VICTOR SOARES MONTEMAGNI

AN ANALYSIS OF THE E-SPORTS TECHNOLOGICAL PARADIGM AND ITS INNOVATIVE DYNAMICS

São Paulo

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To my mother Sueli, to my sister

Patrícia, and to my father Adalberto for

all the support during my whole life

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“Somewhere, something incredible is

waiting to be known.”

Carl Sagan

ABSTRACT

The increasing popularity and media coverage regarding eSports contemporarily to an often-commented decline of traditional sports instigates the questioning of a possible change of paradigm taking place. In this scenario, a multifaceted analysis is conducted in order to understand the context surrounding this hypothesis and to comprehend the involved dynamics, with the ultimate objective of finding a satisfactory answer. An initial perimeter is set and the object of study regarding traditional sports encompasses mass entertainment sports, that have intense public appeal and are transmitted via professionalized vehicles to the audience, such as soccer. Then a method for the analysis is established as a sequence of three study fields, a Market Overview, a Strategic Analysis, and an Innovation Analysis. Each of those presents a sequence of pertinent methods and tools. The proposed method also establishes a subsequential discussion of the analyses to extract results. The Market Overview reveals a greater comprehension of the eSports audience profile, a predominantly young and male public. The Strategic Analysis is composed of three tools that allow a better comprehension of both eSports and traditional sports industries, as well as comparisons between them. Finally, the Innovation Analysis characterizes the eSports innovation under frameworks, notably the Abernathy-Utterback model, and defines the assessed paradigms. A discussion encompassing the analyses points to a likely paradigm shift, considering the substantial increase in some eSports' audience size and an apparent plateau in the one of traditional sports. Additionally, eSports have a more consistent manner to provide novel and digital content, shown to be more demanded and appreciated by young generations. Nevertheless, more data is needed to make a statistically reliable conclusion of whether that audience size observation holds.

Key words: Innovation, Technological paradigm, eSports, Strategic analysis, Disruption

RESUMO

O aumento da popularidade e de cobertura de mídia sobre eSports concomitante a um dito declínio de esportes tradicionais instigam o questionamento de uma possível mudança de paradigma em curso. Nesse cenário, uma análise multifacetada é conduzida de maneira a compreender o contexto em torno dessa hipótese e para estudar a dinâmica envolvida, com o objetivo final de se chegar a uma resposta satisfatória. Um perímetro inicial é delimitado e o objeto de estudo referente a esportes tradicionais engloba esportes de entretenimento em massa, que têm intenso apelo ao público e que são transmitidos à audiência por meio de veículos profissionais de comunicação, com o futebol. O método de análise é, então, estabelecido como uma sequência de três áreas de estudo: uma análise geral do mercado, uma análise estratégica e uma análise de inovação. Cada uma dessas possui uma sequência de métodos e ferramentas. O método proposto também estabelece uma discussão subsequente acerca delas para a extração de resultados. A análise geral de mercado revela uma melhor compreensão do perfil de audiência de eSports, um público predominantemente jovem e de gênero masculino. A análise estratégica é composta por três ferramentas que permitem uma melhor compreensão acerca dos setores de eSports e de esportes tradicionais, bem como uma comparação entre eles. Por fim, a análise de inovação caracteriza o caso de eSports dentro de modelos propostos pela literatura, notadamente o de Abernathy-Utterback, e define os paradigmas tecnológicos. A discussão tendo em vista as demais análises aponta para uma provável mudança de paradigma tecnológico, considerando o aumento substancial no público que acompanha eSports, bem como uma aparente estagnação do público de esportes tradicionais. Além disso, os eSports possuem uma maneira mais consistente de prover conteúdo novo e digital, mais demandado e apreciado por gerações mais novas. Apesar disso, mais dados são necessários para uma conclusão mais confiável estatisticamente acerca da dinâmica de tamanho de público.

Palavras-chave: Inovação, Paradigma tecnológico, eSports, Análise estratégica, Disrupção

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1. INTRODUCTION

For an adequate comprehension of the current work and its theme, this section's objective is to provide the history of eSports, a contextualization of the theme and a more detailed definition of electronic sports.

1.1. History

The origins of eSports date back to the 1980s. Gamers gathered physically in arcades and played within each other. Gaming culture was setting its roots as well, with games and titles becoming popular and appealing (Borowy, 2012). Local competitions at the arcades were becoming popular, with competitors facing matches of the most popular games and titles at the time (Hamari & Sjöblom, 2017). The majority of those events was not promoted by the game developers and publishers, nor did they possess an official organization and a coordinating entity. On the contrary, these tournaments were amateurish by nature.

With those events becoming more popular, organized tournaments started to appear. Even though, those were not professionalized. In other words, the players and the entities did not consist of a sustaining industry.

During the late 1980s, however, there was a setback in arcade and gaming culture. Arcades, as they gained more visibility, started to develop a negative image by society. Some media content portrayed arcades as places of deviant behavior (Borowy, 2012). In Japan, arcades were often characterized as *kurai, kitanai*, and *kowai* (dark, dirty, and scary). Some games, such as *Dungeons and Dragons* (a non-digital roleplaying game) was often accused to provide incentive to evil worship, others have been pointed as a source of violence incitation.

In the 1990s, with the popularization and increased performance of personal computers (PCs), arcades were being replaced or being to LAN *cafes* (Borowy, 2012). In those, it was possible for multiple players to faceoff simultaneously, whereas arcade games usually had a 2-

players capacity. In this period, most of the *genres* popular until nowadays were born, such as the First-Person Shooting (FPS), the Racing and Sports Simulators, and the Real Time Strategy (RTS). Also, many current titles (or their precursors) were also initially released in the 1990s, such as *FIFA International Soccer* (1993), *StarCraft* (1998), and *Half-Life* (1998, which then became *Counter Strike)*. Furthermore, in this decade the first leagues were created, such as the *Cyberathlete Professional League* (CPL), founded in 1997. The skill level required in competition grew as eSports professionalized (Candela & Jakee, 2018).

Console gaming was also a phenomenon at the time (Borowy, 2012). Platforms such as Nintendo 64 and PlayStation were also launched at this time. This, however, provided an incentive to in-house gaming (opposed to gaming collectively in PC cafes). Nevertheless, PC and console gaming increased overall gaming community.

South Korea and the United States were the main cores of this phase (Borowy, 2012). South Korea has had a very important role in the development of eSports. PC cafes, knowns as PC bangs in South Korea were the cornerstone of gameplaying. High urbanization allowed the gathering of many to play and compete against each other in PC bangs. Also, the government of South Korea provided incentive to software and hardware in game development, with the spillover of military electronic technology. The electronic industry was perceived as strategic because of its economic potential. Also, the act of gaming was considered beneficial, as it stimulated intellectually the youth. Until this day, most of the prestigious eSports players and teams in the world are South Korean.

In the 2000s, the trend professionalization and the development of new titles intensified. Broadband connection availability was increasing and, thus, enabling many to play and watch videogames (Scholz et al., 2019). This increased base and more technological means opened path to an era of global tournaments. eSports athletes became professionalized, mainly in the United States and in South Korea (Borowy, 2012). Competitions gained more visibility in

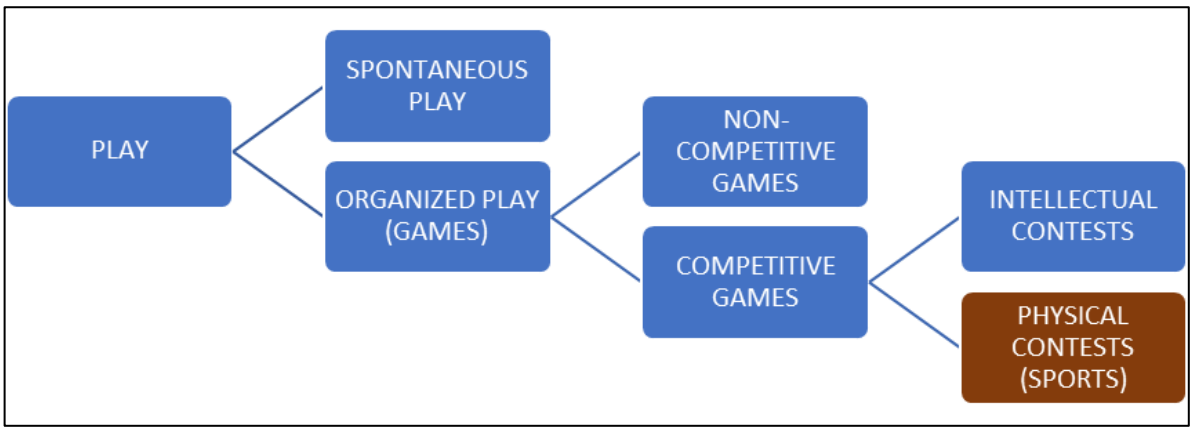
television. Nevertheless, technical limitations regarding connectivity still existed. To watch some live tournaments, fans had to manually synchronize audio from commentators with the video in game built-in platforms (Scholz et al., 2019).

From 2014, even increased average internet connection speed, online gaming and became more viable and pleasant. Live watching also became feasible, with robust video platforms, such as YouTube and Twitch. From this period, eSports are on the spotlight due to a rapid growth in its audience size, as well as media coverage. Furthermore, this period has been characterized by heavy investments and competition among publishers (Scholz et al., 2019).

1.2. Contextualization

The definition of sports is widely debated, but a well-accepted one is that they are competitive games that have a physical component (Guttmann, 1978), as shown in Figure 1. eSports (or electronic sports), on the other hand, are competitive games that possess electronic systems as primary aspects (Hamari & Sjöblom, 2017). Analogously to the categorization of sports by Guttmann (1978), eSports are the competitive subset of videogames. These are often compared to sports, and there is no consensus if the former may be considered as such.

Figure 1- Sports Classification Tree



Adapted from Borowy (2012)

Some competitive games, such as auto racing and chess have an arguable physical aspect and are, nevertheless well-accepted as sports. Regardless of whether eSports may be officially considered sports, many parallels and comparisons may be made. The comparison guiding this study is whether the eSports technological paradigm may replace the one of traditional sports as event entertainment.

1.3. eSports

eSports games may be divided into categories, or genres. These groups contain similarities in gameplay, rules, and settings within its games. A brief description of them is summarized in Table 1.

The most popular genre is the Multiplayer Online Battle Arena (henceforth MOBA). Games of this genre consist in 2 teams of 5 players each whose objective is to destroy the opponent's base in a predefined battlefield. Each player controls their own character, that possesses unique skills and is equipped with items during the match. Opposing characters may kill each other during the matches and are rewarded for that. The MOBA has its roots in a fan modification of StarCraft, a Real Time Strategy game launched in 1998. This modification led to a still existing game, Defenders of the Ancient (*Dota*). *Dota* and its sequences took the lead in the genre and is still one of the most watched eSports. In the last years, *League of Legends* (LoL) surpassed *Dota* 2 as the most popular of both MOBA titles and the entirety of eSports.

First-Person Shooters (FPS) are games that involve armed characters whose view is by a first-person perspective. The most common setting of FPS as eSports consists in two teams of five players that alternate into two groups. One of them has the role of exploding a bomb in the battlefield, while the other team has the role of preventing the explosion from happening. This genre is extremely popular and started to take shape in the 1990s, with titles as Half Life (which then gave sequence to Counter Strike, the most popular FPS currently). FPS titles, despite their popularity, have received criticism over time due to displaying violence. Some of

the new titles have been attempting to reduce sensitive content (such as not depicting blood) as to be more accepted.

Sports simulator games imitate their corresponding traditional sports, attempting to copy the rules, the visuals, the players, the teams etc. Games of this genre have economic rights attached to the use of names and trademarks and serve as a source of revenue to the leagues, such as FIFA, NBA, and Madden.

Real-time Strategy games (RTS) are one of the oldest genres. In this kind of game, each player acts as a commander of their units and manages their various resources. This sort of genre has been turning obsolete in the eSports scenario, as spectators find difficult to understand a match with hundreds or thousands of units moving across the battlefield simultaneously.

Battle Royale is the most recent popular genre, with its first titles launching in 2017. In this type of game, the players or teams must survive in a battlefield that shrinks over time, which forces the players to converge. To win the game, the team must eliminate the other teams' characters and be the last team standing. This genre was heavily inspired by the FPS games and, similarly, is subject to criticism on violence.

Genres seem to be evolving to fit a more marketable entertainment product, that generates fan engagement, appeal, and ultimately more revenues (Scholz et al., 2019).

Table 1 - Most Watched eSports Titles on Twitch in 2020

Title	**Total Hours Watched (in Billions)**	**Genre**
League of Legends	93.21	MOBA
Fortnite	64.01	Battle Royale
VALORANT	48.88	FPS
Counter-Strike: Global Offensive	42.82	FPS
***Dota* 2**	29.83	MOBA

Elaborated by the author. Source: SullyGnome (2020)

Table 2 - Main eSports Genres

Genre	Description
Multiplayer Online Battle Arena (MOBA)	Players with unique characters must defeat the opposing team by destroying its base.
First-Person Shooter (FPS)	Players control their armed characters and must defeat the opposing team throughout sequential rounds. Contain violent content.
Sports simulator	Virtual versions of their corresponding real-life sports, such as soccer and basketball.
Real-Time Strategy (RTS)	Players must develop both their economies and their military forces to defeat the opposing team.
Battle Royale	Survivorship games in a shrinking battlefield in which the last team or player standing is the winner. Contain violent content.

Elaborated by the author

1.4. Objective

The objective of this work is to analyze whether the potential eSports technological paradigm may replace the one of traditional sports. There is still a lack of literature regarding this matter, with most of the works focusing on the eSports games, but not on the business or industry surrounding them. Therefore, a more complete analysis allows a better understanding of the industries, their markets, and the directions that they are taking. This would be of interest to key stakeholders of both industries, as an analysis could aid in decision-making processes, such as investments or divestments, by providing a research basis suggesting the likelihood of the sector to prosper. Aspiring eSports publishers would benefit the most because of their central role in this industry.

The assessed potential replacement does not necessarily mean a full substitution and a termination of the traditional sports as a central entertainment source. This work, though, pursues.

In order to create a consistent comparison, a perimeter must be set. There must be a clear distinction of which traditional sports and eSports are object of analysis. Since the assessment compares the consumption of video content, sports that are already unpopular and non-profit generating should not be considered. That is because their engagement is very different from the profit-generating ones and they are not a mass phenomenon (Blair, 2011). Due to that, sports such as soccer, football, basketball, and baseball are the main examples of the traditional sports group.

eSports, on the other hand, are much newer than the traditional sports. Therefore, the individualization of titles and genres could be misleading since they have not been selected for a sufficient period to create a dominant design between them. Therefore, eSports are treated as an aggregate group, but only eSports, and not general videogames encompass that assessment.

When it comes to replacement of a technology by another, some lines should be drawn. Firstly, the comparison metrics. Sports consumption could be measured by aggregate viewership time, total audience, peak audience, industry revenue, and others. There is no definitive metric, but each of them may reveal distinct piece of information. Total audience, for instance, may reveal the market size, but it does not tell much regarding assiduity nor industry profitability. Total revenue, on the other hand, may provide a good notion on the amount of resources involved in the industry. Therefore, the data must be analyzed considering the availability and the advantages and limitations of a given metric, otherwise a myopic conclusion could be reached.

Another perimeter to be set regards geographical area. Even though eSports' development is heterogenic, it is a worldwide phenomenon. Thus, the comparison should be as broad as possible. There is a limitation, however, that most traditional sports have their most important World event in non-annual cyclical events, such as the Olympic Games or FIFA's World Cup. This fact should be kept in mind during a data analysis.

2. LITERATURE REVIEW

This chapter's objective is to gather the most suitable tools, models, and interpretations provided by academia in strategy and innovation research to ultimately apply them to the case of the eSports paradigm and allow a sufficient analysis and interpretation. Furthermore, this chapter also collects pertinent information regarding specifically traditional sports and eSports in literature to allow a greater comprehension of the theme.

2.1. Strategy Analysis

Strategy analysis is commonly used for the assessment involving scenarios in which players act rationally and interact with other with certain degree of competition. In literature, there are well-known tools and methods conceived to aid the conduction of Strategic Analysis and this section explores some of those.

2.1.1. PEST Analysis

Political, Economic, Social and Technological (henceforth PEST) analysis is a widely used framework to assess factors that favor a successful scenario for a company, industry, or even technological paradigm (Grant, 2016). In this assessment, each of the four dimensions is associated to relevant, pertinent, and likely factors that provide a significative influence in it.

