university-industry collaboration, co-location choices by firms, the development of spin-offs dynamics endogenous to the cluster, and interactions between firms and institutions. These processes contribute to long-term expansion and resilience.

While the three different dimensions should not be regarded as rigidly separated but on the contrary we should keep in mind the dynamic interplay between structural conditions, catalytic events, and self-reinforcing mechanisms that drive the evolution of industrial clusters, our systematic review will aim at highlighting the role played by each specific factor and dimension in the different clusters in our sample.

Table 1. Clusters in the videogame industry.

Cluster	Year of emergence of the cluster	Year(s) of observation of the cluster	Cluster scale	Cluster size	Cluster size notes (n. of games studios in year)	City	Population	Population Range
Brisbane	1990s	1980s to 2012/2014	city-level	medium	38 (2014)	Brisbane	2706966	Large city
Montreal	1990s	2009-2015	city-level	big		Montreal	1798853	Large city
Hamburg	2000s	2015-2016	city-level	medium/big	In 2015, there were 87 companies located in Hamburg, and Hamburg was only second to Hessen in terms of turnover generated by video games (Castendyk & Müller-Lietzkow, 2017).	Hamburg	1787280	Large city
Liverpool City Region	1980s	LCR 2005-2015, interviews 2010-2013	regional-level	small	During this research, there were 30 firms identified as focusing on video game production, within the LCR. Equally, the digital/creative sector boasts an employment of almost 19,000 with a GVA of £878m (LCRLEP, 2016a).	Liverpool City Region	1551000	Large city
Cape Town	2010s	2019	city-level	small	59 gaming, or gaming and animation companies were found in South Africa, the largest group (48%) of which are in the Western Cape. Most of the gaming and animation companies in the database were founded in the last 10 years (65% have been founded since 2008).	Cape Town	4710000	Large city
Los Angeles	1980s	1972–2007	national-level	big		Los Angeles	3898747	Large city
Vancouver	1980s	2010	city-level	big	At the end of 2008, the total revenue of Vancouver-based video game firms was around CDN$1.5bn (EA Canada made close to a billion dollars). There were approximately 3500 jobs, and 145 firms.	Vancouver	2682510	Large city
Dublin	2000s	2012	city-level	small		Dublin	1450701	Large city
Munich	1990s	2010s	city-level	medium		Munich	1558395	Large city
Dallas	1990s	1972-2008	global	medium		Dallas	1302753	Large city
Helsinki	1990s	2012-2014	city-level	big	According to a report describing the game industry in Finland, there were over 250 game companies in Finland in 2016, and almost 40% of those were located in the Helsinki capital region	Helsinki	1268296	Large city
Lyon	1990s	1990-2013	city-level	big		Lyon	1696000	Large city
Calgary	2010s	2015-2018	national-level	big		Calgary	1681000	Large city
Edmonton	2010s	2015-2018	national-level	big		Edmonton	1567620	Large city
Ottawa	2010s	2015-2018	national-level	big		Ottawa	1070889	Large city
Toronto	2000s	2015-2018	national-level	big		Toronto	2832718	Large city
Austin, TX	1990s	2003-2008	national-level	big		Austin, TX	1028225	Large city

In sum, some preliminary findings reveal a wide geographic coverage of videogame industry clusters, with cases documented across America, Asia, Europe, and Australia. Clusters are not confined to large metropolitan areas; they have also emerged in smaller urban settings, reflecting the diverse spatial dynamics of the industry. Additionally, the temporal distribution of cluster formation indicates distinct periods linked to the historical development of the videogame industry at national levels, suggesting significant contextual influences.

As for the drivers of cluster formation, we expect not only to assess the most frequent factors identified in the literature, but also differences in their relevance across cluster types.

The paper contributes to the literature on clustering in cultural and creative industries by shedding light on how unique features of the videogame industry influence cluster dynamics. Furthermore, it

highlights distinct conditions and factors as peculiar enablers of cluster sustainability and growth in this sector.

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