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MAPPING A HYBRID PHENOMENON IN THE DIGITAL
WORLD: THE GREEK PROFESSIONAL GAMING SCENE
THROUGH SOCIAL NETWORK ANALYSIS (SNA)

ABSTRACT

The consumption of video game content as a commercial spectacle, namely professional gaming, is a complex cultural, social and economic activity that seems to be growing in popularity. The application of Social Network Analysis (SNA) allowed for a graphical representation of the Greek professional gaming scene, specifying its size and the different actors operating within it, and highlighting the crucial role of the content producers themselves. It also revealed the rapid commercialisation of professional gaming and the fact that it is a highly gendered space, where different gendered identities are excluded or marginalised.

Keywords: *professional gaming, esports, SNA, video games, gender identity*

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ΧΑΡΤΟΓΡΑΦΩΝΤΑΣ ΕΝΑ ΥΒΡΙΔΙΚΟ ΦΑΙΝΟΜΕΝΟ
ΣΤΟΝ ΨΗΦΙΑΚΟ ΚΟΣΜΟ: Η ΕΛΛΗΝΙΚΗ ΣΚΗΝΗ
ΤΟΥ ΕΠΑΓΓΕΛΜΑΤΙΚΟΥ GAMING ΜΕΣΑ
ΑΠΟ ΤΗΝ ΑΝΑΛΥΣΗ ΚΟΙΝΩΝΙΚΩΝ ΔΙΚΤΥΩΝ (ΑΚΔ)

ΠΕΡΙΛΗΨΗ

Η κατανάλωση του περιεχομένου των βιντεοπαιχνιδιών ως εμπορικού θεάματος, δηλαδή το επαγγελματικό gaming, είναι μια σύνθετη πολιτισμική, κοινωνική και οικονομική δραστηριότητα που φαίνεται να γίνεται όλο και πιο δημοφιλής. Η εφαρμογή της Ανάλυσης Κοινωνικών Δικτύων (ΑΚΔ) επέτρεψε μια γραφική αναπαράσταση της ελληνικής σκηνής του φαινομένου, προσδιορίζοντας το μέγεθός της και τους διάφορους φορείς που δραστηριοποιούνται σε αυτήν, και αναδεικνύοντας τον κεντρικό ρόλο των ίδιων των παραγωγών περιεχομένου εντός της. Αποκάλυψε, επίσης, τη ραγδαία εμπορευματοποίηση του επαγγελματικού gaming, καθώς και το γεγονός ότι πρόκειται για έναν χώρο με ιδιαίτερα προβληματικό έμφυλο πρόσημο, όπου διαφορετικές έμφυλες ταυτότητες αποκλείονται ή περιθωριοποιούνται.

Λέξεις κλειδιά: επαγγελματικό gaming, esports, ΑΚΔ, βιντεοπαιχνίδια, έμφυλη ταυτότητα

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PROFESSIONAL GAMING: AN INTRODUCTION

In recent years, a new way of engaging with video game content has emerged that has not only become extremely popular within gaming culture but also seems to have gradually become an integral part of the video game industry, one of the fastest-growing modern creative industries.¹ More specifically, the consumption of video game content is no longer just a private leisure activity but can take place in front of an audience with the intention of, among other things, generating financial gain for the gamer – in other words, it can become a commercial spectacle.

From the local LAN parties in the arcades of the 1980s, today – just four decades later – esports tournaments are held on a national or even a global scale, gaming YouTubers host some of the most successful channels on the platform, surpassing even the channels of multinational corporations in terms of audience reach and subscribers,² while Twitch.tv, a platform created for the broadcasting of this type of content, is currently ranked 40th in the global website rankings based on the number of visitors (Semrush, 2023).³ The ever-growing popularity of professional gaming is impressive: according to a *Newzoo* survey, the esports audience was 435,7 million in 2020, has grown to 532 million in 2022 and is expected to reach 641,8 million by 2025 (Newzoo, 2022, p. 31). Moreover, in some countries, these activities are subject to government funding and planning, and Jin notes that they are one of the most profitable sectors of the South Korean economy (Jin, 2010, p. 82).

In Greece, the phenomenon has not yet reached such levels of growth – perhaps due to the lack of a substantial local gaming or technology sector –, but its presence is still at least noteworthy. According to *Socialblade*, popular gaming YouTubers *Unboxholics* host the 17th most successful channel in all of Greek YouTube in terms of subscribers, higher than well-known Greek musicians and all the Greek television channels (Socialblade, 2023b).⁴ In 2021, the Hellenic Ministry of Culture and Sports proposed a

1. By the beginning of the 21st century, the video game industry had already surpassed the film industry in the United States of America and the music industry worldwide in terms of profits (Dyer-Withford & de Peuter, 2009, p. xvi; Papailia & Petridis, 2015).

2. For example, according to *Socialblade*, a website that provides metrics about channels or pages on different social networks, the channel of the gaming YouTuber PewDiePie is the 7th most subscribed channel on the platform. The position refers to the data of the last access, in March 2023 (Socialblade, 2023a).

3. The position refers to the data of the last access, in March 2023

4. The position refers to the data of the last access, in March 2023.

draft law concerning, among other things, the recognition of esports and possible measures for their development, which was approved by the 35th plenary session of the Hellenic Olympic Committee (Hellenic Ministry of Culture and Sports, 2021, pp. 21-23). Important local companies, such as *Public* or *Germanos* stores, often collaborate with Greek professional gamers to promote their products, while in 2015 the *Greek Gaming Academy*, a school for aspiring professional gamers, was established with the aim of “gradually accepting esports as a profession”, according to an article in the newspaper *Kathimerini* (Katsigera, 2015).

Therefore, professional gaming appears to be a significant cultural, social, and economic activity that has garnered increasing commercial, journalistic, public, and academic interest in recent years. A meticulous study of this phenomenon is not only intriguing but also essential, as it provides insight into the production and consumption dynamics of video games, one of the most popular cultural products of digital capitalism. It also sheds light on the ongoing transformations and negotiations within a crucial contemporary economic sector: the new media and creative industries.

This article is part of a broader study on the Greek professional gaming scene, which was conducted between 2016 and 2020. One of the study’s objectives was to create a necessary first map of a previously completely uncharted field, by identifying the basic aspects of the Greek professional gaming scene, the actors that shape it and the roles they play within it, its rules it and its main characteristics. According to Dodge, mapping is an extremely useful tool for dealing with complex social spaces and is particularly recommended for digital research, where:

so much of the ‘terrain’ of study, the social phenomena and the online places in which they occur, are composed of immaterial software [...] and are to a large degree invisible. Consequently, this ‘terrain’ can be hard to comprehend, and maps are an obvious tool to help make the virtual tangible. The processes of mapping can help make the virtual understandable to the researcher. (Dodge, 2005, p. 117).