Political factors tend to be associated to policymaking, legislation, regulation, and taxation. This set of mechanisms may be used by governments or legislatures and could offer incentive or discouragement to the object of study. Despite some of them may intentionally target the object of study, it is pertinent to also involve political tools that create undesired externalities over it.

Economic factors may be either macroeconomic or microeconomic. Macroeconomic factors, such as inflation, unemployment, and recession tend to influence the Economy as a whole but may have different effects over distinct industries and segments. Microeconomic

factors are more specific to the analyzed market and could be caused by multiple reasons. This specificity causes these factors to be publicly less known and present less available data to the general public than macroeconomic factors.

Social factors are associated to society and its beliefs, values, rules, and behavior. These, however, may not be trivially interpreted as they could be intertwined to psychological or sociological phenomena and may require specific skills from the analyzer to conduct the assessment. Nevertheless, more general observable data could be sufficiently useful for some insights and conclusions.

Technological factors are assessed mostly to determine technical feasibility of a scenario. The degree of complexity of a technology may pose a technical barrier of that paradigm and prevent it from emerging, for instance. Additionally, technological factors may shape or modify markets and practices, so they must be included in the analysis as well.

2.1.2. SWOT Analysis

SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a characterization of a company, a product, or a project by listing its strengths and weaknesses generated by its capabilities, as well as its external threats and opportunities presented by the environment (Grant, 2016). This framework is useful in the assessment and identification of the analyzed object, and it aids in driving capabilities and monitoring the competitive environment.

Figure 2 - SWOT Diagram

	Positive	**Negative**
Internal factors	Strengths	Weaknesses
External factors	Opportunities	Threats

Adapted from Grant (2016)

Strengths and Weaknesses are related to the object's internal characteristics and capabilities. Logistics competence, for instance, may be a strength to a delivery company, while the lack of communication competences would be a weakness to a marketing company.

Threats and Opportunities, on the other hand, are associated to external factors that influence the object of study. The changing of these conditions does not depend on the study object and, therefore, they are considered given.

With the overall casting of the internal and external factors comes a greater comprehension of consistency and adequacy of the object of study to its context. Intense adverse factors (weaknesses and threats) point to a potential diminished attractiveness. Conversely, intense strengths and opportunities suggest a more attractive scenario.

2.1.3. BCG Matrix

BCG Matrix is a methodology to analyze product lines (Grant, 2016). This framework presents four different stages in product lines, based on 2 factors. One of these factors is the cashflow generation, that can be high or low. The other factor is the cashflow absorption, which can also be high or low.

The Question Mark stage is characterized by low cashflow generation and high cashflow absorption. This is common in the early stages of a product, while it requires high investments to takeoff, but it is unable to generate cashflow, since it does not bring considerable associated revenue.

The Star stage is characterized by a high cashflow generation and a high cashflow absorption. Usually this is associated to a product that is still not mature enough and, thus, still requires considerable investments to fulfill its potential, but it has already started to generate revenues.

The Cash Cow stage consists in high cashflow generation associated with low cashflow absorption. This is commonly related to mature and successful products that no longer require great investments and simultaneously is associated to great revenues and profit.

Finally, the Dog stage is related to unsuccessful or obsolete products that do not bring considerable cashflow nor require investments. In this stage, the product is often discontinued.

2.1.4. Five Forces of Porter

The framework proposed by Porter (1979) is used to analyze an industry. It decomposes the factors (forces) as sources of pressure to determine the industry's attractiveness and profitability. Three of these forces are related to horizontal competition and two are related to vertical competition. A graphical representation of the framework is shown in Figure 3.

The threat of entry is a force that is related to the degree in which entrants face a barrier to the entry movement. These barriers may derive from many sources. One of them is the capital requirements to join the industry. High capital requirement means that an aspiring entrant would have to face high costs to build its capital structure and be established in the industry (Grant, 2016).

The intensity of economies of scale in the industry may also discourage entrants. The higher this effect, the less competitive it is for a player to make a product or provide a service to a diminished customer base. Network effects may also provide a favorable situation to incumbents, as value is increased to customers as they are situated in a large network of users.

Product differentiation is relevant to the threat of entry force, as it brings loyalty and brand recognition to a stablished player. Entrants may have to face high promotion and advertising costs to compete against widely accepted products.

The substitute competition force relates to the customer's willingness to substitute a product within the industry to a product outside it. Some factors such as price and performance

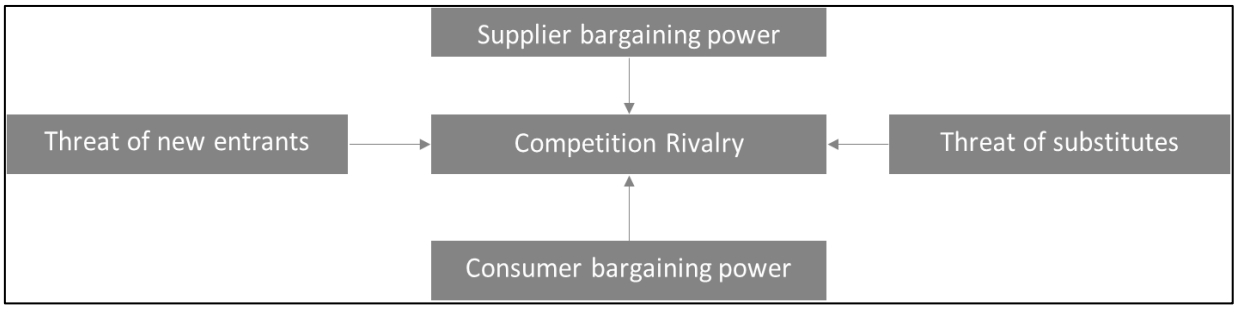
may drive this substitution. High substitutability decreases the industry's attractiveness and potential profitability (Grant, 2016).

Industry rivalry is the force within direct competition. Product differentiation and diversity of competitors may shape that rivalry. The less differentiated, the higher the strive to compete for costs and product performance. High market concentration may point a more attractive environment for its incumbents opposed to the ones in more competitive industries.

Supplier power relates to bargaining power and their price sensitivity. Higher concentration among suppliers may lead to an oligopolistic market that extracts part of the industry's surplus. The more diminished the supplier power, the more attractive the industry, as it leads to higher efficiency and productivity.

Finally, buyer power is an analogous force to supplier power. If there is high price sensitivity among buyers, margins in the industry may be diminished. High competition between buyers also increases the incentive to demand price reductions. Low switching costs as well as ability to backward integrate in the value chain also increases buyer power and reduces the analyzed industry's attractiveness and potential profitability.

Figure 3 - Five Forces of Porter Diagram



Source: Porter (1979)

2.2. Innovation Analysis

Innovation analysis is often used for the assessment and study of technological progress and its dynamics. In scenarios in which there is an innovative product or technology and there is the risk of substitution, this study field allows a greater comprehension of frameworks.

2.2.1. Innovation Taxonomy

A thorough comparison between both types of entertainment should involve adequate quantitative and qualitative tools and concepts to lead to an unbiased and due conclusion. Therefore, common vocabulary should be set.

In this case, there is an innovation phenomenon. Innovations have multiple taxonomies which may assist in identifying their context. A summary of them is shown in Table 3. One of the main classifications opposes incremental innovation to radical innovation (Dutton & Thomas, 1984). The former consists in a development of the same core technology, such as the subsequent improvements that the combustion motor suffered from the early 20th century until nowadays. Radical innovation, on the other hand, involves the adoption of new core technologies (Cantamessa & Montagna, 2016). The adoption of the electric vehicle instead of the traditional combustion vehicle would rely on totally different technology, which would make it a radical innovation.

Innovation may also be classified in terms of the main players (Christensen, 2013). Sustaining innovation is conducted by the industry's incumbents, whereas disruptive innovation subverts the market and are conducted by minor players or entrants (Cantamessa & Montagna, 2016). For instance, the adoption of digital cameras melted down Kodak and Fuji's incumbency, making way to electronic manufacturers, such as Sony.

Table 3 - Summary of Taxonomies

Antagonisms	**Classification object**	**Proposition**
Incremental and Radical	Underlying technology	Dutton & Thomas (1984)
Competence Enhancing and Competence Destroying	Required competences to produce the new product.	Anderson & Tushman (1990)
Sustaining and Disruptive	Whether incumbents remain as such.	Christensen (2013)

Elaborated by the author

The framework proposed by Henderson & Clark (1990), shown in Table 4 classifies innovation within two dimensions. The first of them regards the underlying technology used in the innovative product. The framework differentiates whether the reference technologies have changed or not. The second factor regards product architecture and assesses whether the relationship between component have changed in the innovative product or not. Based on this, innovation may be categorized in one of the following groups: modular, radical, incremental, or architectural.

Modular innovation is defined by unchanged product architecture, or changed at component level, while reference technologies have changed. Personal computers switching Hard Disk Drivers (HDD) to Solid State Drivers (SSD), for instance, have the same relationship between components, while underlying technologies have evolved from analogical to digital.

Radical innovation relates to changes both in reference technology and in product architecture. If a manufacturer switched its production from incandescent light bulbs to LED bulbs, that would not only require a totally different technology, but the relationship between the product's components would drastically change.

Architectural innovation occurs when reference technologies remain unchanged, while product architecture is modified. In the case of switching rear-based vehicles to front-based ones, for example, the main modification pertains to architecture, and the underlying technology is basically unaltered.

Finally, incremental innovation is defined by unaltered architecture, with modifications regarding reference technology. Personal computers switching processors to better performing ones, with higher processing rates, would characterize both sustainment of architecture and base technology.

Table 4 - The Henderson and Clark Taxonomy

		Relationship between components	
		Change	Do not change
Reference technologies	Change	Radical innovation	Modular innovation
	Do not change	Architectural innovation	Incremental innovation

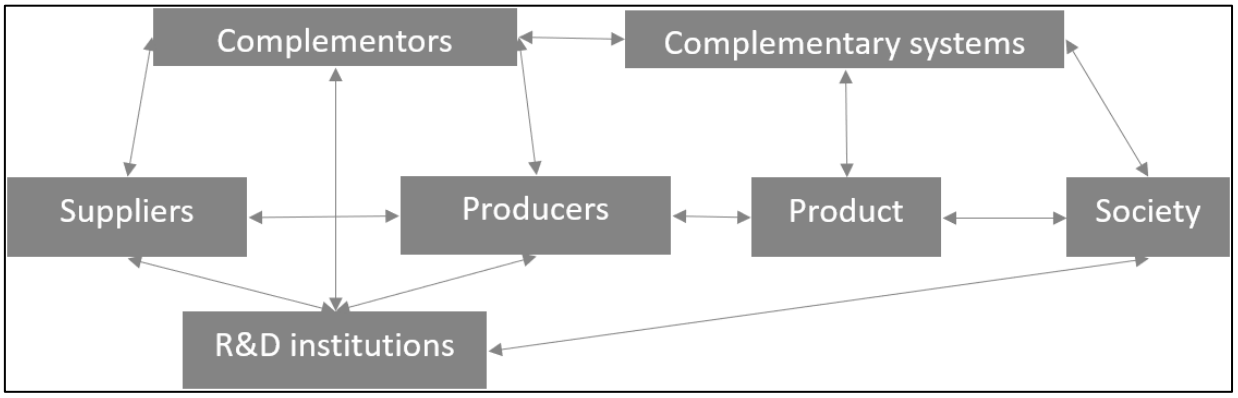
Source: Cantamessa & Montagna (2016)

2.2.2. Innovation Dynamics

The concept of dominant design assists in the comprehension of innovation adoption. That refers to the technical solutions, components, and features accepted as the default product in that industry. For instance, the dominant design of a vehicle is currently the combustion engine car. This concept relates to the one of technological paradigm. This is the setting of different elements (and their relationships) that sustain a dominant design. It embraces the knowledge, theories, tools, and methods that potentialize the useability of a technology into products or services, around which a sustainable business model may be established (Cantamessa & Montagna, 2016). It also embraces beliefs, needs, morality, rules, and values set by society. As is shifts these demands, the paradigm is forced to a change.

The components of a paradigm are the suppliers in the industry, the producers, the complementors, the research and educational institutions, the complementary systems, the society, and the product itself (Cantamessa & Montagna, 2016). A graphical representation in shown in Figure 4 The components of a paradigm provide a certain resistance due to their interrelationships.

Figure 4 - Technological Paradigm



Adapted from Cantamessa & Montagna (2016)

For instance, in the paradigm of the combustion engine vehicle, this is the dominant design. In other words, it is the uncontestably most adopted form of vehicle. There are the suppliers that manufacture the products and components. Some complementary systems, such as roads, streets, and highways, as well as complementors that act in gasoline production and distribution assist in the existence of the paradigm. Research and educational institutions provide qualified professionals in the industry. Society and its beliefs are part of that paradigm, as some values such as freedom and independence sustain the demand side in the industry.

One of the most traditional comparison methods for innovation adoption and product lifecycle is the use of s-curves. The s-curve of a technology is the chart that consists of the relationship between performance and cumulative adoption of a technology. It is a graphical representation of the evolution of a technology that tracks its perceived performance over time. A similarly shaped s-curve pertains to the diffusion curve.

Traditionally, an emerging technology presents a slow performance evolution in its initial phase, known as the incubation phase. During this stage, the potential of that technology is highly unknown and unexplored, and there is a high underfunding. After it starts is adopted by users, there is more research and exploitation on it. Also, the revenue deriving from sales aids in generating more investment. Therefore, performance increases abruptly. This stage is known as diffusion phase. Lastly, there is the maturity phase, in which performance evolves at a slowing pace. This happens because the technology is very close to its potential limit. Marginal performance increases demand high investments. In this phase, there is a large likelihood that the technology is gradually replaced by a better performing one until it is discontinued.

For instance, the average storage capacity of floppy disks could be a performance indicator. As people started to adopt that technology, new generations of floppy disks suffered incremental innovations, achieving greater capacities. With the technology becoming more popular, more resources were available to Research and Development efforts. However, that development reached a certain point which was no longer economically worthy or viable to increase the capacity. Therefore, the performance increased until a certain limit, and was replaced by a technology that provided superior standards.

Even though s-curves provide good graphical information, their use may not be as straightforward as it seems. Firstly, the choice of the performance criteria is fairly subjective or biased. One could measure the performance of cell phones over time considering weight, processing power, display resolution, or even a weighted combination of them all. There would not be an ultimate indicator, but the one chosen could lead to different analyses. Also, s-curves' shapes are not well defined. Usually, an s-curve could be decomposed into multiple minor s-curves and its format is far from a perfect classical s-curve shown in textbooks. Otherwise,

every technology could be trivially forecasted with minimum effort. The dynamic of a technology depends on multiple factors and, thus, does not present a well-defined pattern.

2.2.3. The Abernathy-Utterback Model

The model proposed by Utterback & Abernathy (1975) is useful for the understanding of technological lifecycle and, therefore, its s-curves as it breaks it down into three sequential phases (shown in Figure 5). The first of them is the Fluid phase. During this stage, the technology is immature and still has low performance (Cantamessa & Montagna, 2016). Because of that, demand and adoption are low. In this phase, there is still no dominant design as no particular solution has clearly proven superior performance. Many firms are drawn and attracted to this innovative effort as the technology in question is apparently promising. With this plurality, different technical solutions, with different logic, performance and architecture are developed.

The next stage is the Transition Phase. At this moment, a particular product architecture takes the lead as the dominant design, becoming the prevalent one. With this prevalence, many firms that have invested and developed competences in unsuccessful technical solutions fall behind in this market and are forced out. Therefore, the quantity of participants in the supply-side is reduced. Furthermore, as the dominant design becomes recognized, research and development efforts focus on a common direction. Competitors imitate each other and stimulate competition. Due to these motives, product performance increases significantly at this phase, what provides an inflection point in the s-curve. Sales also takeoff in this period, as performance is increased, and customers understand better the product.