Thus, in line with the above rationale, the present article discusses the process of mapping the Greek professional gaming scene using Social Network Analysis,⁵ as well as some conclusions that emerged from this process.

5. Henceforth referred to as SNA.

1. SOCIAL PHENOMENA AS NETWORKS AND THE PROCESS OF NETWORK FORMATION

The representation of phenomena as networks of structural relations between actors has a long tradition in the social sciences and humanities and can be traced back to the works of early social philosophers such as Durkheim, who compared human societies to biological systems, in the sense that they are composed of interconnected elements that interact with each other. The emergence and spread of the internet, “a global network of machines, information and people” (Burrell, 2009, p. 188), has established the network form as the dominant way of thinking about social reality, to the extent that the former has become a metonym for the latter (Woo et al., 2015, p. 289). Furthermore, as Burrell notes, the complex social space of the internet has cemented the overriding realisation that a research field is not something that can be simply discovered but is *constructed* through a process of exclusion and inclusion (Burrell, 2009, p. 182). Such a construction process through the application of SNA is described in this article, in an attempt to map the Greek professional gaming scene as “a network composed of fixed and moving points including spaces, people, and objects” (Burrell, op.cit., p. 189). SNA is a technique, based on Social Network Theory and Graph Theory, used to depict the relationships between different social entities and to describe the patterns and effects of these relationships (Wasserman & Faust, 1994, p. 3).

More specifically, an attempt was made to create an initial inventory of the professional gamers and other actors within the Greek scene. The process began by identifying individuals who were frequently referenced online, followed by tracing their references to others. This resulted in a list of professional gamers, teams formed to participate in competitive gaming tournaments, websites dedicated to esports and/or gaming, and venues or organisers of gaming events, including four major internet cafe franchises. Subsequently, in May 2017, data mining was carried out from the Facebook pages of all of the above using the *netvizz* application,⁶ following the steps suggested by Rieder (2013). The data was processed using *gephi*,⁷ resulting in an initial visualisation of the relationships between the above-mentioned pages. The same process was repeated for each node⁸ that emerged and

6. *Netvizz*, a Facebook app created by University of Amsterdam researcher Bernhard Rieder that allowed users to gain insight into Facebook pages, stopped being available in August 2019.

7. Available at: <https://gephi.org/>

8. In the networks considered in this article, nodes represent pages or channels on Facebook and YouTube. Links represent “likes” and “featured channels” respectively.

was not included in the initial recording until the data generated from each page via netvizz did not reveal any pages that had not appeared in the data of a previous page.

Consequently, since the aim of the graph was to identify actors active in the professional gaming scene during the study period, pages with no posts in the last nine months, i.e. before September 2016, were removed from the network. Pages related to communities, professional gamers or tournaments from abroad were also removed, as the whole process was intended to graphically illustrate the way the phenomenon is emerging in Greece. Finally, the pages that did not represent a gaming-related entity and did not have enough connections with the rest of the network at this stage were deleted; specifically, the pages of companies, YouTubers, media and communities that were not directly related to video games and were 0 degree or 1 in-degree nodes,⁹ as they were most likely not a significant part of the network and their presence was considered a random event. The resulting nodes were classified according to the content of each page, as described in the next section. The whole process, which lasted from May to July 2017, was repeated in the same way one year later, from May to July 2018, to graphically illustrate how the phenomenon evolved (Figure 1). In this way, two graphs were produced that allowed the framing and mapping of such a fluid and complex phenomenon and a visual description of the network of professional gaming in Greece was made possible (Figures 4 and 5).

9. The degree of each node in a network represents the number of connections it has with other nodes in the network; thus, in this graph, the degree is the total number of “likes” of other pages on a given page (in-degree) and the total number of “likes” of the page on other pages (out-degree).