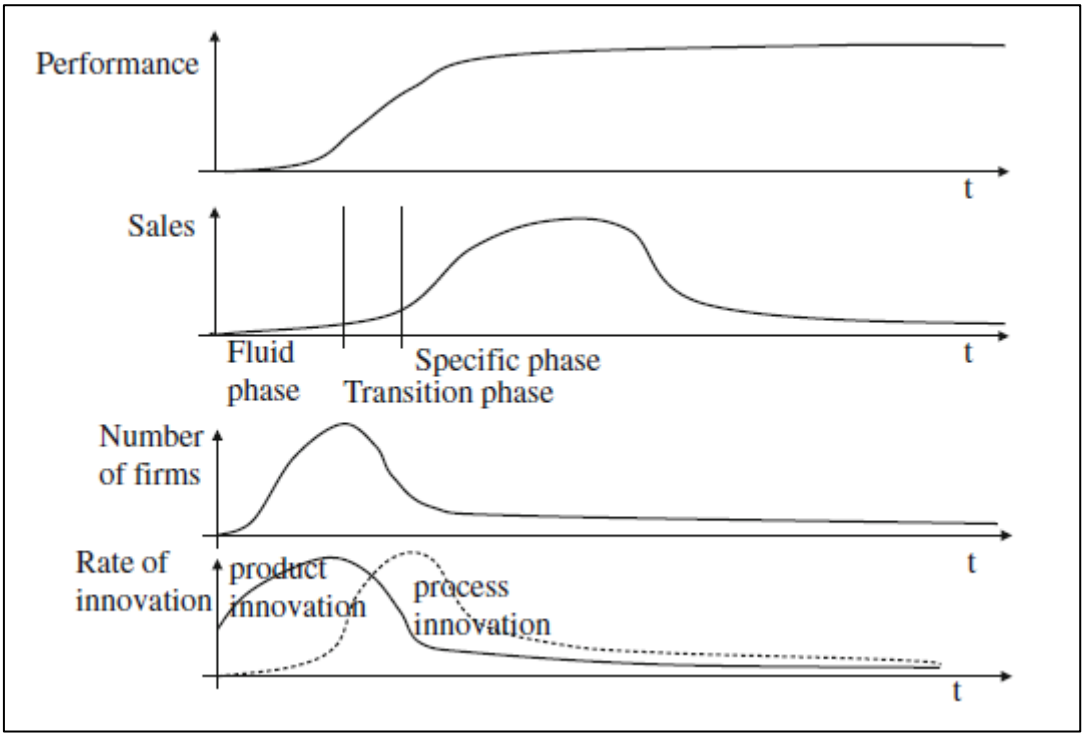
Finally, there is the Specific Phase. During this stage, the product is highly mature and, thus, firms compete highly on quality and cost, rather than on the technical solution or architecture. The improvement focus shifts progressively from the product to the processes, as the maturity brings more certainty and safety to committing to dedicated equipment and plants

to a defined product. In performance s-curves, this phase is characterized by an inflection point followed by a convex curve. This happens as marginal performance increments are more costly, the technology approaches a feasibility cap, and the abovementioned process-focus is set. Furthermore, with subsequent process innovation achievements, minimum efficient scale becomes significant, as fixed costs must be diluted into a reasonable product quantity to ascertain an economically viable production (Cantamessa & Montagna, 2016). Regarding sales curves, this period presents its peak, as the Early Majority adopts the technology.

The Specific Phase also involves the end of the technology lifecycle and its replacement by another one when performance stagnates, and sales tend to address reposition only.

The Abernathy-Utterback model, however, has a reverse sequence of product and process innovation regarding services. In the case of services, the process innovation happens first, as the service infrastructure is built in the Fluid and Transition Phases. After this settling, product innovation takes place to offer a mature product in the existing infrastructure. In the case of product-services, when the distinction cannot be made, the prevalent aspect determines whether the innovation follows the product or the service sequence.

Figure 5 – Abernathy-Utterback S-Curves

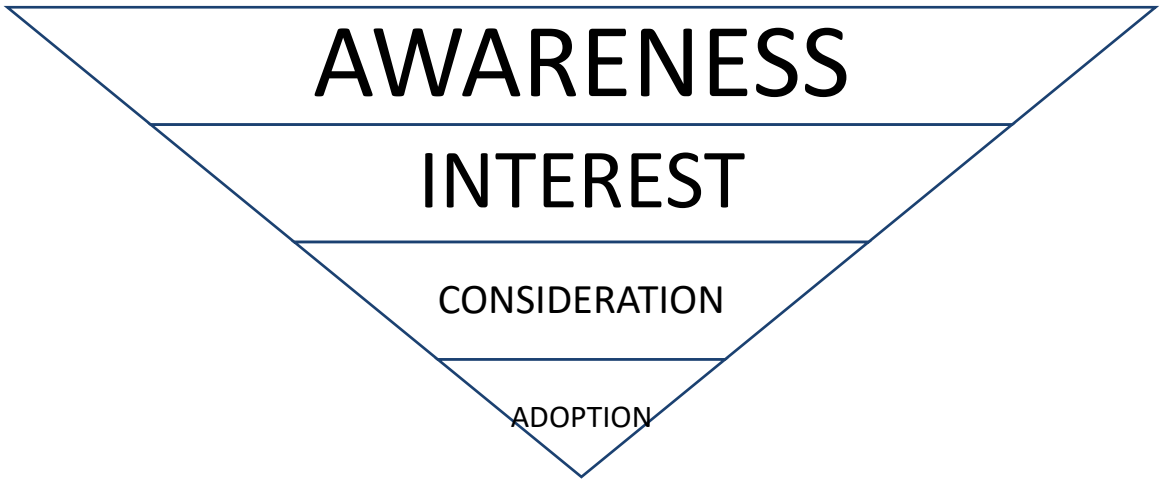


Source: Cantamessa & Montagna (2016)

2.2.4. Adoption Models

Two models of adoption are mainly relevant for the case of eSports. The first of them, Kotler's Marketing Funnel, refers to adoption at the individual level (Kotler & Keller, 2006). According to this model, the potential consumers follow a sequence of steps until they adopt a product. Firstly, they must be aware that the product exists. For that to happen, they should be reach by the product, or marketing effort, or word of mouth. After acknowledging it, they should consider consuming it, believing it is appropriate for them. Then, they should try the product and be satisfied with the experience.

Figure 6 - Kotler's Marketing Funnel



Adapted from Kotler & Keller (2006)

At an aggregate level, Bass diffusion model is explanatory. It considers that the pace of adoption of a technology depends on the cumulative sales and on two parameters. One of them is the innovative adoption and it reflects the direct communication by the producers. The other parameter is the imitative adoption, and it reflects the word of mouth and network externalities. The model also considers that there is an adoption cap, which is the maximum cumulative adoption possible. Therefore, when adoption is close to the cap, diffusion is slower since there few individuals unaware of the product that could be approachable.

Both models are complementary and explain adoption at different levels. The Marketing Funnel is useful to assess the efficiency of each step that encourage or prevent a potential customer from consuming. However, this model lacks a sight at quantitative level. The Bass Model, on the other hand, is useful for predictions, but it does not explain or measure the psychology of the consumer.

2.2.5. Disruption

Disruptive innovation may occur due to different factors. One of them regards the failure of incumbents in joining the emerging paradigm. The established technology may present

decreasing performance while the defiant technology's performance progressively fulfills in a better manner the users' needs (Cantamessa & Montagna, 2016) and that would encourage incumbents to embrace change and adapt to the new environment. The incumbents' inability to join the paradigm may be either due to cognitive inertia or to action inertia (Cantamessa & Montagna, 2016). The former relates to inability to comprehend the changing paradigm, while the latter happens when an ineffective response is performed by the incumbent.

Confirmation bias may lead incumbents into repeating old strategies while their underlying assumptions no longer hold (Cantamessa & Montagna, 2016). Market conditions change and, therefore, old practices and behaviors may be inconsistent to the new setting. For instance, consumers have become more demanding regarding environmentally friendly products and processes, applying pressure for long-time polluting firms to adapt their production processes.

The incumbents' unwillingness to addressing sunk costs is another source of cognitive inertia (Cantamessa & Montagna, 2016). These firms may face investing in the new technology as wasting investments that have already been made in favor of the older technology.

Finally, cognitive inertial may also reflect a misinterpretation of the new technology's potential by incumbents (Cantamessa & Montagna, 2016). These could overlook how the competing technology's performance, despite a low starting point, has a solid potential and therefore could pose a significant threat. A late response by the incumbents may present insufficient timing to be effective (Cantamessa & Montagna, 2016).

The Christensen Effect proposed by Christensen (2013) is another explanation to incumbents' inability to join the emerging paradigm (Cantamessa & Montagna, 2016). When radical innovation starts to develop, it presents a lower perceived performance than the dominant design. As abovementioned, its performance increases as research and development

efforts are directed towards it. Nevertheless, emerging or specific markets overlooked by incumbents may have a different demand and attribute performance differently. With these market niches, the emerging technology generates revenues that allow a more intense research and development pace that, consequently, causes a performance increase sooner than expected by incumbents.

2.2.6. Sustainment

Not all radical innovation, nevertheless, materializes nor leads to disruption (Cantamessa & Montagna, 2016). Despite the appeal of the inventiveness of some radical innovation examples, most often they do not cause disruption at all (Cantamessa & Montagna, 2016). This notion is of extreme important in the assessment of innovation because it prevents an overestimation and a misconception that a most recent technology or product is inherently fit to substitute an existing one. Some of those reasons for sustainment are discussed in literature and are presented in this section.

One of the reasons for that inability to disrupt is related to irregular advancement of the technology in the given paradigm, which may cause misinterpretation regarding its lifecycle (Cantamessa & Montagna, 2016). In other words, the s-curves of that paradigm may erroneously lead to conclusions that the technology has approach or is on the verge of approaching an endpoint. However, there are factors that cause the s-curves not to present a well-behaved shape or pace. Firstly, product generations may influence the aspect of steps composing s-curves (Cantamessa & Montagna, 2016). A certain product generation may reach its plateau in terms of performance, while a subsequent generation may present significant gains. That scenario would generate an irregular shape for that paradigm's s-curve.

An active reaction by the incumbents may create similar irregularities in the s-curves. In other words, the incumbents, while facing an emerging threat of substitution may direct their efforts into improving their technology to avoid disruption (Cantamessa & Montagna, 2016).

With a better technology, they can decrease the likelihood of the adoption of the arising competition and may present great leaps of performance gain. That is often known as the Sail ship Effect, due to this technology's great advancements posed by the competition against the developing steam engine ships.

Localized technological change is another factor to prevent disruption from happening (Cantamessa & Montagna, 2016). This factor is related to the willingness to adopt not only caused by the technology's performance per se, but also by the switching costs. Under this concept, surrounding circumstances may increase the unwillingness to transition, creating a lock-in to customers. In other words, the customer of an existing technology might face high switching costs due to previous investments surrounding it, such as complementary products. Thus, in this case, this individual would face a diminished, if not negative, utility gain to adopt.

Finally, another reason to contribute to a sustainment may be related to appropriability regimes and the requirement of complementary assets (Cantamessa & Montagna, 2016). This interpretation comes originally from Teece (1986) and pertains to the degree in which innovators may benefit or conduct their innovation. The appropriability relates to the protection that they have against imitation by competitors. If the radical innovation is highly replicable and is not offered legal intellectual property protection, it is likely that incumbents simply copy that technology if it presents a menace or if it allows greater profit (Cantamessa & Montagna, 2016).

Highly specific, expensive, or even unavailable complementary assets may be required by the entrants to offer the new technology to the market (Cantamessa & Montagna, 2016). That may be to the extent to be economically unviable, as those entrants cannot either integrate no hire suppliers. If this happens, the innovative product is unable to takeoff and disruption does not take place.

2.3. Sports and eSports Industries

A literature review on sports is pertinent to establish sufficient comprehension of the object of study of the current work. Traditional sports have been studied by academia under many different areas of knowledge and for a long time. eSports, on the other hand, due to their much newer existence, still have limited academic knowledge and most of is inherited from general sports studies.

2.3.1. Identification of Key Stakeholders

It is extremely relevant to identify the main players in the sports and eSports industry to characterize and assess their current dynamics. Some authors, such as (Blair, 2011), have listed and characterized key stakeholders in the traditional sports industry, while authors such as (Scholz et al., 2019) pointed out analogous key stakeholders in the eSports industry. Due to this high similarity, they are listed simultaneously, apart from developers, that are exclusive to the eSports industry.

- Players

The most basic unit in the supply side are the players. They practice and improve their skills and get compensated (financially and not) accordingly to their performance. The more professionalized the sport, the more usual that its top players have their professional careers in it. The players tend to have great stimuli to win, since it draws more payroll, more prizes, more bonuses, more advertising income and other sources of revenue and recognition (Blair, 2011; Scholz et al., 2019).

Professional players have great incentive to building and maintaining positive reputations. This affects their and their teams' likelihood to receive sponsorships, to gather the general public's attention, and even to receive investments (Blair, 2011). Due to this dependency on reputation, professional players are subject to both in-field and off-field rules

and codes of conduct determined by their employers, leagues, governing bodies, and even behaviors expected by society (Blair, 2011).

Professional players, trivially, start as amateur players and are progressively developed to that level (Blair, 2011). Incentives as the publicity received by previous professional players and their salaries, their prestige *etc.* motivate aspiring players into thriving that path. Nevertheless, a funnel-like logic applies, where the more competitive the sport, the harder it is to reach a professional status (Blair, 2011).

- Franchises

The franchises, also known as teams or clubs, are the collection of players that play on their behalf. Franchises can either pool players to play as a unit in collective sports, such as soccer; or to play solo in individual sports, such as Formula 1. Teams and players are the objects of a fan's support. Thus, their image, appeal, and prestige are extremely relevant as audience drives profit in this industry (Blair, 2011; Scholz et al., 2019).

- Leagues and organizations

Leagues and organizations are formed between franchises to offer a more competitive and, thus, desirable entertainment product (Blair, 2011). They achieve that by granting, for instance, reliable schedules, championships, and in-field and off-field rules. They also negotiate collectively and manage contracts with broadcasters and other entities. Traditionally, sports leagues and organizations have a well-defined territorial approach. For instance, UEFA does not accept South American franchises as part of its members. Because of this form of organization, championships also have a territorial logic (Blair, 2011; Scholz et al., 2019).

In order to provide the abovementioned competitiveness, leagues may intervene to generate competitive balance among teams (Blair, 2011). Some mechanisms are often adopted, as imposing salary caps among its members, so that more privileged teams have a limit to hiring

more expensive (thus probably better performing) players and posing undue advantage (Blair, 2011). Another measure adopting for correcting competitive imbalance is revenue sharing, where part of the league's revenue pool is transferred to more challenged teams with the expectation that they may use those resources to perform better.

Leagues may either be closed or open. Open leagues have a rotation of teams, mainly based on performance, in which some franchises are admitted or excluded from them (Blair, 2011). In this system, called the *promotion and relegation system*, a franchise usually must work its way up from less prestigious leagues to the more prestigious ones. Closed leagues, on the other hand, do not possess such regular rotations. They only admit new members based on consensus and usually expel members due to contractual breaches. Due to that aspect, these leagues are often criticized as being monopolistic since they exercise a considerable market power as suppliers of tournaments and titles (Blair, 2011).

- Media vehicles

Media vehicles create or broadcast content regarding the sport, such as matches, facts, articles, and news. They may be content creators, content distributors, or both (Blair, 2011; Scholz et al., 2019) depending on their involvement.

These vehicles are crucial in the value generation of the entertainment product, since they are responsible for reaching most of the audience (in the case of media distributors) and for creating more appealing and desirable content (in the case of creators) (Blair, 2011).

- Sponsor and advertisers

Sponsors and advertisers are present in different stages, both in-field and off-field. They can be related to any other agent. For instance, a firm may sponsor an individual player, a franchise, a league or even the media platform. Sponsors and advertisers may be endemic or non-endemic. The endemic ones are related to that specific industry such as sports equipment

manufacturers. In the case of eSports, endemic sponsors and advertisers are usually, but not limited to, software and hardware producers. Non-endemic sponsors and advertisers are not related to the industry per se, but they pursue the audience as a subset of their target markets. For instance, cold beverage producers are historically associated to sponsoring sportive events (Blair, 2011; Scholz et al., 2019).

- Game Publishers

eSports' key stakeholders are analogous to the ones of regular sports. There are also the players, the franchises, the leagues, the advertisers, the media vehicles, and the public. There are, however, additional component in their dynamics. These are the game developers and publishers. The game developers are the firms responsible for creating and updating the titles (Scholz et al., 2019). Unlike traditional sports, digital games must be programmed and, thus, developers may add or modify rules by-design. Game publishers usually detain the game's economic rights and make these titles available to the public for gameplaying via platforms. It is notable that the publishers have a direct channel to the public in their own platforms, what makes direct monetization highly feasible by selling exclusive content and services such as better services and aesthetical in-game equipment (commonly known as skins)(Candela & Jakee, 2018; Scholz et al., 2019).