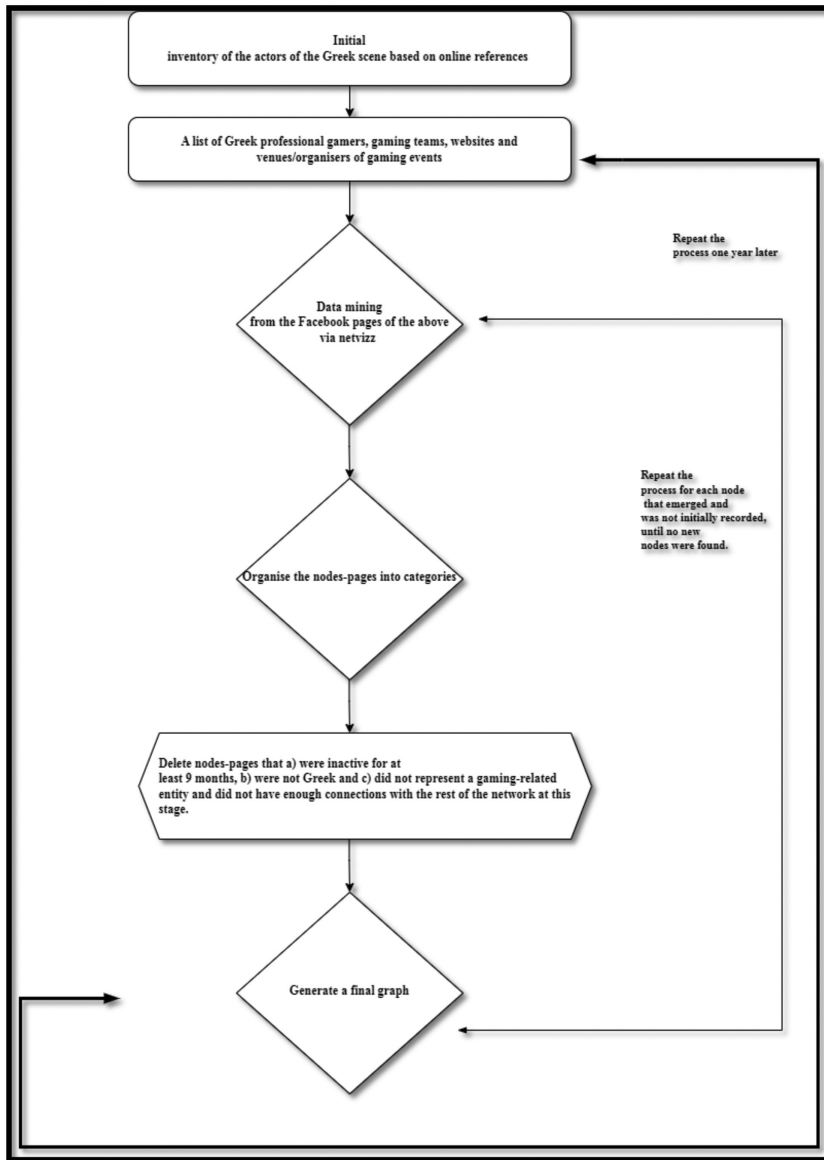


Figure 1: *The process of network formation*

The choice of Facebook over other platforms that could be used for data mining was primarily based on the importance of this medium during the research, both as a way of sharing information about the phenomenon, but also as a place where relationships between professional gamers and their audiences are constantly maintained: Professional gamers use their pages to announce the uploading or live streaming of a video, as well as their upcoming participation in tournaments, to comment on other gamers and current events, to post photos and snapshots of their daily lives that help build an appealing persona and attract viewers, while viewers create pages and communities to socialise with each other and express their admiration for a particular gamer. At the same time, the vast majority of gamers and other actors maintained a Facebook page, even though they may not have been active on other platforms. Thus, studying the professional gaming network on this popular social media platform was able to reveal actors and relationships that were not easily visible in other online or physical spaces.¹⁰ The next section discusses in detail the data obtained through the application of SNA according to the procedure described above, and attempts –to the best of my knowledge, for the first time– to map a completely unknown sector of our country’s cultural/media industry.

2. THE PROFESSIONAL GAMING NETWORK IN GREECE: BASIC METRICS, STRUCTURE AND EVOLUTION

By applying SNA to Facebook pages as per the procedure described above, nodes emerged that could be classified into different categories based on their types, thereby revealing the various factors constituting the Greek professional gaming scene. Thus, it seems that the scene in question includes: 1) Professional gamers, of course; those who create commercial gaming videos, broadcast their gameplay live, regularly participate in competitive tournaments for cash prizes or corporate funding, and those who engage in all three of the aforementioned activities – which is quite common. 2) Commercial companies, which in turn can be classified as i) large multinational companies headquartered in some foreign country, ii) companies that create and promote video game titles, iii) smaller or

10. It should be noted that Facebook’s popularity began to decline during the survey, at least among professional gamers, with the majority gradually becoming more active on Instagram. However, this shift began to take place towards the end of the survey, while companies and other actors, unlike professional gamers, were much more reluctant to follow this trend.

larger companies based in Greece or Greek freelancers, and iv) institutions that organise competitive gaming tournaments or game-related events in Greece. 3) Websites, webcasts and social media sites that provide gaming or professional gaming news – or both. 4) Artists, mostly cosplayers, who are inspired by gaming culture and who appear to be frequent participants in gaming events. 5) Internet personalities or websites that provide content of interest to the gaming community, mostly technology news. 6) Some other companies, organisations or interest groups that also target the professional gaming audience, such as sports clubs, escape rooms or board game groups. 7) The audience of all the above.

More specifically, the first graph in 2017 showed 1093 active nodes with 3815 connections, while the second, in 2018, showed 1179 nodes with 4738 connections (Table 1, Figures 2 and 3). There is therefore a slight quantitative growth, with a slightly larger number of actors participating in the scene over time, as well as a noticeable increase in the number of connections between them. However, the comparison of the two networks reveals a very different synthesis of the field, which in my opinion highlights the rapid commercialisation of the phenomenon: The number of professional gamers and teams, as well as the number of smaller news sites and websites, has decreased significantly, while there has been a dramatic increase in the number of international, local and video game companies. There is also an increase in the number of personalities or institutions active in fields other than video games, which I believe is an indication of the transition of professional gaming from a subculture to a more mainstream entertainment trend, and of the crucial role that collaboration plays in the success of online content production.

Table 1: *Percentage composition of the network in 2017 and in 2018*

	2017		2018		Percentage change
	Absolute value	Percentage	Absolute value	Percentage	
Prof. gamers	409	37,42%	314	26,63%	- 28,83%
Tournaments and their organisers	143	13,17%	145	12,38%	- 5,99%
Gaming websites, journalists and news websites	118	10,89%	92	7,8%	- 28,37%
Video game companies and titles	92	8,51%	171	14,59%	+71,44%
Local companies or freelance professionals	82	7,59%	117	9,32%	+ 22,79%
Gaming communities	51	4,76%	46	3,9%	-18,06%
Esports teams	47	4,30%	35	2,88%	- 33,02%
Non-gaming communities, internet celebrities and websites	47	4,39 %	83	7,12%	+62,19%
Multinational companies	44	4,12%	97	8,23%	+ 99,75%
Cosplayers, graphic designers and other artists	26	2,47%	32	2,8%	+13,36%
Other (sports websites, servers, gaming houses, etc.)	24	2,38%	43	3,73%	+56,72%

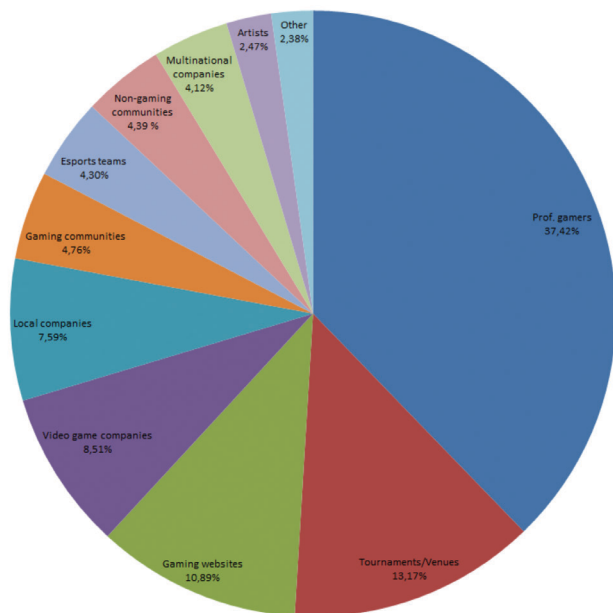


Figure 2: *Composition of the network in 2017*

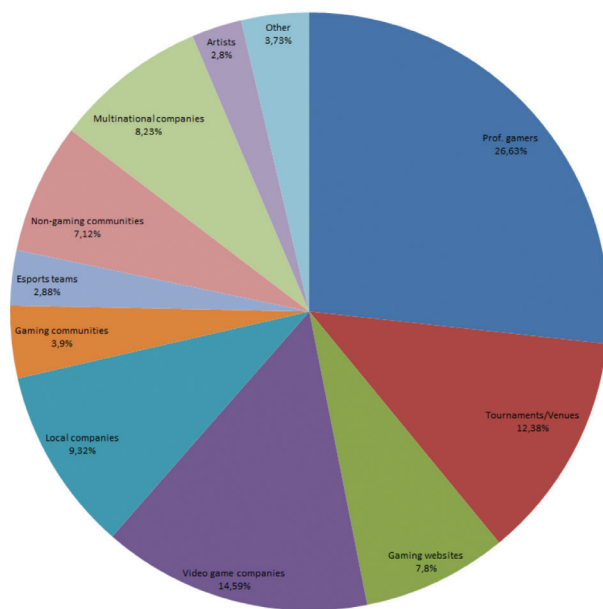
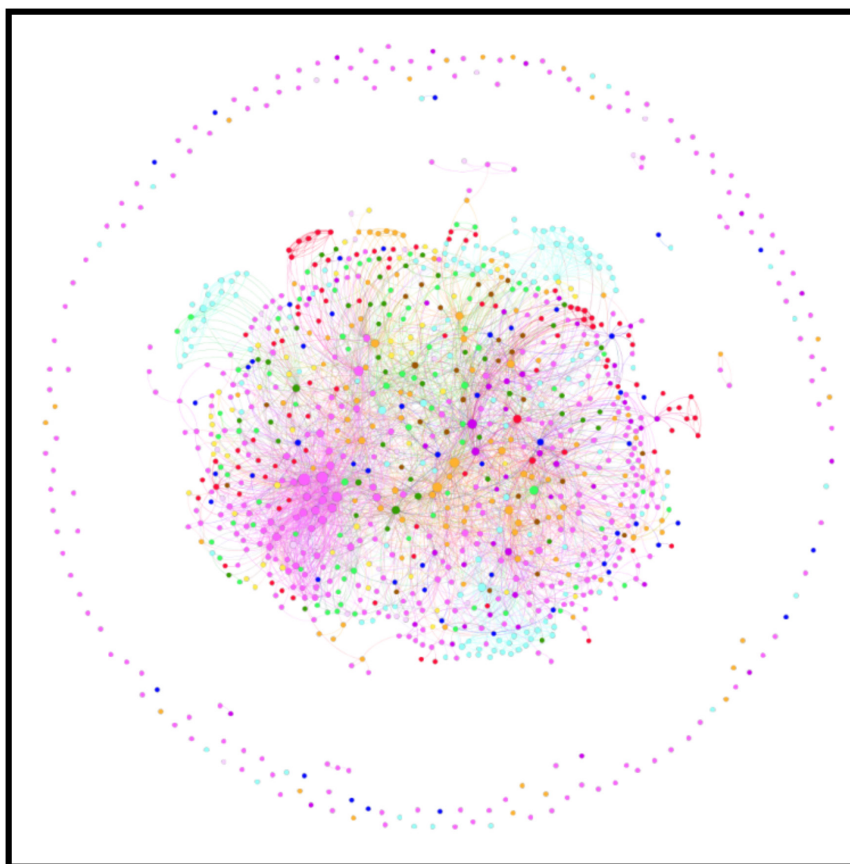
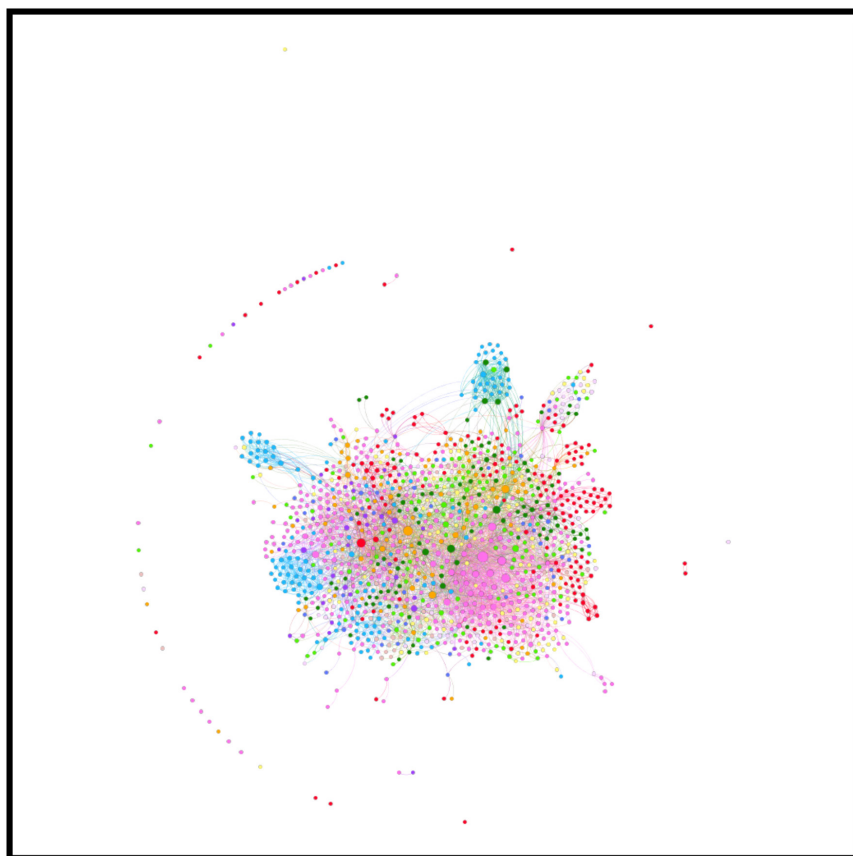


Figure 3: *Composition of the network in 2018*



Professional gamers	37,42 %
Tournaments and their organisers	13,17 %
Websites	10,89 %
Video game companies and titles	8,51 %
Local companies	7,59 %
Teams	4,30 %
Gaming communities	4,76 %
Other	2,38 %
Multinational companies	4,12 %
Cosplayers and other artists	2,47 %
Non-gaming pages	4,39 %

Figure 4: *The network in 2017*



Professional gamers	26,63 %
Tournaments and their organisers	12,38 %
Websites	7,80 %
Video game companies and titles	14,59 %
Local companies	9,32 %
Teams	2,88 %
Gaming communities	3,90 %
Other	3,73 %
Multinational companies	8,23 %
Cosplayers and other artists	2,80 %
Non-gaming pages	7,12 %

Figure 5: *The network in 2018*

A graphical representation of the phenomenon, as in Figures 4 and 5, visualises the idea introduced by Becker when he wrote of “art worlds”, that is, cultural production and consumption shaped by “the network of people whose cooperative activity, organized via their joint knowledge of conventional means of doing things” (Becker, 1982, p. x). As he notes:

Whatever the artist, so defined, does not do himself must be done by someone else. The artist thus works in the center of a large network of cooperating people, all of whose work is essential to the final outcome. Wherever he depends on others, a cooperative link exists (Becker, 1974, p. 769).