The publishers are stimulated to make their games popular both for competitive and for casual purposes, and both for gaming and for watching. Gaming not only allows the abovementioned direct revenue, but it also provides more aspiring professional players, increasing tournaments' competitivity and, thus, generating more audience. Viewership in tournaments carries associated broadcasting revenue and draws and retains the amateur player base due to the engagement and visibility caused by the tournaments.

- Viewers

Consumers or fans receive media content, purchase tickets, and consume sponsored goods and licensed items. Fans are not necessarily direct paying consumers. For instance, one may watch a football match via open television and be impacted by advertisements. Nevertheless, the audience may always be seen as demand-side because they are always targeted as such in the value chain. The media vehicles can be either content generators or distribution channels (Blair, 2011; Scholz et al., 2019).

Both traditional and electronic sports have similar natures of motives for consumption. Authors such as (Hamari & Sjöblom, 2017) have much contributed to the understanding of reasons that lead the general public into consuming sportive content. Escapism is one of the most intense one, associated to one's desire to immerse into another reality as means to seek distraction and relief.

The acquisition of knowledge is another relevant motive, as the spectator could incorporate some of the tactics, skills, or movements into their gameplay. This aspect, however, is much more intense in the case of eSports than in traditional sports. This happens mainly because of the physical and motor coordination barrier existent between professional athletes and spectators, which makes most of the spectacle difficult to copy. For instance, skillful kicks in soccer, or distant throws in basketball often require a strong physical condition besides years of training. In the case of eSports, however, that barrier is lower. Even though players practice as much as traditional ones, the moves per se are a sequence of buttons pushed or mouse scrolling. The perception of the audience, therefore, considers watching as a rightful source of knowledge (Hamari & Sjöblom, 2017).

Novelty is a factor associated to seeing new players and teams in the sporting scene, which brings excitement and enjoyment (Hamari & Sjöblom, 2017). This motive is associated

to both sports and eSports. In the case of the latter, there is a constant influx of new participants as the evolvement of the market happens. Also, eSports have more novelty regarding the elements of the games. New maps, characters, skills, or even appearances may be brought by publishers, which add an extra layer into the possibilities of change.

A relevant aspect is that sports consumption assists in shaping eSports consumption. The former serves as a gateway into the consumption of the latter. The perception of what competitive events, cheering, and fandom that one has over eSports comes from the traditional sports reality (Hamari & Sjöblom, 2017).

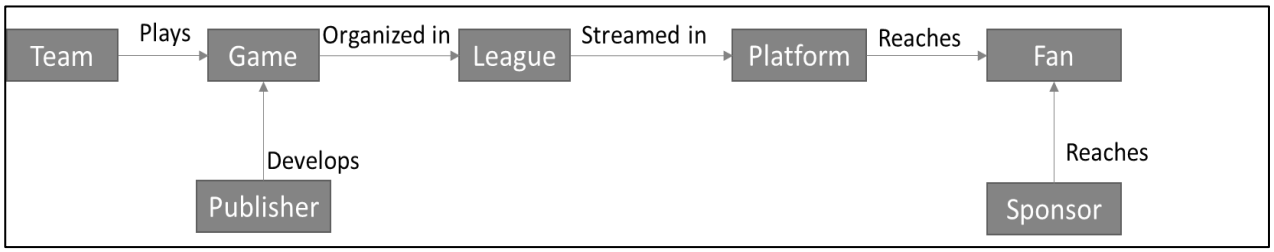
- Relationships Among Key Stakeholders

Some authors, as (Blair, 2011), provide a systematic representation of the relationship among the key stakeholders in the sports industry. A graphical representation of that work's model is shown in Figure 7. A linear relationship is posed, as players and teams compete in leagues. That content is broadcasted to the audience. This model, despite its oversimplification, sets ground to some insights. The first of them is the final stakeholder, which is the audience. The final product is the consumption of the sportive content by viewers. Also, broadcasters are, in this model, not mere conduits, but generators of that entertainment product, because they add value to that chain with commented content, for instance. The absence of sponsors in this graphical chain is also important because it shows that these are not directly in the chain.

More recently, other works, such as Cozzitorto, (2019) and Scholz et al. (2019) have provided analogous insight regarding eSports. The former work's contribution is shown in Figure 7. This work is very consistent to Blair (2011) comprehension of traditional sports, maintaining a quasi-linear relationship among stakeholders. According to this model, teams play games developed by publishers, which are organized in leagues. Those matches are streamed in platforms and that content, as well as involved sponsors, reach fans. Some relevant

differences to the previous model, however, may be pointed. Sponsors are explicitly represented as interested in the audience (or fans). This is slightly different to the implied participation of sponsors exposed by Blair (2011), because it states explicitly that stakeholder's objective.

Figure 7 - eSports Ecosystem

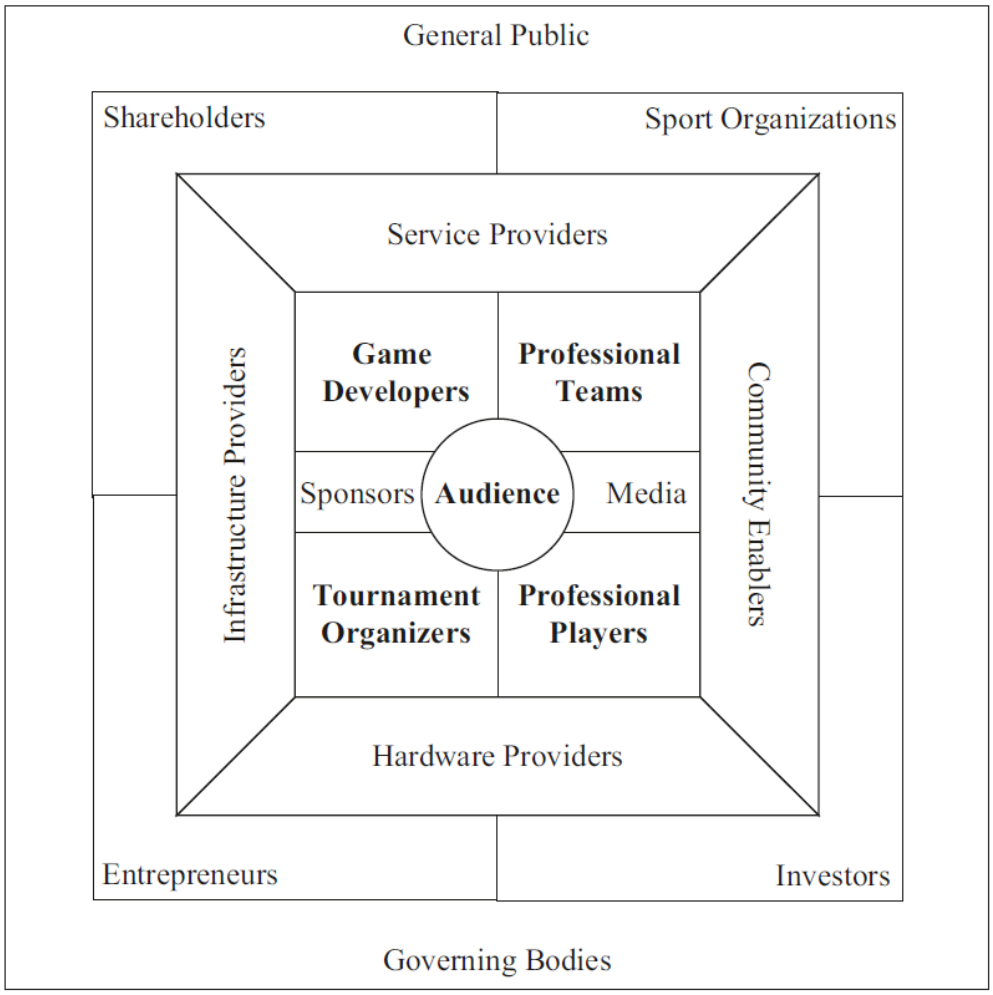


Adapted from (Cozzitorto, 2019)

It is the model proposed by Scholz et al. (2019), however, that adds more complex relationships in the eSports industry. It is represented in Figure 8. That model poses a much more intertwined and complex system, with many interfaces and stakeholders within it. Nevertheless, that complexity comes at the expense of less trivial interactions.

The representation of Scholz et al. (2019) also has the audience at a meaningful position. It is not an ultimate stakeholder, but it is the most central one. The remaining six previously listed stakeholders have an intense relationship to the audience. This model, however, proposes the encompassment of more peripheral stakeholders. Service, infrastructure, and hardware providers supply technological input to enable gaming, broadcasting, and watching. In the next outer ring, there are the investors, the entrepreneurs, the shareholders, and the sports organizations. They drive the industry by injecting resources. Finally, in the outmost ring, there are the general public and governing bodies that provide general laws.

Figure 8 - eSports interrelationships



Source: Scholz et al. (2019)

2.3.2. Sports Economics

Traditional sports economics has been explored by many scholars. Basically, the main product offered by the sports industry is the exhibition of competitive and organized matches to the fans (Blair, 2011). The main aspect for the perceived product performance is the competitiveness. Because of this, the public size reinforces the industry in a virtuous cycle. Increased public draws more investments, prizes, and attracts more people into becoming pro players. Due to this increased supply in the professional athletes' market, for the same number of titles, competition becomes fiercer. With this more competitive scenario, the perceived quality increases, attracting more audience (Blair, 2011).

Franchises have some main sources of revenue. One of the most traditional is the gate receipts (Grant, 2016). This is related to the fans' willingness to pay for attending a match and stadium capacity. Usually, the willingness to pay for a match in person is higher than to watch remotely, and it depends on some factors. One of them is the importance of the match per se, e.g., if it is a final to an important tournament. Also, the presence of star players and the competitive balance influence that demand as well. Furthermore, in-site watching brings additional revenues, such as parking and overpriced food and beverage (Grant, 2016). However, as television image quality increases, fans are geographically less restricted to the team's area, and internet and on demand-content are more available, that source's relevance is decreasing.

Broadcast revenues are usually negotiated collectively by the leagues. That means that the broadcasting rights for a championship or for a season are licensed to media vehicles by the league. The latter pools the revenues and distributes to franchises accordingly. Teams that bring in greater audience tend to receive greater shares of that income.

Advertising and naming rights revenues are related to the advertisers' willingness to pay for associating their image to the franchises'. The more prestigious and publicly recognized the franchise, the greater the potential of that income. Naming rights consist in the licensing the name of stadiums and venues after the licensee. Some examples are the Allianz Stadium in Turin, the Allianz Arena in Munich, and the Allianz Parque in Sao Paulo.

In the cost structure, mostly of a franchise's costs are fixed in the short run since many of them are guaranteed contractually. Salaries are fixed in the short run because the team could not simply avoid its contractual obligations. Analogously, the cost of participating in matches and competitions is also fixed (such as transportation costs) because the team is contractually obliged to participate in the league's games. However, these costs are variable in the long run, since a franchise may reposition itself. For instance, the franchise may hire cheaper players or withdraw from a league.

The salary budget of a team has a big impact in its competitiveness. Better players are expensive and provide greater chances of success in competitions. This not only increases the likelihood that the club wins a tournament (winning prizes and recognition), but it also draws more attention and public interest regularly. Despite the benefits of investment in salaries, this cost may be inconsistent to a team's positioning and financial situation.

Costs associated to venues and stadium are highly fixed and relevant in the cost structure. The market for venues is very illiquid because the potential demand is extremely specific and, thus, its construction or acquisition cost may be considered sunk. Their upkeep costs are unavoidable and, therefore, it is desirable to keep event attendance high to maximize in-place profit.

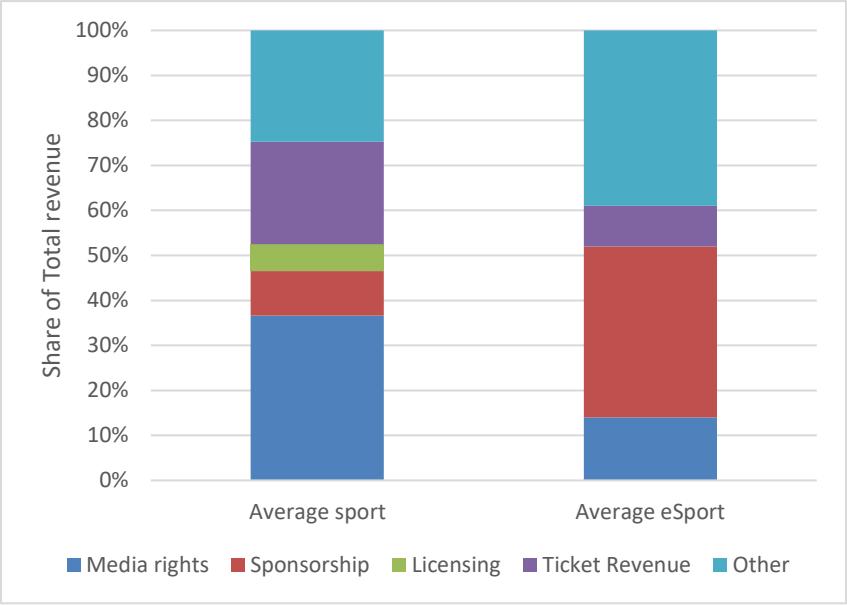
eSports franchises have very similar economics. However, their composition is much different. Distance watching is much more relevant to eSports, and most franchises do not perform in stadiums. Presential performance does not often take place in a team's venue. They are usually performance places (used by concert performances, for instance) rented by the leagues. Due to this difference, eSport franchises tend to have considerably lower fixed costs.

Both for sports and eSports, public is the major driver for profit. Greater audience implicates more valuable advertisements, broadcasting rights, and trademarks. Also, as abovementioned, increasing public reinforces itself due to the competitiveness stimulus. Moreover, there is another network effect regarding the audience size. When more people follow appreciate and follow the sport, the more likely it is for an individual to be able to socialize about I with friends and family.

eSports have peculiar economics regarding the game publishers due to direct monetization. Additional content is sold in the platforms, such as skins. These are purely aesthetical modifications that affect some elements of the game, such as character and gear

appearance. In eSports, these paid elements do not affect player performance, such as some pay-to-win features sold in regular videogames. That would generate a distortion misaligned to the principle of competitive fairness present in sports and, thus, would harm the game's reputation as an eSport title.

Figure 9 - Revenue Composition



Adapted from Merwin et al. (2018)

2.3.3. The Comparison of Both Industries in Literature

Some authors have much contributed to comparing eSports to traditional sports. Perhaps the most ancient questioning made by academia is whether eSports may be considered sports at all, as briefly pointed in Section 1.2. Some scholars stress the fact of a diminished physical component, or that the activity presents a totally different nature than traditional sports. Others, however, compare eSports to chess or motorsports, promoting a relaxation of the physical component. That debate is still unfinished, and a definitive answer may not be of extreme importance. However, this question opened a path to more diverse comparisons.

As abovementioned in Literature Review, some works as Hamari & Sjöblom (2017b) allowed a further comprehension in terms of different reasons that satisfy an individual in the two distinct types of entertainment.

Candela & Jakee (2018) has contributed with one of the most direct comparisons of those. According to that article, which compares the viewing habit of those distinct entertainment sources, some lines may be drawn.

Additionally, Candela & Jakee (2018) is perhaps the first published work that helps creating a perimeter around the comparison, in which it only makes sense to compare eSports to mass sports, which Blair (2011) referred to non-profit generating sports. That remark not only narrows the field of study, but it also aids in separating sports that have an intense entertainment dimension from those that are more restricted to certain niches.

Candela & Jakee (2018) is also one of the most relevant works to first point to a substitution of entertainment consumption from traditional sports to eSports and other new digital content, such as social media and video streaming. According to it, the viewership of traditional sports is, on average, stagnated and it is highly noticeable, and it happens due to a generational shift in favor of digital consumption. The age bracket from 18 to 49 is considered to reveal the direction that trends move, and this group is shown to be detrimental to sports. That same group, however, represents more than 80% of the analyzed eSports fandom (Candela & Jakee, 2018).

That same study is also relevant while reverberating the comparison of the closeness and relatability between both types of athletes. Traditional professional players are, on average, much more distant to the general public and have much more eccentric physical traits.

3. METHODOLOGY

To determine the existence of a paradigm shift, a defined method must be set. This proposed approach, illustrated in Figure 10, consists of a sequence of analyses with the objective of collecting pertinent information to observe the phenomenon properly. Therefore, those steps follow a pattern used in their fields of study, notably Strategy Analysis and Innovation Analysis. In the case of the former, authors such as Grant (2016) structure strategy analysis with analogous procedures. The proposed method regarding Innovation Analysis, on the other hand, encompasses the classifications and concepts shown in Section 2.1.

Firstly, the eSports business is subject to examination under the optics of Strategic Analysis, with the objective of a further comprehension of the involved parts, their relationships, and their stimuli. To achieve that, in Section 4.1, a market overview is conducted to provide sufficient insight to subsequent analyses. Key stakeholders should be sufficiently identified and discussed, as well the pertinent value chain to characterize a delimited perimeter.

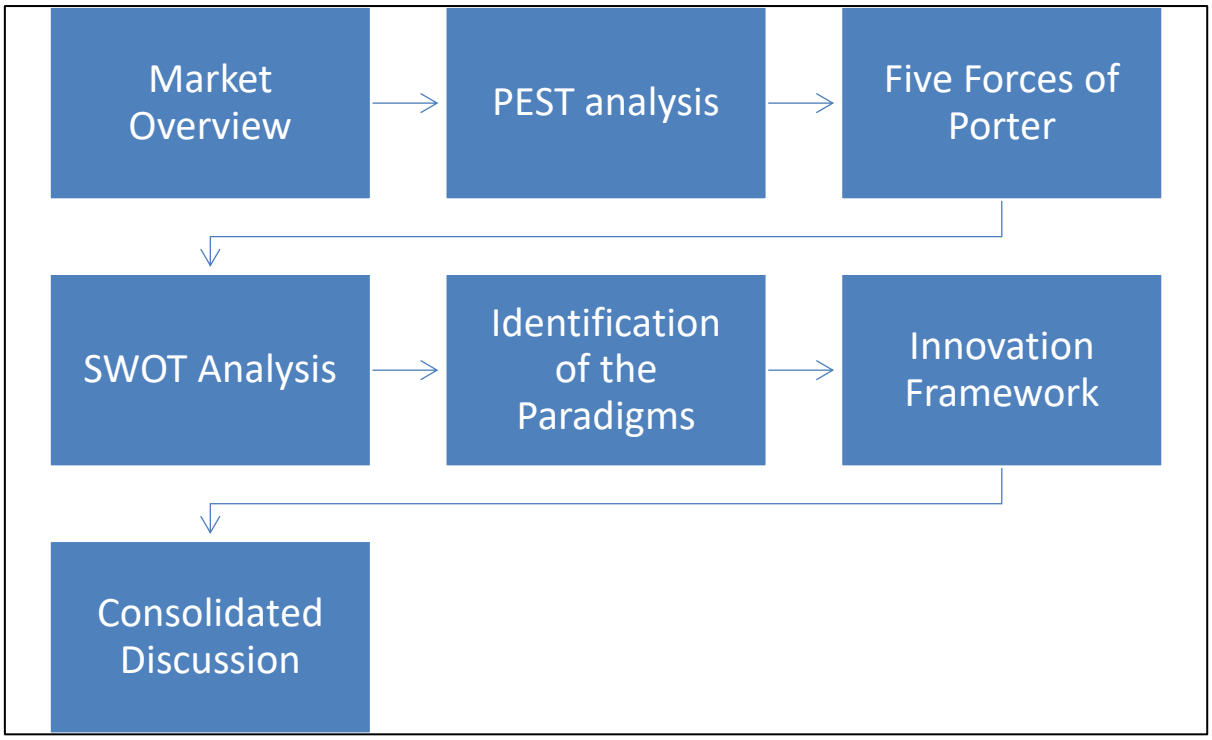
Then, previously presented concepts are used. The environment is characterized by PEST analysis in Section 4.2.1 with the objective of providing sufficient context regarding the environment surrounding the eSports business. For that, the information to be sought must affect sports, eSports, or entertainment in general. Then, in Section 4.2.2, the eSports industry is subject to a Five Forces of Porter framework with the objective of analyzing its attractiveness. Additionally, that analysis should be adequate to finally comprehend the value-chain of the industry as-is. This step is important because, while the PEST analysis focuses on surrounding circumstances, the Five Forces framework allows a deepening comprehension of the inside of the involved business. In Section 4.2.3, a SWOT analysis is conducted in complementarity to the Five Forces model.

Subsequently, in Section 4.3, the Innovation Dynamics is assessed, enabling an application of the Abernathy-Utterback model to ultimately determine whether there is a

paradigm shift in course. For that, both traditional sports and eSports paradigms must be determined and discussed. Also, the innovation under assessment is categorized and assessed. Key stakeholders' actions are also discussed under the innovation analysis optics.

Finally, a discussion must be made to bring the previous analyses together and reaching a sufficient and adequate conclusion to whether there is a paradigm shift.

Figure 10 - Sequence of Steps to Determine Paradigm Shift



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4. DEVELOPMENT

Given the established method, this current section presents the proposed sequence of analyses among the three abovementioned blocks: Market Overview, Strategy Analysis, and Innovation Analysis.

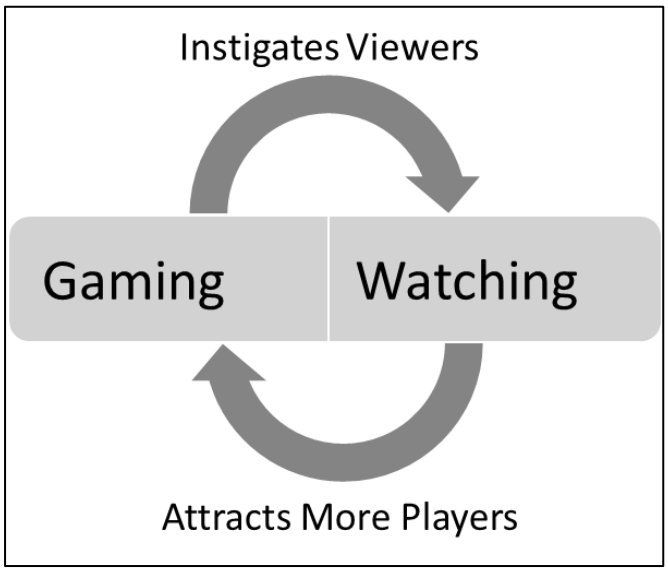
4.1. Market Overview

In Section 2.3, classes of key stakeholders of both eSports and traditional sports are characterized as they approach in the academia. Nevertheless, some of those stakeholders may be individualized and further studied to allow a better understanding of the industries and of the market and, thus, providing insightful context for the conduction of Strategy Analysis.

4.1.1. Viewers and their Profile

As previously presented in Literature Review, the most central stakeholder and the ultimate demand-side of both traditional sports and eSports industries is the audience.

Figure 11 - The Reinforcing Cycle of eSports



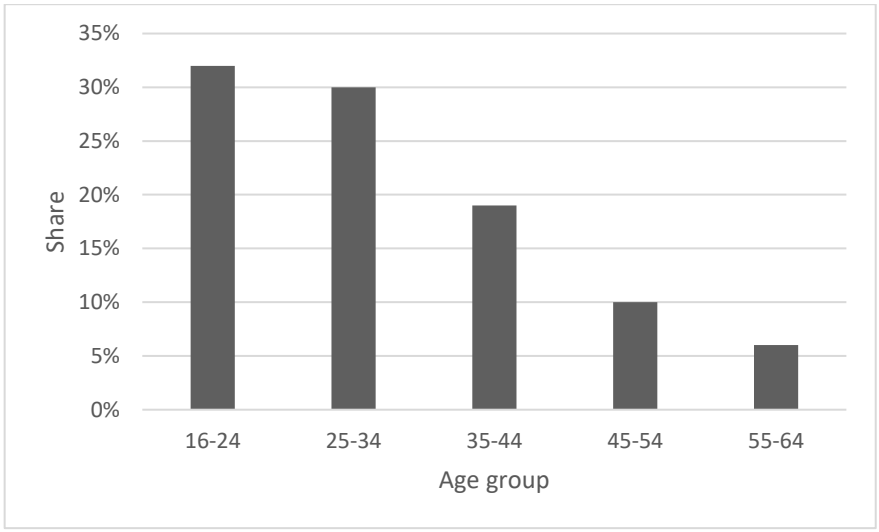
Elaborated by the author

- Fan profile

57% of eSports frequent viewers are in the Asia Pacific region. Europe and North America represent 16% and 12% respectively (Newzoo, 2020).

Data supports that eSports worldwide audience is young (shown in Figure 12). 32% of it falls within the age of 16 to 24, while the age of 25 to 34 takes another 30% (Wuensch, 2019). That is consistent to the idea of familiarity to videogames and online content. The younger generations are more aware of eSports and tend to have more acquaintances that enjoy this form and entertainment and, thus, may be a potential source of imitative adoption.

Figure 12 - Internet Users who Watch eSports Championships Worldwide



Adapted from (Wuensch, 2019)

Regarding gender, eSports have a clear majority of male viewers. In China and in Europe, male viewership makes up to approximately 70% of total audience (SuperData, 2017). In some localities, such as in The United States, the discrepancy is even higher, with 85% of male audience (SuperData, 2017). South Korea presents the most balanced proportion, with 62% of male viewership (SuperData, 2017). Nevertheless, eSports are undoubtedly most watched by male individuals.

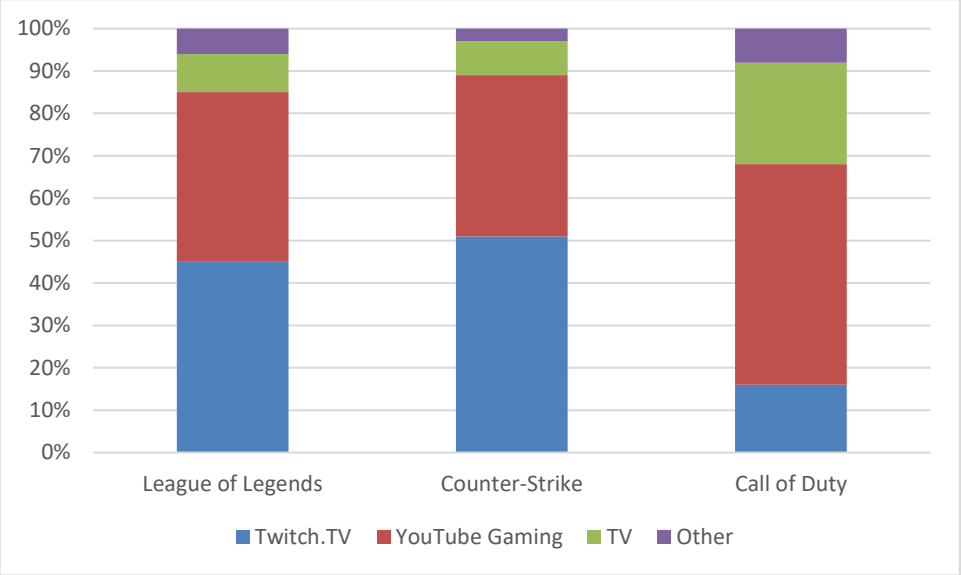
A survey revealed the average number of genres followed per eSports fans to be between 2 and 2.6 in selected countries (Master & Pike, 2017). In these same countries, the average number of eSports titles followed per fan ranged from 3.8 (in Germany) to 5.7 (in the United States) (Master & Pike, 2017). These numbers corroborate the treatment of eSports as an aggregate group, since there is a relatively high transition of viewers among different games.

- Consumption means

Both modalities are often consumed within different means. Traditional sports are usually watched on linear television, with an estimated proportion of 80% viewership by linear means, and 20% digital (Merwin et al., 2018). eSports, on the other hand, are mainly watched on the Internet, with the inverted proportion of 20% linear and 80% digital (Merwin et al., 2018). Different platforms and websites, such as Twitch, YouTube, and others provide live content to the audience.

eSports viewership is approximately 80% digital and 20% linear (Merwin et al., 2018). Digital consumption includes online and on-demand content, whereas linear consumption is related to linear television, in which content follows the timetable of the media vehicle. That is the opposite situation of traditional sports, that have approximately 20% digital consumption and 80% linear consumption (Merwin et al., 2018). This disparity has some reasons. One of them relates to different generations and their habits (Candela & Jakee, 2018). Younger generations have better familiarity with digital content, while older generations have been raised in a more analogical world.

Figure 13 - eSports Consumption Channel Worldwide in 2019



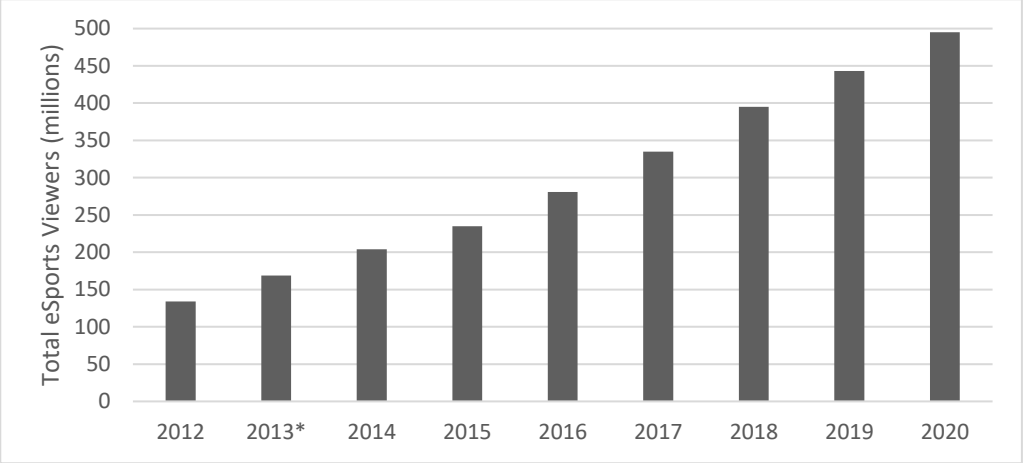
Adapted from (Now, 2017)

The second most significative reason has at it cause the sports culture. The consumption mean is related to the modality culture and legacy. Linear television has evolved always providing sports content. Even though Internet can provide real time content, the habit of watching matches in linear television sticks as a legacy. eSports' fans historically have watched games and matches online, since it has been the most viable mean for many years, until linear television eventually provided some exposition to it.

- Viewership Trend

eSports' total audience increased at an approximate 17.7% compound annual growth rate (CAGR) between 2012 and 2020, from 134 million to 495 million viewers. In the latest comparison, between 2019 and 2020, total audience increased 11.7% (Newzoo, 2020). Data suggests that the s-curve for eSports is still in the Diffusion phase because annual growth is still solid, meaning that adoption has already taken off without losing *momentum*. In most industries, annual growths superior to 10% are associated to aggressive growth.

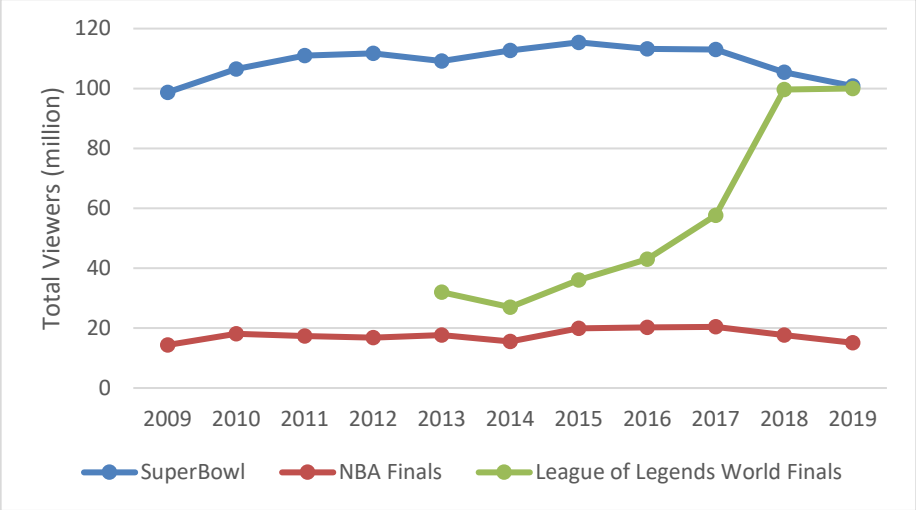
Figure 14 - Total eSports Audience



Adapted from (Newzoo, 2020)

The assiduity of the audience may also be assessed as well. Finals tend to be the most appealing and competitive matches of a season or tournament. They present a faceoff between the better-performing teams and, therefore, should reflect the interest in the sport. In the case of traditional sports, the FIFA World Cup finals are one of the top-watched matches. In the 2018 finals, total audience was estimated to 517 million viewers, which accounted for more than 7% of the population at that time. Some considerations, nevertheless, are relevant. One of them is that soccer is the most popular sport and, therefore, has the greatest audience. Also, the World Cup occurs in a four-years interval. Because of that, the event is more singular than yearly championships and may assist in concentrating extra demand.