Thus, even in a cultural production process such as the one in question, where professional gamers take on many more responsibilities than, for example, a show host in a conventional medium, a network of different actors working together is required for content to be shaped, shared and consumed: The technological networks and tools through which it is created and distributed, the video game industry that is its reference point, external funding from smaller or larger companies, the interest groups in which it operates, the media coverage and the audience that watches the spectacle. It should be noted, however, that in gaming as a commercial spectacle, the “cooperative links” that Becker writes about are largely *horizontal*; professional gamers are more connected to each other than to the other actors in the scene, they depend on each other differently than, for example, a musician depends on other musicians, since their relationships with each other are part of the spectacle.

In any case, as the SNA suggests, professional gaming in Greece is characterised by relatively close relationships between the different actors involved. Graph density, a variable that expresses the actual versus the maximum potential number of connections between nodes in a network (Wasserman & Faust, 1994, p. 101), is only 0,003 in both graphs. However, this figure takes on a different weight when one considers that professional gaming is a very recent phenomenon, whose audience seems to believe that it stems to some extent from the spontaneous creativity of independent professional gamers, as a result of self-expression and love for gaming. In addition, the diameter of the networks, 14 in the first application and 15 in the second application, i.e. the maximum distance between any two nodes in the network (Jackson, 2008, p. 55), is relatively small for graphs of this size. The average degree of the analysis, that is the average number of connections of each node in the network, increases from 3,19 in 2017 to 4,019 in 2018, indicating a trend towards greater interconnectedness over

time, in addition to the aforementioned relative increase in the number of actors involved in the phenomenon in question.

Finally, it should be noted that the connected components, i.e. the subsets in which all nodes are connected by some path (Wasserman & Faust, 1994, p. 109), are dramatically reduced, from 193 in the first application to 45 in the second: isolated nodes, that is individuals, companies, groups or institutions that do not develop relationships with the other actors in the network, are rapidly disappearing from the Greek professional gaming scene. In any case, most of the nodes in both graphs belong to the same component –892 out of 1093, or 81,6%, in the first graph and 1133 out of 1179, or 96%, in the second– as shown in Figures 4 and 5. At the centre of each network, there is a large subset of nodes that have established links with each other, and only at the periphery, there are isolated nodes or groups of two or three nodes. In my opinion, this highlights the fact that, indeed, despite the different characteristics that gaming as a spectacle may have on Twitch, YouTube or in tournaments, it is a unified phenomenon that can –and should– be approached as a whole, at least in a study that aims to map and analyse a local scene. The main characteristics of the professional gaming network in Greece during the first and subsequent application of SNA on Facebook are presented in Table 2 below.

Table 2: *The main characteristics of the two networks*¹¹

	2017	2018
Average degree	3,49	4,019
Average path length	4,556	4,792
Diameter	14	15
Graph density	0,003	0,003
Connected components	193	45
Average clustering coefficient	0,204	0,24

The high average path length and the high average clustering coefficient of the two networks –4,556 and 0,204 in 2017 and 4,792 and 0,24 in 2018,

11. For the non-technical reader, the significance of the data in Table 2 for Social Network Analysis –and for the specific graphs– is summarised briefly as follows: *Average degree* is a metric that calculates the average number of connections per node in a network; in these particular graphs, it shows the average of the total number of “likes” from and towards each Facebook page that appears as a node in the networks. *Average path length* measures the average shortest

respectively, as shown in Table 2– are characteristics that, according to Watts and Strogatz, define what they call small-world networks, in analogy to the small world phenomenon (Watts & Strogatz, 1998, p. 440), more commonly known as the “six degrees of separation” theory, which was confirmed by social psychologist Stanley Milgram’s famous empirical experiment (Easley & Kleinberg, 2010, p. 611).¹² These are larger, more sparsely connected networks, with very dense subsets of nodes (Shirky, 2008, p. 215), namely systems that are highly clustered but have small characteristic path lengths, like random graphs (Watts & Strogatz, 1998, p. 440).

Social media platforms tend to respond to this organisational structure (Adamic et al., 2003; Mislove et al., 2007), and in fact, they tend to reinforce it: Backstrom et al. (2012), for example, found that on Facebook the “six degrees of separation” is reduced to 4,74, and it is no coincidence that this number is very close to the average path length of the two networks created by the actors of the Greek professional gaming scene, as they connect on Facebook. Beyond social media and the web, small-world networks are also often found in business clusters and other economic organisations,

path length between all pairs of nodes in a network or how many steps/“likes”, on average, it takes to move from one node/Facebook page to another in the specific networks. The *Diameter* of a network is a metric that represents the longest shortest path between any pair of nodes within that network. In other words, it measures the maximum number of steps required to travel between any two nodes in the network – the maximum number of “likes” between any two Facebook pages appearing as nodes in the networks in question. *Graph density* measures how many connections exist in relation to the total number of possible connections in a network or, in simpler words, it shows how tightly connected or spread out the connections are in a social network. *Connected components* are the subsets in which all nodes are connected to each other by some path. Finally, the *Average clustering coefficient* is a measure of how nodes are integrated into groups with their neighbours, forming smaller subgroups within the network. Watts and Strogatz calculate it as follows:

Suppose that a vertex v has K_v neighbours; then at most $K_v(K_v-1)/2$ edges can exist between them (this occurs when every neighbour of v is connected to every other neighbour of v). Let C_v denote the fraction of these allowable edges that actually exist. Define C as the average of C_v over all v (Watts & Strogatz, 1998, p. 441).

12. In this experiment Milgram asked random people to try to forward a letter to a specific person they did not know. The participants had the address, name and some basic information about the person, but they could not send the letter directly, only by forwarding it to their own close acquaintances, with the aim of ensuring that it reached its final destination as quickly as possible. Although only 1/3 of the letters reached their destination, it turned out that it took an average of only six steps to get them to the right address, demonstrating how interconnected human societies really are (Easley & Kleinberg, 2010, pp. 611-612).

including the creative industries, as they are particularly effective “in moving information, innovations, routines, experience, and other resources that enable organizational learning, adaptation and competitive advantage” (Baum et al., 2003, p. 697). For example, Uzzi and Spiro (2005) concluded that the organisation of Broadway musical performers into such networks has a significant impact on their economic and artistic performance, Lee (2015) studied how such networks stimulate the circulation of knowledge in Seoul’s creative economy, while Baker and Faulkner (1991) applied this analysis to the labour market for Hollywood actors.