Figure 15 - Events' Total Audience

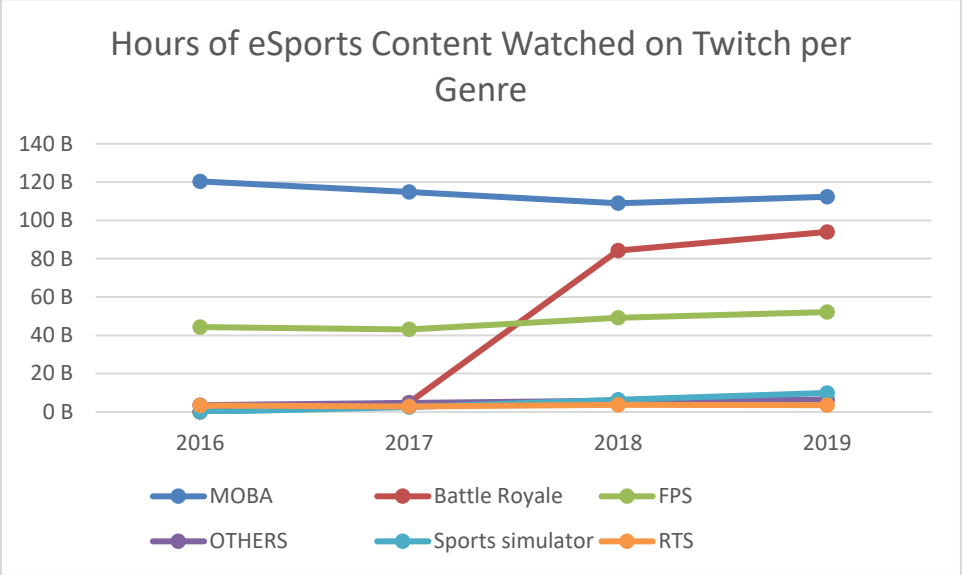


Sources: Riot Games, (2020), Bloomberg (2020), and Nielsen (2020)

A more direct comparison of annual events in soccer would be the UEFA Champion's League, which is the most popular one. In 2015, the total audience for that event was of 380 million viewers. The Super Bowl, the finals of the National Football League, is another worldwide popular event. It is the most notorious and important match of football yearly. In 2019, it had a 100.7 million people audience. The Super Bowl, despite its relevance, has been suffering a severe public decrease. It peaked 115 million viewers in 2015, and then decreased to 97 million users in 2021, at a CAGR of -2.8%, losing on average 3 million viewers annually (Nielsen, 2020).

eSports already present a comparable public. In 2019, the finals of *League of Legends* had a viewership of 100 million people (Riot Games, 2020). In other words, the most popular eSport finals had an approximate same public as one of the most watched yearly traditional sports finals.

Figure 16 - Hours of eSports Content Watched on Twitch per Genre



Source: SullyGnome (2016, 2017, 2018, 2019)

4.1.2. Franchises' Economic Value

Even though the audience for traditional sports may not be substantially increasing, this industry is far from becoming unprofitable. In the United States the average franchise value in the NBA, NFL, and MLB has increased abruptly in a 13-year timeframe despite stagnated audiences. These nominal values have at least tripled from 2007 to 2020, while cumulative inflation in the period was 24.8% (Statista, 2021). This means that the teams, on average, have been able to extract more value per viewer in their operations. This fact is of extreme importance because it points that the sports industry is not necessarily on the verge of incurring in big losses.

4.1.3. The Game Publishing Business

As pointed out in Literature Review, game publishers are exclusive to the eSports industry, and they have no counterparts in the traditional sports. Their existence is crucial to promote eSports and they also pose much of the differences between both types of entertainment.

- Intellectual Property

Intellectual property is a central difference between traditional sports and eSports. The former is not subject to intellectual property per se. Soccer players are not obliged to compensate or acknowledge an IP for that sport, for instance. They could not be stopped from playing or practicing it. Leagues, organizations, players, and franchises do possess trademarks and copyrights. However, these do not apply on the sport itself. Soccer is not a trademark and, thus, no entity would be prevented from organizing a tournament due to IP reasons.

With respect to eSports, on the other hand, the game publisher is usually the detainer of IP. If the publisher decided to discontinue the service, for instance, no one else would be able to legally practice or compete the eSport. Moreover, if it changed the game rules and applied it to all available servers and tournaments, no one could even remain playing the previous versions.

This difference sets a high bargaining power in the hands of the publishers since their consent is primordial for the eSport to exist. That characteristic creates a high leverage in drafting contracts and in pricing its compensations. As an economic consequence, the mere risk of a publisher doing so elevates the required gains for other participants in the market. In other words, a franchise's cost of capital is higher due to that IP issue than if the game were public domain.

- Vertical Integration

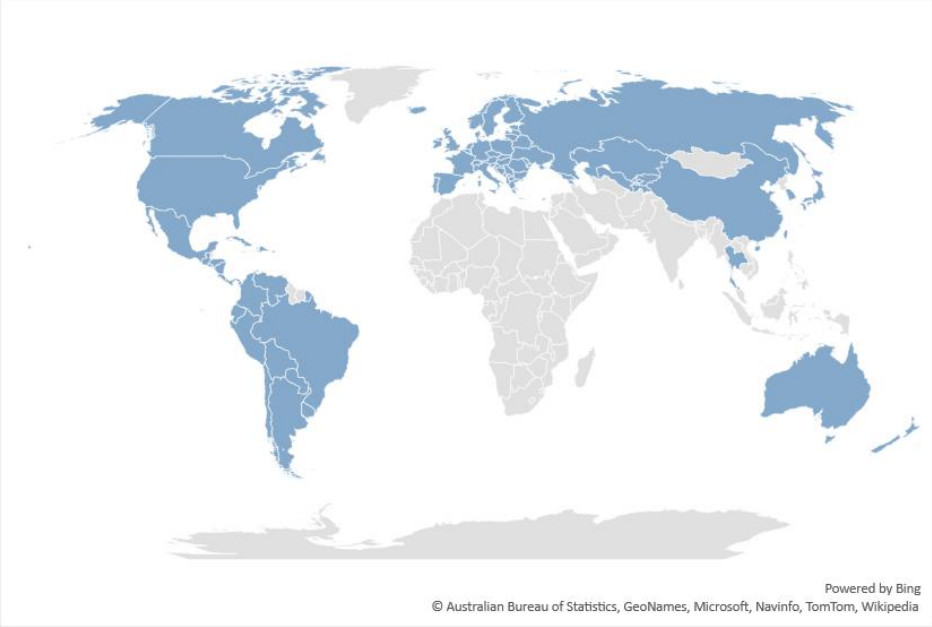
In the case of eSports, the existence of that Intellectual Property allows the publishers to exercise the role of vertical integrators. This happens because developers may choose whether to license the game for leagues and to allow media vehicles to broadcast events and tournaments. Consequently, if a publisher attempts vertical integration by creating leagues and

solely broadcasting its games, that publisher may actively prevent competitors from contesting that willingness.

This aspect is notable in the case of Riot Games. This is the publisher of some of the most popular eSports ever, such as *League of Legends* (the most popular eSports title in 2020) and *Valorant* (the most popular FPS title in 2020). Riot Games' main competitor in the eSports publishing is Valve, the publisher of *Dota* 2 (the second most popular MOBA title in 2020) and Counter Strike: Global Offensive (the second most popular FPS title in 2020).

Even though both publishers present very similar games, the eSports around them follow different logics. While Valve licenses its titles to big and famous leagues, such as ESL, Riot Games is famous for operating its own leagues with closed-leagues system. In Figure 17, countries where Riot Games operates its own leagues of *League of Legends* tournaments are highlighted. It is notable that its penetration is extremely high, with direct action in more than 100 countries.

Figure 17 - League of Legends' Leagues Operated by Riot Games



Elaborated by the author. Source: Riot Games (2020)

As mentioned, Riot Games is also known for vertically integrating into broadcasting. It is the official broadcaster and generates live streaming, in-depth commentary, official in-game statistics, and other content.

This integration executed by Riot Games allows greater synergy in generating a more entertaining product. As previously presented in Literature Review, one of the main reasons for eSports popularity is their capacity to generate novelty. This integrated publisher may modify game content, for instance adding new in-game items, which immediately affects the *metagame* and may alter the balance among dominant teams in the subsequent tournaments. Also, that *metagame* shift is instantly and adequately understood by the integrator's media content generators. Conversely, there is information flow in the opposite direction. The media and broadcasting branch of the integrator have closer contact to professional players and to audience and is more likely to supply pertinent feedback to developing further modifications both to the league and to the publishing.

Despite the lack of transparency to financially compare both Valve and Riot Games models, it is reasonable to suppose that the vertical integration promoted by the latter has potential to become the dominant one and to influence product architecture. In Table 5, the main titles of both publishers are compared in terms of video streaming involvement.

Table 5 - Comparison Between Publishers and Titles

Title	Publisher	Genre	Launching Year	Average Twitch Viewers				
				2020	2019	2018	2017	2016
League of Legends	Riot Games	MOBA	2009	176,879	127,689	112,499	116,725	117,894
Dota 2	Valve	MOBA	2013	56,603	57,429	53,934	51,361	56,539
VALORANT	Riot Games	FPS	2020	92,759	-	-	-	-
Counter-Strike: Global Offensive	Valve	FPS	2012	81,264	52,274	45,869	47,928	59,933

Elaborated by the author. Source: SullyGnome (2016, 2017, 2018, 2019, 2020)

4.2. Strategic Analysis

With the gathered information regarding the market and the sports and eSports information collected in the literature review, it is possible to use the tools of strategic analysis to provide a greater comprehension of the industries.

4.2.1. PEST Analysis

The surrounding environment for sports and eSports may be analyzed by the PEST analysis to further indicate factors that may influence the paradigms. A visual representation of these factors is shown in Figure 19.

- Political

As abovementioned in Section 1.1, eSports and gaming in general have received different sorts of public stimuli over the time. Violent content is often frowned upon by public policies, with more restrictive legislation. Some legislations ban certain unwanted content, while others simply set a minimum age limit to access that content.

Some examples of content control are notable. Firstly, the German legislation. Even though Germany poses the largest eSports market in Europe, many videogame titles are banned in its territory due to gory and violent content. Also, sensitive content is often controlled as well. For instance, no direct reference to Nazism and to its symbols is allowed for videogames. Many other Western countries pose some sort of control over violent content. In the United States, the Illinois House Bill 3531 presented in February 2021 (Illinois General Assembly, 2021), for instance, proposes the banishment of all sorts of violent videogames that may incentive or teach unlawful practices. Regardless of whether that bill is likely or not to pass, it shows that videogames are still susceptible to violence control and, thus, are subject to regulation standards.

Also, some Islamic-oriented legislations prohibit not only violent content, but also depiction of nudity, insinuation of homosexuality, and negative criticism to the Islam. Saudi Arabia, Afghanistan, Pakistan, and the United Arab Emirates are examples of this sort of religious-oriented control. Other legislations also present similar mechanisms of morality control, although not due to Islamic culture. That is the case of the Russian legislation.

Some other countries also address political content. In China, for instance, the videogame *Battlefield 4* has been banned due to its depiction of China as a hostile state. The videogame *Football* Manager, moreover, has been prohibited since it recognizes Taiwan and Tibet as independent countries. Also, some publishers preemptively do not sell or distribute some politically sensitive content in some authoritarian countries. For instance, Activision has not officially launched *Call of Duty: Modern Warfare 3* in both China and in Russia, allegedly to not incur the risk of suffering reprisals.

Nevertheless, videogaming and eSports have also received incentives. In South Korea, for instance, the videogame industry is considered strategic by public authorities and, therefore, has benefited from technology transfers and public grants for research and development.

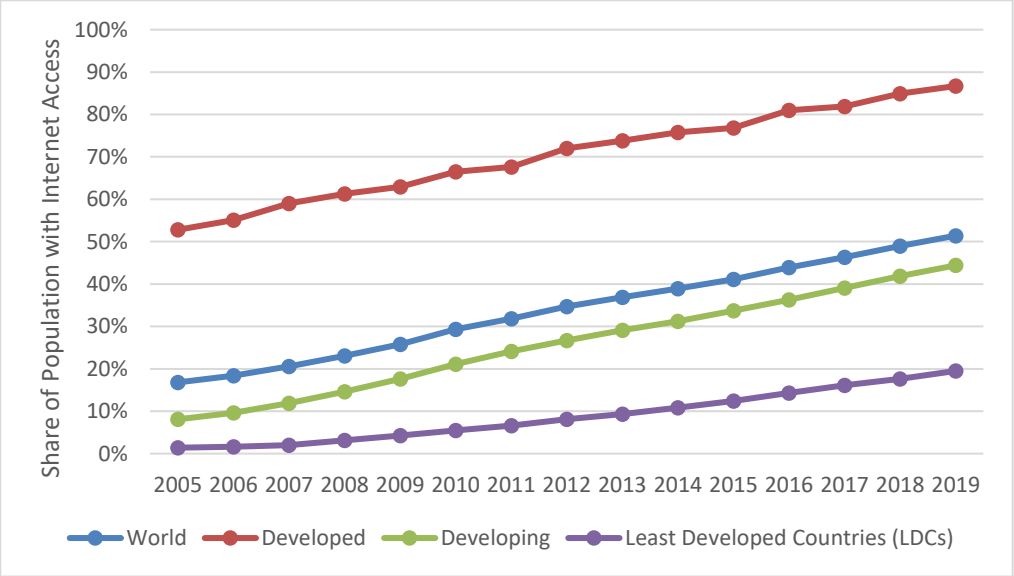
Some national and supranational entities have started to regulate the arising industry, establishing minimum payrolls, and enforcing antitrust mechanisms. This regulatory initiative sets ground for a more organized and reliable environment, often referred as the “Wild West” (Merwin et al., 2018; Scholz et al., 2019). With a more predictable environment, the cost of capital of the industry is diminished, attracting more investments. Also, more aspiring players feel confident to professionalize, as careers become more solid.

- Economical

In developing countries, the infrastructure development affects the increasing Internet penetration, which influences the awareness and the possibility of consumption, as it creates

means for an already aware individual to consume eSports. From 2005 to 2019, Internet access rose from 8.1% to 44.4% in developing countries (shown in Figure 18), while developed countries experienced an increase from 52.8% to 86.7%, and Least Developed Countries increased that fraction from 1.4% to 19.5% (ITU, 2020). In India, for instance, the number of internet users rose from 688 million in 2015 to 883 million in 2019 (ITU, 2020). This effect once again serves as an input to Kotler's Funnel, due to the increase of the addressable market.

Figure 18 - Internet penetration rate



Adapted from ITU (2020).

- Social

There is a fundamental difference in the manner that both forms of sports are seen by society. Traditional sports industry is considered mature for more than a century, with the first modern Olympic Games edition being in 1896. This mature perception affects the seriousness of the entire business, with well-established demand and supply for it. Players are incentivized to professionalize partially because they see the path as a career. Also, governments usually possess programs to provide incentive to sport, as there is a perception that it is beneficial to individuals and to society.

eSports, on the other hand, still may not have crossed the chasm to be considered mature by society itself. It still deviates from the mainstream and, due to that, there is a certain barrier when it comes to acceptance. Aspiring pro players have greater risks to incur in their paths compared to traditional athletes and may be subject to social pressure not to accept those risks.

One of the most influencing factors leading to eSports growth is its increasing awareness. That means that more people understand what eSports are. That leads to a possibility of individuals taking into consideration the consumption of that service. Among those who consider it, there is a fraction that actually watch and practice eSports at least once. It could be interpreted as a Kotler's Funnel case.

In Germany, the percentage of people who never heard of eSports dropped from 47% to 17% between 2017 and 2019 (Deloitte, 2019). This increasing awareness makes way for a grater addressable market and enables a greater diffusion.

The Kotler Funnel could be applied to the player base as well, as more awareness could increase the inflow of aspiring professional players, which could feed the increasing competitiveness process as well.

There is also a generational effect that much contributes to creating demand to eSports. Baby-boomers (term that describes the generation born approximately in the 1946-1964 timespan) and to the Generation X (term to describe to ones born between 1964 to 1977), have been born and raised in a much more analogical environment and had to be educated to use some digital technologies (Williams & Page, 2011).

After those generations, the Generation Y (those born between 1977 and 1994) has experienced an abrupt digital transformation and it has lived the early days of the Internet (Williams & Page, 2011). Progressively, the Generation Z (born between 1994 and 2012) has grown with a much greater presence of the Internet and has witnessed a digital gaming context

(Williams & Page, 2011). Because of that, their relatability to such a digital product as eSports is much more natural and these individuals do not require habit transformation to migrate to a digital world. Consequently, digital consumption is facilitated as well.

Data points that awareness and adoption is much greater in younger generations (Deloitte, 2019). Also, much of the eSports growth strategy focuses on this younger audience. The Electronic Sports League's Chief Executive Officer once stated that the league's target is to attract the younger generations that already grew in the eSports and videogames context, rather than educating older generations about the matter (Candela & Jakee, 2018). Publishers and developers also seem to prioritize that customer segment because of the appeal of their contents and platforms. They frequently carry slogans, expressions, and visuals more associated to millennials.

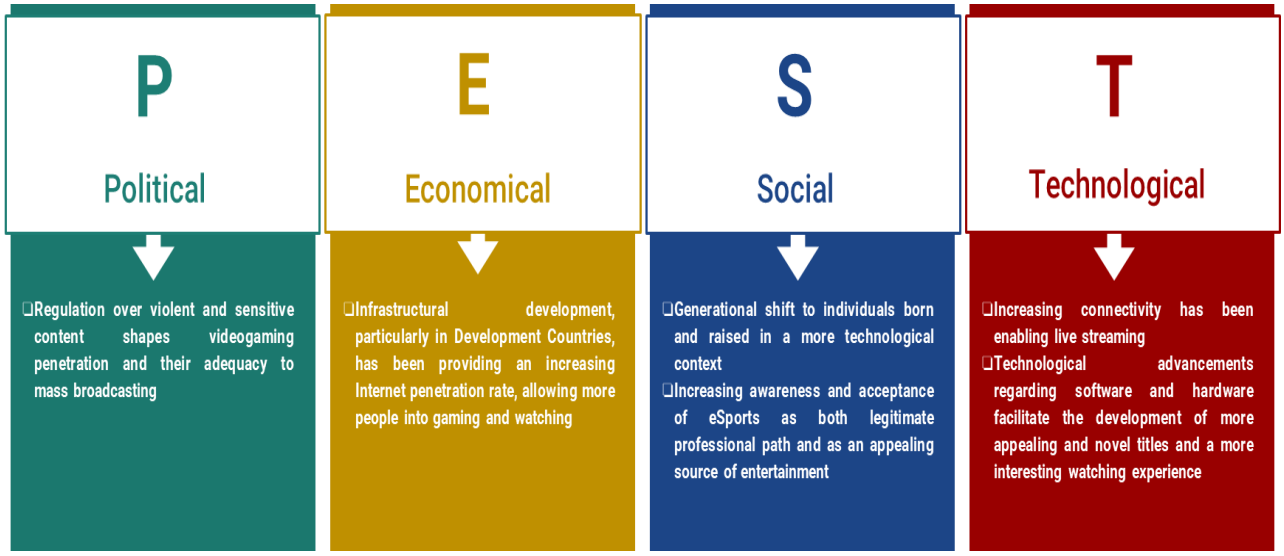
- Technological

Technological advancements may allow eSports to be watched and played by a broader public, and they allow the titles to present higher quality. As exposed in Section 1.1, eSports had very restricted ways of consumption due to technological limitations. For those events not normally, or not consistently, broadcasted by television until recent years, live watching by digital means had intense obstacles.

In terms of gameplay, the popularization of 5G connectivity may aid in offering a smoother experience in which the connection lag is reduced, which has a perceived quality among gamers.

Other technological advancements, such as the optic fiber allows an increased internet data flow, enabling viewers to watch tournaments and events with greater image resolution. This kind of advancement assists, thus, in providing a higher perceived quality regarding eSports.

Figure 19 - PEST Analysis Diagram



Elaborated by the author

4.2.2. Five Forces of Porter

To correctly analyze both industries and their attractiveness, two independent Five Forces of Porter analyses must be conducted.

- eSports Analysis

To conduct a Five Forces of Porter analysis, a well-defined perimeter that encompasses the eSports industry must be set. Considering the value chain, the components within the industry should be the publishers, the leagues, the teams, and the players. That is because these components have an aligned, active, and dedicated objective of granting competitive matches. The channels, such as internet platforms, have a more passive role and, therefore, are out of scope in the proposed analysis.

The first analyzed force is the rivalry within the industry. Teams inherently have a highly competitive dynamic since it is the core of competitive gaming. Leagues, regardless of being operated by publishers, compete against each other to become more popular and attract more audience and, ultimately, profit from that. Publishers have a competitive scenario, as they

struggle to offer the most appreciated game for each genre. Nevertheless, it is relevant to state that few big publishers coexist.

Regarding the Entry Force, it is relevant to trace a distinction once again between key stakeholders. Teams tend to have a low entry barrier since they do not require building much structure. Most of its setting up efforts rely on gathering an initial lineup. However, if the aspiring team is joining an eSport title where closed leagues are dominant in an upper-tier level, this poses an increased entry barrier, as joining the most prestigious leagues would not involve solely its performance.

Leagues, however, have a lock-in effect in the market for their game. Switching from a mature league to an evolving one could bring reduced earnings, especially if it is not sufficiently recognized. Leagues, therefore, have a high entry barrier since entrants would have difficulties in building their customer base of franchises.

Developers face a network effect among their offered titles. In other words, the perceived utility and performance for more popular games are generally higher. Casual players tend to prefer more popular eSport titles since they are more competitive, and more acquaintances tend to play them. Under the perspective of the audience, the competitiveness, as abovementioned, is lower and, therefore, the offered event quality is diminished. For professional players, competing in these titles is less attractive since sponsors have no great interest in low audience and prizes tend to be meager as well. Direct-to-consumer sales are also a challenge when games are unpopular because not only the volume is low, but the willingness-to-pay for aesthetical items is probably lower. Developers, therefore, are faced by a considerably high entry barrier.

Substitution Force relies on digital entertainment. Perhaps the most trivial substitute is the object of the current work’s comparison, which are the traditional sports. These offer a

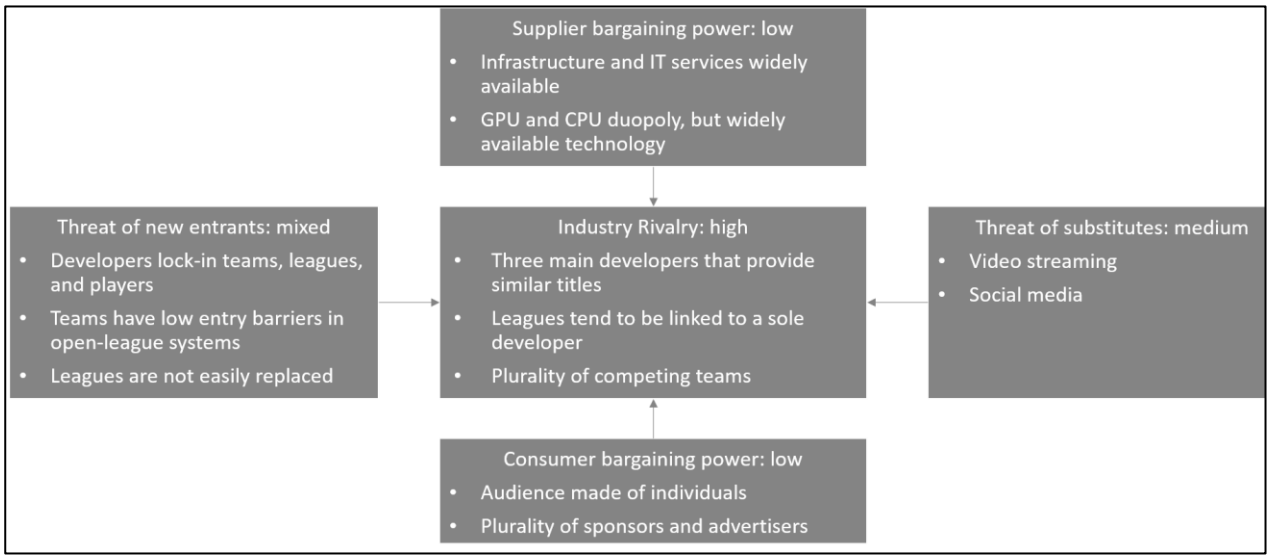
highly substitutive product of the event-watching, despite all the considerations made to this point (such as appeal among different age groups). Nevertheless, this substitutability is much less intense in the playing-side since they have distinct natures. Performing traditional sports is more related to outdoor activity, physical effort, and presential meetings, for instance. Performing eSports, on the other hand, relates more profoundly to indoor (more specifically, in-house) activity, comfort, and virtual meetings. Video streaming, however, poses a substitution threat on gaming and, more intensely, on eSports competitive watching (Candela & Jakee, 2018) due to its virtual consumption nature.

Regarding supplier power, some supplying aspects may be listed. General infrastructure, notably internet connectivity, and general hardware, such as personal computers, serve not only the eSports market, but the general public as well. That does not pose an organized bargaining power by the suppliers over the industry thus. However, concerning more specific and high-end technology, the situation is slightly different. Latest-generation processors and Graphic Processing Units (GPUs) not only allow better performance, but they are also prerequisites for sufficient competitive gear for professional players. The market for both components follows an oligopolistic dynamic, with two major suppliers, Intel and AMD. Latest releases for processors and GPUs are targeted at enthusiasts and professional gamers due to their high demand sensibility to the offered increment in performance. Due to this aspect, bargaining power is slightly increased concerning dedicated equipment suppliers over the industry, but nevertheless it is still fairly low. Regarding the suppliers of event infrastructure, it does not seem that they exercise high bargaining power. eSports' leagues do not seem to be excessively reliant on specific physical venues to receive their audience, added the effect that most of the public follows those events online. Overall, supplier power is low.

The buyer power in the eSports industry is low as well. The audience is made of individuals, not characterizing an intense potential to collectively bargain. If the streaming

platforms are treated as buyers, however, that power would be high, as they may control the monetization fees without much resistance from the industry. Nevertheless, taking the final consumer as the typical buyer, this overall power is low.

Figure 20 - eSports Five Forces of Porter Diagram



Elaborated by the author

- Traditional Sports Analysis

Analogously to the perimeter of the eSports industry, the analysis of the traditional sports industry encompasses the leagues, the teams, and the players. The diagram of this analysis is shown in Figure 21. Within the industry, there is a high rivalry due to the high plurality of competing teams and players. Differently from eSports leagues, in the case of traditional sports, the system of leagues is more organized, and they often have a hierarchical relationship and, therefore, not necessarily compete against each other.

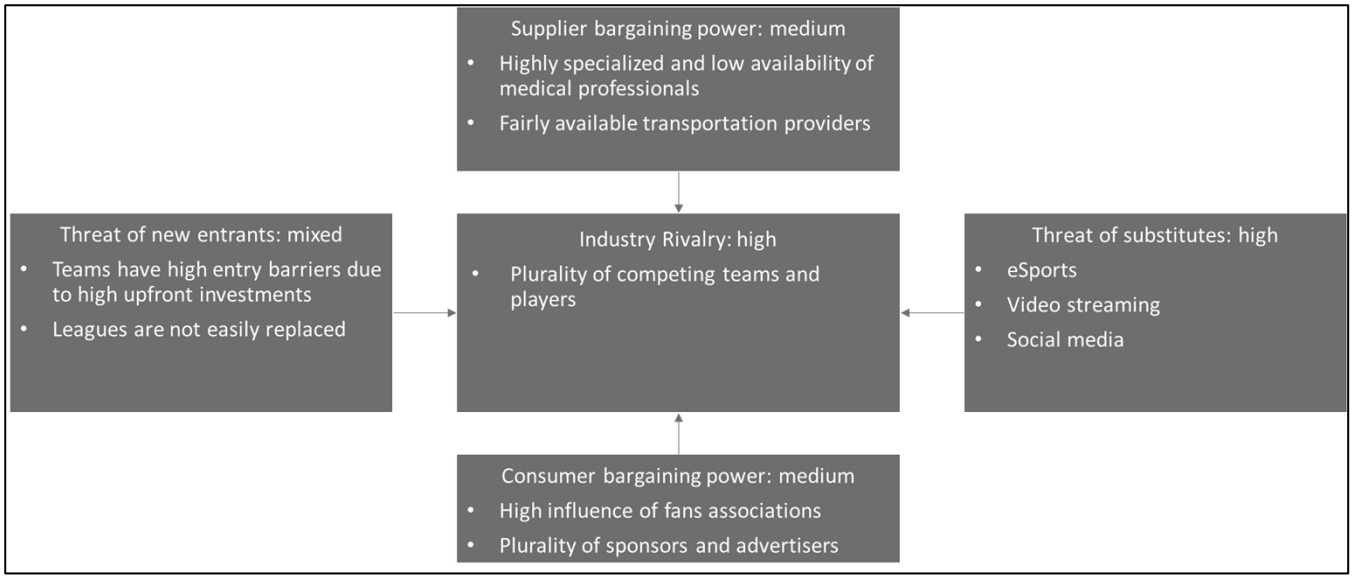
Regarding new entrants, it is notable that leagues are not easily replaced in this industry because the incumbents have a high maturity and are established. Furthermore, teams have high entry barriers due to high upfront investments and to a difficulty of gathering an entire collection of players. These, however, have a natural renovation and, therefore, there is a constant inflow of professional players been formed.

The threat of substitutes is high in this industry. Not only eSports are a considerable substitute product, but other entertainment sources, such as video streaming and social media, pose alternatives to consuming sports. All these substitutes are more aligned to the digital consumption trend.

In the case of the consumer bargaining power, there is an intense contrast to the case of eSports. Traditional sports traditionally have organized fans associations that directly influence their corresponding teams. Also, these same associations indirectly influence the leagues and organizations due to their participation in teams. There is, however, a high plurality of sponsors and advertisers, both endemic and non-endemic, from many distinct industries.

The supplier bargaining power is medium in the case of traditional sports. Transportation providers that are fundamental move teams to the matches' localities are fairly available. Long-haul distances are usually serviced by charter flights while short-haul distances are usually serviced by buses. Both services, especially the latter, are widely available and, therefore, this does not aggregate into an intense force. There is however, a much less available and much more specialized supplier. Medical services providers are highly specialized in sports medicine, familiar to injuries and physical conditioning, especially in the top-tier leagues. Medical units that supply teams are not easily replaceable and may, therefore, pose an intense bargaining power.

Figure 21 - Traditional Sports Five Forces of Porter Diagram



Elaborated by the author

4.2.3. SWOT Analysis

The industry has as its main capability the generation of engaging and continuously novel content to its public. Also, the offered entertainment product is highly immersive, and the offering of both watching and gaming provides a symbiotic environment to its public. Furthermore, the proximity to amateur players and viewers is another significative strength. The proximity between players and publishers allows a more accurate and fast cycle of game improvements, which benefits its overall perceived performance. Additionally, the proximity between viewers and professional players (which are often streamers) establishes greater empathy and engagement (Hamari & Sjöblom, 2017)

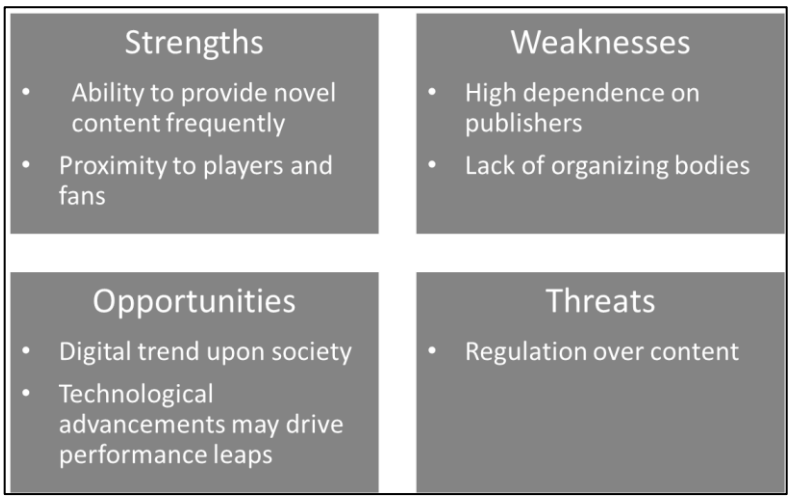
Nevertheless, as a main weakness for eSports is the difficulty for generating content to older generations. This not only sets a cap to the addressable market, but it also prevents eSports from becoming a family entertainment source currently. Furthermore, the study of the viewers' profile conducted in Section 4.1.1 has shown an uneven distribution regarding gender, which may point to another inability for the industry to evenly address its market. Also, the industry's

high dependence to publishers has its downside of been susceptible to their practices and continuity. If one of the main publishers divests or fails to keep its operations, it would likely negatively impact many leagues, players, sponsors, and fans. Finally, a still lack of organizing bodies is another weakness because the progression and hierarchy of tournaments are often unclear. Consequently, this affects the willingness to invest, since there is of a league and its participating teams having their importance diminished.