The intriguing thing about such networks for the analysis here lies in two of their properties. First, they are very difficult to disrupt, because the potential disappearance of an average node does not matter (Shirky, 2008, p. 216). Even the large difference in the percentage composition of the two networks did not significantly change their main characteristics, and despite the departure of a large number of professional gamers (the 409 players in 2017 decreased to 318 in 2018, as shown in Table 1), the Greek scene continued to grow and develop. Second, the nodes with the most connections take on a particularly important role, since how efficient a network of this structure is at transmitting messages depends on *their* connections, not on how dense the connections are in the network as a whole (Shirky, op.cit., p. 225). As the network grows, the importance of these nodes increases. Gladwell calls them “connectors” (Gladwell, 2002, p. 38).

In the two networks that emerged during the analysis, the majority of the most connected nodes, or, in other words, the majority of the nodes with the highest degree, are not companies or other actors, but rather professional gamers themselves: 50% of the top 10 nodes in the case of 2017 and 80% in 2018. There is therefore an indication of an increase in this percentage over time. More importantly, if the nodes are ranked according to eigenvector centrality, a variable that determines the importance of a node by taking into account the number of its neighbours (its degree) and the importance of each neighbour (their degree) (Jackson, 2008, p. 65), the percentage of the most influential nodes representing professional gamers becomes even higher. Eigenvector centrality is considered a better indicator for calculating the influence of a node in a graph, as it takes into account the entire network (Bonacich, 2007, p. 555), and, on this basis, professional gamers account for 80% of the top ten most influential nodes in both 2017 and 2018.

The particularly influential role that the content producers themselves seem to have in the phenomenon of professional gaming can be discussed

in the context of the notion of the Italian autonomist “multitude”, that new social body that both sustains and threatens the modern economy (Hardt & Negri, 2002, p. 98) and that has emerged through the individual and collective opportunities arising from the different organisational structure of contemporary production processes. In addition, I think it becomes clear just how differently the construction of political identities can work in a productive phenomenon such as this one. As Tilly and Tarrow argue, political subjects are formed through conflict, struggle and protest (Tilly & Tarrow, 2017, pp. 49-50). However, in such a productive activity, the rules are somewhat internally determined, as evidenced by the fact that it is the professional gamers who ultimately can shape or change the scene, as their prominent role in the networks suggests. Consequently, conflicts, struggles, or protests are much more difficult to emerge, as there is no obvious *external other* against which they could be directed.

The comparison of the two networks also shows that, despite the recent emergence of the phenomenon, the professional gamers who appear to be the most important have to some extent established themselves as such over time. 41 of the top 50 players in terms of influence, 82% in other worlds, remain the same for 2017 and 2018, although there are some minor or major changes in the ranking order. The influence of the nodes was calculated by taking into account the number of followers of each page, the “talking about count”, a statistic that provides the number of interactions with the page in the last seven days since the extraction of the data, provided by Facebook itself, and the eigenvector centrality of each node.¹³ As mentioned above, eigenvector centrality is an indicator that quantifies a node’s ability to influence the wider network by calculating its connections and the connections of its neighbours (Wasserman & Faust, 1994, pp. 202-210; Jackson, 2008, pp. 66-70). Because it takes into account the pattern of relationships across the network (Bonacich, 2007, p. 555), it is considered particularly useful for measuring the influence of nodes, as evidenced by the fact that the well-known Google PageRank algorithm is based on it (Jackson, 2008, p. 66). The consolidation of the most influential professional gamers, combined with the departure of a significant percentage of them from the second network, proves that it is not so easy to enter and secure a position in the scene, despite the neoliberal

13. Specifically, the influence index in this article was derived from the average of these three measures, namely the number of followers, the “talking about count” and the eigenvector centrality, normalised using Microsoft Excel.

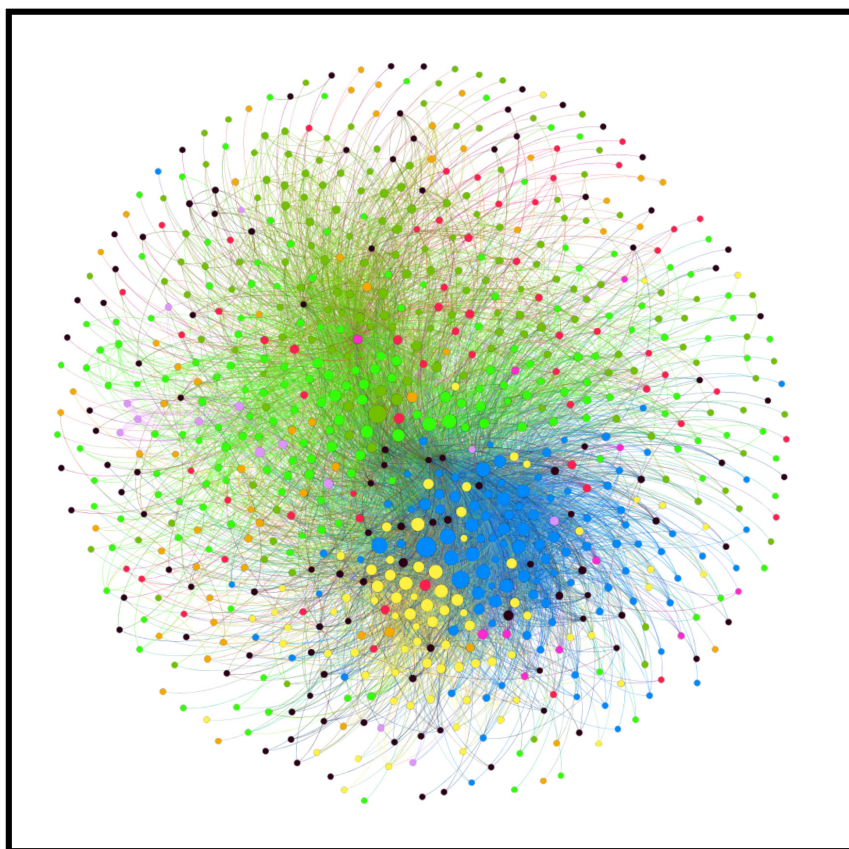
rhetoric that dominates such phenomena and argues that everyone has a chance to succeed.

A visit to the pages of the most influential professional gamers reveals that they are mainly active on YouTube. It is therefore clear that YouTube is the preferred environment for professional gaming in Greece, a fact that is linked to the absence of major sponsors, which prevents the emergence of a more organised esports scene. For this reason, another attempt was made to apply SNA for a third time on this platform, to obtain a more complete graphical representation of the phenomenon. For the data extraction, which took place in February 2018, the “channel network” feature of the *YouTube Data Tools* page was used.¹⁴ The result was a network of 738 nodes, each of which corresponds to a channel on the platform. Subsequently, as in the case of the graphs created using the Facebook page data, the channel nodes were arranged into separate categories to determine the percentage composition of the network, as shown in Figure 6.

More specifically, as shown in Figure 6, the following categories of channels are included in the professional gaming network on YouTube, as this was formed following the above process: 1) The Greek gaming channels, i.e. those that post –if not exclusively, at least in a significant percentage– gaming videos, with Greek or Cypriot hosts. These channels represent 15,07% of the network, of which 13,67% belong to male gamers and 1,4% to female gamers. 2) Gaming channels with hosts from other countries, representing 20,31% of the network. 3) Channels from Greece that do not broadcast gaming videos, at least not consistently (10,22% of the channels on the network) and similar channels from abroad (23,12%). These are usually channels with funny videos, vlogs and technology product reviews. 4) Channels from Greek or foreign companies, mostly video game and technology companies, gaming and technology websites or media (7,79%). 5) Music channels, either major labels or smaller independent artists, Greek or foreign (7,54%). 6) Channels that are automatically created by the platform itself and host the most popular videos on certain topics (1,79%). 7) Inactive channels, i.e. those that have posted less than 10 videos or have not posted at all for a year or more (14,18%).

Once again, in the case of YouTube, the professional gamers take the lead and the companies –or other actors– follow. The Greek professional

14. The above page uses the netvizz code, adapted to YouTube’s API instead of Facebook’s, and the “channel network” option creates a network of channels based on a channel’s “featured channels” and subscribers.



Foreign channels (non-gaming)	23,12 %
Foreign channels (gaming)	20,31 %
Inactive channels	14,18 %
Greek gaming channels (male)	13,67 %
Greek non-gaming channels	10,22 %
Companies	7,79 %
Music channels	7,54 %
YouTube channels	1,79 %
Greek gaming channels (female)	1,40 %

Figure 6: *The Greek professional gaming network on YouTube*

gamers' channels ranked higher in terms of both degree and eigenvector centrality here too, which shows the importance of cooperation and the need for mutual promotion in a phenomenon like this and in a scene as small as the one in Greece. Even the most subscribed foreign channels do not seem to promote other channels as often –and as much– as in Greece. After removing inactive nodes, as well as nodes that were not exclusively related to the Greek gaming scene, such as foreign music and gaming channels, a network of 332 nodes was obtained, of which 35,54% are channels with gaming video content. Once more, the same names appear in the top ten lists based on degree and eigenvector centrality as in the two Facebook graphs, confirming both the consolidation of certain hosts and the fact that the popularity of professional gamers extends across platforms.

An application of SNA to YouTube is an outline of a phenomenon that is emerging in the context of a global youth culture centred on gaming and technology. Such a graph illustrates the fact that, as Dovey and Kennedy point out, “to be subjects within the privileged twenty-first-century first world is to be increasingly caught up in a network of technically and mechanically mediated relationships with others who share, to varying degrees, the same attitudes/tastes, pleasures and preferences” (Dovey & Kennedy, 2006, p. 17). A third application of SNA to YouTube places the phenomenon in the context of a particular perspective that associates video games with technological innovation, gadgets and geek masculinity; a heavily gendered perspective, which marginalizes every other approach to gaming and consequently discourages alternative forms of performance, as will be discussed in the following section.

3. WHERE ARE ALL THE GIRLS? THE WOMEN IN THE GREEK PROFESSIONAL GAMING SCENE

Professional gaming –and video games in general– is an entertainment sector aimed primarily at men. At least, this seems to be the conclusion that can be drawn from an analysis of the Greek professional gaming scene, as shown by the percentage of women participating in it as content producers. Women are both much fewer than men *and* much less influential. Not only does their participation not exceed 8,5% of the total number of professional gamers, but among the top fifty most influential professional gamers only three are not male in both the 2017 and 2018 graphs. However, there is one category of nodes where the participation of women far exceeds that of men: the one that includes artists, mainly

people involved in cosplay,¹⁵ the act of creating costumes and props inspired by fictional characters and then embodying those characters in a real-life setting (Scott, 2019, p. 146). In Greece, such competitions seem to be held at all major gaming events.

According to Scott, most scholars who study cosplay treat it primarily as a playful way of performing identity and as a result, despite its popularity, it has not yet been sufficiently theorised (Scott, op. cit.). However, it can also be carried out as a strategic practice of postfeminist self-branding (Scott, op. cit, p. 148), aimed at monetary gain, something that also happening in the Greek scene. As in the case of professional gaming, which has only recently begun to receive more scholarly attention, it seems that these hybrid forms of consumer entrepreneurial production have not yet been properly analysed, having only emerged in the last few decades in the context of digital neoliberal capitalism. In the Greek cosplay scene, in addition to the cash prizes won by cosplayers who place first in contests, there are Greek women involved in cosplay who run themed YouTube channels, try to sell the costumes they create, or mention on their social media profiles that they can be “booked” for events for a fee – often for the very same events that are organised by the internet cafe branches, where popular, almost exclusively male, professional gamers are the main attractions.

Thus, the Greek professional gaming scene is characterised by a very pronounced division of roles based on normative gender characteristics. If men, who make up the majority of professional gamers, create content by consuming a technological product, focusing on the game itself and displaying mainly intellectual skills, the predominantly female cosplayers create content by engaging in activities that emphasise not their technological skills but their bodies, and that are closely linked to normative femininity in the social imaginary, such as make-up or clothing. Thus, this highly gendered division that emerges from the study of the Greek scene proves that social hierarchies continue to exist in new forms of work in digital capitalism, despite the veneer of equality and meritocracy.

To understand the persistent –and perhaps increasing– strong gender bias of the scene, one should first consider the broader problematic gender bias of video games as a medium, which academic research has identified and attempted to analyse since the moment they began to gain popularity, as early as the 1980s and the era of the first arcades (Williams et al, 2009, p. 832; Huntemma, 2015, p. 165). Women’s low interest in this medium

15. The term comes from the combination of the words *costume* and *play*.

has been attributed to a more general low interest in technology, which in turn has been attributed to gendered identities and, consequently, to gendered technological desires and fantasies (Kiesler et al., 1985; Miller et al., 1996; Brunner et al. 1998). At the same time, as video games gradually gained recognition as a distinct field of academic interest, studies turned to the game text itself. The intense action, competitiveness, violence and aggression, that some of the above studies find in such products, were seen as elements that may be attractive to men but seem to repel the female audiences, combined with the fact that women are rarely the main characters in video games and that these rare representations are misogynistic or hypersexualised (Dietz, 1998; Beasley & Stanley, 2002; Norris, 2004). In addition, some scholars have gone so far as to argue, albeit reluctantly, that video games require cognitive skills that are thought to be more prevalent in men, such as the ability to perceive space or to plan strategically (Greenfield, 1994, pp. 5-7; Brown et al., 1997, pp. 810-811).

However, analyses such as the above tend to conclude tautologically that women do not engage with video games because they are not interested in engaging with the medium as it has been shaped. I suggest that to better understand this gendered exclusion, it is important to consider that video games were born out of fields of activity that are associated with masculinity in the social imaginary, such as science, technology, the military or mathematics (Dovey & Kennedy, 2006, p. 36), and are therefore perceived as predominantly masculine. As Shaw (2011) argues, this makes it more difficult for women to *identify* with gaming culture and adopt the gamer identity.

Although statistical data from various, mostly commercial surveys show a significant increase in the number of women consuming video game content today, the strong gender bias in the industry continues to exist and affects the way women engage with gaming culture. The gender division is shifting to the new binary categories of serious or “hardcore” gamers on the one hand, and “casual” gamers on the other. Vanderhoef notes the existence of a rhetoric that associates casual gaming with femininity, “resulting in the recreation of a traditional gendered cultural hierarchy in the medium of video games” (Vanderhoef, 2013). Girls who consume video games should choose the right titles, constantly prove their skills by playing “correctly”, and regularly engage with video game content; otherwise, they are assumed to be doing so only to impress men. But even if those involved in gaming culture meet these “requirements”, it is not uncommon for them to be perceived as “weird” and “pretentious”

(Sveningsson, 2012, p. 434) – they may even be confronted aggressively.

So, if the identity of the typical consumer of video game content is so highly gendered, the identity of the professional gamer, who not only consumes but also produces content related to the medium, becomes even more problematic. Firstly, a professional gamer has to be active in public, and there is a traditional exclusion of women from public entertainment spaces. As Taylor notes, too much focus on some public activity is closely linked to the display of power, and mainstream representations are full of images of men setting aside all other problems to pursue some ambitious goal (Taylor, 2012, p. 120). In contrast, women are supposed to be more moderate and if they deviate from the norm, they are perceived as pathological cases (Taylor, *op.cit.*). Secondly, the identity of the professional gamer involves a display of technological prowess that has historically been intertwined with the image of the hegemonic, heroic male who can shape and control the future (Wajcman, 2000, p. 454). Thirdly, a big part of professional gaming has a highly competitive aspect, while overt displays of competitiveness may be socially acceptable for men, but are seen as a practice that women should avoid, relying on more implicit tactics to satisfy their aspirations (Bertozzi, 2008, p. 481). At the same time, the association of competitive gaming with sport offers access to a privileged form of masculinity, “a kind of survival of the fittest model of hierarchy” (Taylor, 2012, p. 114), where gender discrimination is naturalised because it is justified as biological or psychological difference (Taylor et al., 2009, p. 249). Finally, the labour subjectivities of professional gamers develop around entrepreneurial rationality. According to Butler, in the Western philosophical tradition, there is a systematic ontological separation of rational consciousness from bodily materiality, where rational discourse is associated with masculinity and the body with the feminine element (Butler, 2009, p. 38). Thus, the identity of the professional gamer is constructed according to the rhetoric of normative masculinity, which promotes a seemingly rational approach to the management of resources such as money or leisure time.

It is, therefore, an identity that not only involves the productive consumption of a highly gendered entertainment product but also develops around key components of hegemonic masculinity and contributes to the imaginary identification of the professional gamer with manliness. The reasons for the low participation of women –and all other gender identities– in the Greek scene are therefore evident, a trend that appears to also hold at a global level, as suggested by the limited number of relevant studies.

(Rambusch et al., 2007, p. 163; Taylor et al, 2009; Taylor, 2011; Taylor, 2012, pp. 110-133; Borowy & Dal, 2013, p. 2269; Hamilton et al. 2014, p. 1317; Johnson & Woodcock 2017, p. 4; Taylor, 2018). Even though there are no official entry restrictions, in an environment so closely associated with hegemonic masculinity, where the public performance of personality –and its gendered characteristics– is an integral part of the spectacle, the participation of diverse gender identities is de facto made much more difficult. Thus, women who are interested in creating content based on video games and gaming culture, in general, either turn to other forms of expression, such as cosplay, or find themselves excluded from the scene or forced into completely different performances as professional gamers than their male counterparts.

4. SUMMARY AND CONCLUSION

In conclusion, SNA has been the tool for a first approach to a completely unexplored phenomenon that, due to the lack of formal institutions from the scene and its very recent emergence, is difficult to even define, let alone to properly study. Through the application of SNA on Facebook, the size of the Greek scene was revealed, at least approximately, and the actors involved in it were identified, while the leading role of the content producers themselves in organising the scene was also highlighted. The rapid pace of commercialisation of professional gaming has become apparent, as well as the fact that the most prominent professional gamers have managed to consolidate themselves to some extent, while the less popular ones are struggling to stay in the field. YouTube turned out to be the most popular environment for professional gaming in Greece, and the graph of the phenomenon there shows a broader youth culture centred on gaming and technology, a strongly gendered perspective, which marginalises any other approach to gaming and discourages alternative forms of performances. Finally, SNA underlines the great need for cooperation between Greek content creators, while it seems that the absence of official access barriers and institutional exclusions not only does not diminish gender inequality but rather reinforces it.

In any case, it should be emphasised that the application of SNA in the context of this project was only a first step in identifying the basic structural characteristics of uncharted territory, and a further application of this technique may be necessary for future research dealing with this phenomenon. The graphs presented in this article are the visual

representation of a “microcosm” in a very limited geographical and chronological context, in the sense that Skarpeles is writing about referring to the world of Greek discography: This is a community,

that shows a kind of densification of relations between its members rather than with the rest of the network, that may have a geographical frame of reference without needing to, that is both self-recognised and recognised by experts and the public as “distinct” from the rest of the network [...], even if its work is morphologically indistinguishable from that of other similar groups. (Skarpeles, 2019, p. 41)

Consequently, the relationship between the network of the Greek scene and that of the global scene, its position in the video game industry, the application of SNA to other platforms and the analytical comparison between them, or systematic monitoring of the way the networks evolve, can provide important insights in the light of future research.

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