Technological progress may pose diverse opportunities to the industry. Increased processing power and connectivity may lead to more interesting, appealing, and novel games and streaming features to the audience, which may generate an even greater fan engagement.

The most representative threat to the industry is regulation. Violent content may be more severely addressed by regulatory agents, as shown in Section 4.2.1 in the PEST Analysis. This, however, would affect some of the genres, and the entirety of eSports titles. Additionally, the industry is indirectly impacted by the electronic components market. In 2020, a crisis involving semiconductors had led to a severe shortage of GPUs, essential to gaming. Despite this episode has not shown great direct impact to the market, similar shortages could affect the amateur player base.

Figure 22 - eSports SWOT Diagram



Elaborated by the author

4.3. Innovation Analysis

To this point, most of the analyzed content in this work regards stakeholders, the market, and the industry in a relatively isolated manner. This section, therefore, intents to analyze the paradigms holistically to, then, allow a discussion involving the entirety of the matter.

4.3.1. Identification of the Paradigms

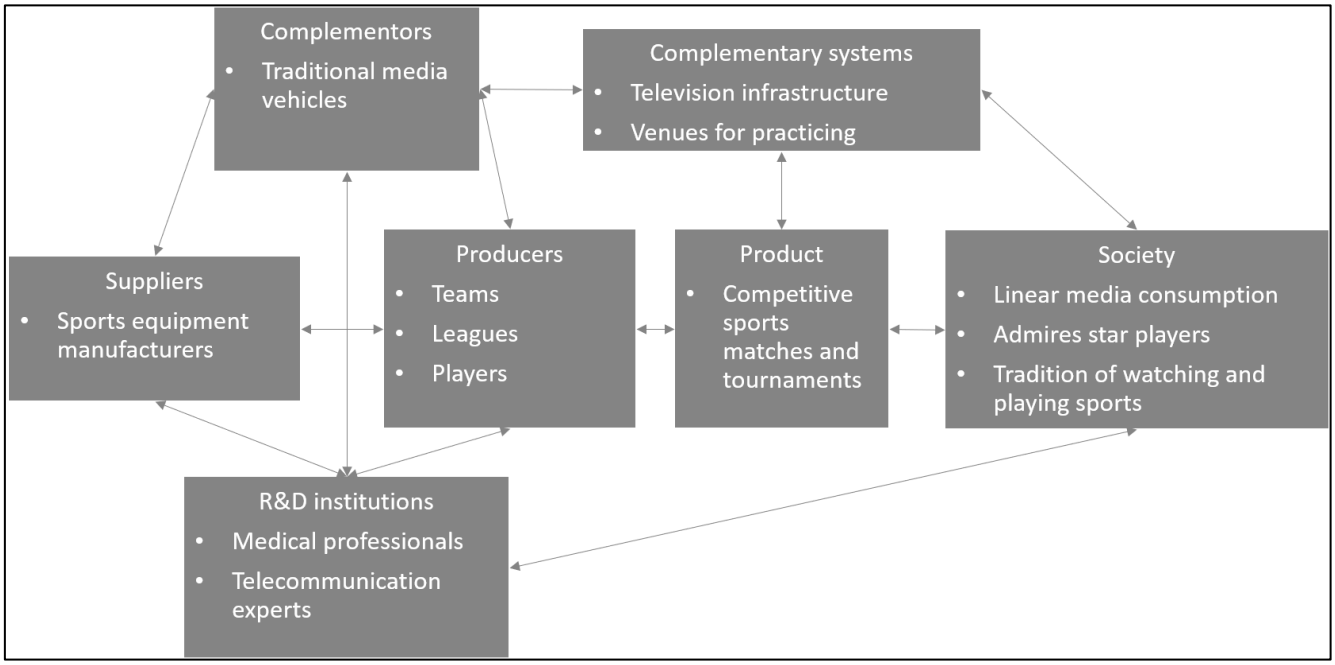
To assess whether there is a paradigm shift in course, both paradigms must be identified. The current one regards traditional sports. The dominant design in this paradigm consists of competitive matches and tournaments of some sports, mainly team-based ones, that take place in high-capacity venues and are linearly broadcasted. The producers of this paradigm are the leagues and organizations, the franchises, and the players.

The complementary systems are the ones that enable the product and its consumption to be viable but are not within the product itself. In the current paradigm, it is much reliant on media involvement, with the industry having a large dependency of broadcasting rights and advertisements. The media vehicles, therefore, could be considered complementors and their networks and infrastructures are part of the complementary systems. The presence of devices used for following the tournaments, such a television sets, smartphones, and computers is also part of requirements for consuming sports and, thus, are part of the complementary systems. Consequently, their manufacturers are part of the complementors of the paradigm. Venues for amateur practicing (for instance, soccer fields and basketball courts) allow people to engage and relate to those sports, making stronger bonds to fandom and cultivating the habit for those sports, and providing new generations of aspiring professional players. In other words, they aid in creating demand for consuming sports and in creating supply for future professional players. The presence of venues, thus, constitutes part of the complementary systems and their providers and maintainers, such as local government and other entities, take part as complementors.

Research and Development institutions are responsible of providing technology and capacitated professionals into the paradigm, both into the supply-side and in the demand-side. In the traditional sports paradigm, there is inflow of technology and professionals to the abovementioned complementors, with the formation of engineers and research on image improvement, for instance. Regarding the relationship between Research and Development institutions and sports per se, it is more oriented to biomedical sciences.

On the demand-side, the paradigm relies on society and its beliefs and culture. Sports are appealing, as competitivity and cooperation (among team members) are accepted values by society. The physical element of sports is often associated to healthy lifestyle. Culturally, the tradition of sports and its events date back. Weekly sportive matches and events are, for generations, part of routine life. Furthermore, practicing sports is part of most cultures, and is also a socialization habit.

Figure 23 - The Traditional Sports Paradigm



Elaborated by the author

The eSports potential paradigm has differences and similarities to the one of traditional sports. Firstly, the event format. eSports' tournaments and events undeniably have a legacy from regular sports. Championships generally have the same logic of faceoffs and bracket format (in which the winning team of each match advances to the next opponent). The competitive spirit is also extremely analogous, with team rivalries, fandom, and rooting.

The dominant design for eSports, yet not certainly defined, seems to point to free-to-play digital titles, with a games-as-a-service logic. All the five most popular eSports cited on Table 1, for instance, follow that logic. None of those games requires payment for downloading and playing them. Nonetheless, all of those have aesthetical items or additional services upon payment negotiated in the developers' in-game platforms.

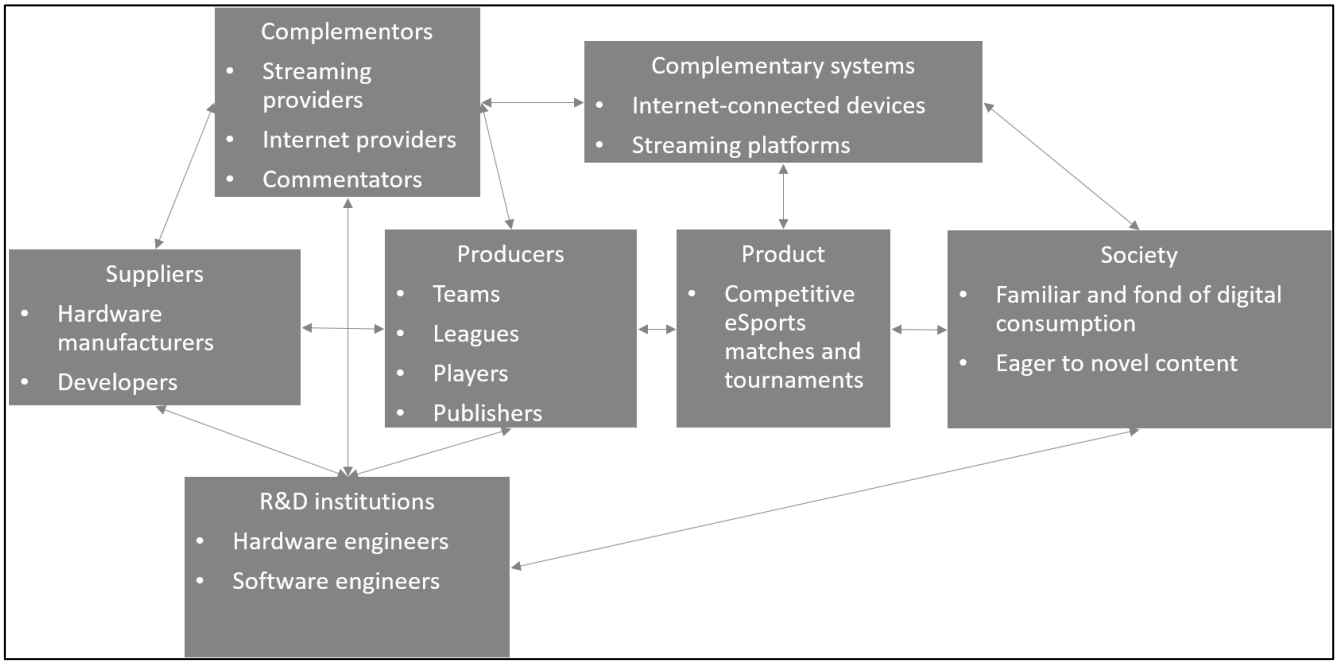
The entertainment product is intensely similar to the one of traditional sports. Competitive tournaments with the same structure and logic apply. The producers are the leagues, the franchises, the players, and the developers. As abovementioned, those developers have a very peculiar and central role regarding eSports. Therefore, they are also centrally positioned in this paradigm.

Complementary systems and their complementors are fairly distinct to the ones of the regular sports paradigm. In the eSports case, they are much more related to digital consumption. Internet service providers assume a great role in this paradigm, as connectivity not only enables watching matches, but gaming as well. Hardware and software providers are, for similar reason, in a position of importance in this paradigm. Even though media vehicles are primordial for broadcasting content, in the case of eSports, as pointed out, these vehicles are more passive, serving as channels and are mainly formed by streaming platforms, such as Twitch and YouTube Gaming.

Research and Development institutions have a key role in providing professionals and technologies regarding gaming and streaming technology. Software engineers, for instance, receive their education from universities and enable the development of better performing games, or even streaming platforms. Moreover, research regarding connectivity technology, such as 5G, act as an influence over the whole paradigm.

On the demand-side, the eSports paradigm has much intersection with some societal aspects of the traditional sports paradigm, such as competitiveness and collaboration. However, in the case of eSports, some habits and values would be more permissive and encouraging to digital interaction. The online interaction that happens during gaming would be appraised and appreciated. The physical interaction, however, would be less relevant. As previously discussed, digital interaction and relatability is a habit much linked to new generations of people that have been born or raised in a context more familiar to technology.

Figure 24 - The eSports Paradigm



Elaborated by the author

4.3.2. Innovation Framework

To enable a better understanding of a possible paradigm shift, the eSports' technological innovation is characterized under the classifications explained in Section 2.2.1. In other words, the current section contextualizes what an eSports paradigm shift would be.

- Classifications

When comparing the analyzed innovation under the Dutton & Thomas (1984) classification, it might be considered radical, since eSports are based on totally different technologies, such as network connectivity, computer-based gaming, and virtual interaction.

Regarding the Christensen (2013) classification, the assessment involves defining whether incumbents would sustain themselves as such, or if entrants tend to subvert that logic.

Under the optics of the players, the current market leaders may not be in the timeframe of that disruption. In the short run, current fans are enduring and sustaining their position. In the long run, as the generational effect sets the transition into an eSports paradigm, the traditional players' importance should be diminished, as they share the market with the fandom of eSports athletes. However, at individual level, the traditional players would not be the same as in the current paradigm. In other words, the aspiring traditional players of future generations will probably follow their paths under the scenario of diminished relevance.

Franchises, however, as legal entities, may be sustaining. This depends on their ability to transition between both markets and develop competences to act as eSports teams. As abovementioned, clubs are falling behind with respect to taking the lead in this initiative. Nevertheless, their attempts are likely to suggest this intention in the future.

Leagues may sustain their leadership only regarding the sport simulation genre. This happens because their brand, image, and scope are too rigid to transition to other genres and act as, for instance, a basketball and MOBA league.

Media vehicles are already suffering disruption, considering the digital trend. Traditional media vehicles are consistently losing audience to digital means, such as YouTube and Twitch. Even the traditional media attempt to adapt do streaming is falling behind the entrants' successful penetration.

Taking these different aspects into account, the eSports innovation would be mainly disruptive.

Regarding the classification proposed by Henderson & Clark (1990), the determination of the eSports innovation relies on both product architecture and reference technologies. The latter is undoubtedly changed, as eSports require virtual environments to be played, whereas traditional sports have a physical faceoff. Also, eSports' main distribution channel, internet streaming, is also based on different technologies than linear television, which is the main channel for sports.

Product architecture is also modified. In the case of eSports, the event and its rules are provided by the publisher. This component of the spectacle is the core of the supply-side for eSports, while it does not even exist in the traditional sports paradigm.

Due to both diverse product architecture and reference technologies, eSports would be considered Radical Innovation in the classification.

- Innovation Dynamics

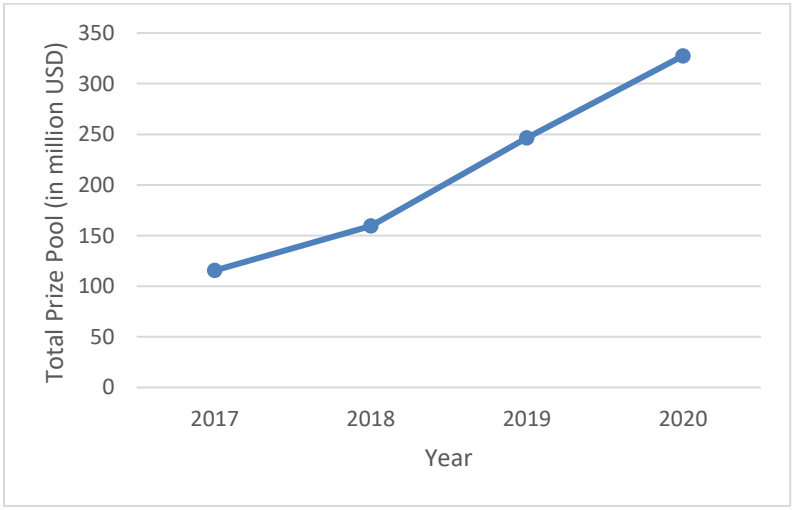
Some actions and trends on the eSports side could be stressed due to their relevance. Firstly, regarding league formation, which is aiding into creating demand. eSports' leagues have become more structured, providing a more competitive scenario as well as a clearer notion to the audience and to the market about ranking and competitions, as previously mentioned in Literature Review. Much of the leagues, especially in Europe, have been switching to the closed-league system, which allows more predictability to investors (Deloitte, 2019). This

league consolidation is associated to the active behavior from game publisher, notably Riot Games in creating or facilitating the leagues to their own videogames.

That not only draws more attention to the public, but it sets more favorable conditions to investors, sponsors, and advertisers, since it is more certain that the league's matches are in fact important and recognized. Investors may rely on clearer and more predictable metrics, such as franchise ranking. Media rights have an increased value since appearances in games and events becomes more reliable and predictable (Deloitte, 2019).

Increasing prizes are a very interesting driver for eSports. Prizes draw more players into competing for that reward. This, therefore, increases competitiveness and, thus, leads to a more desirable product with increased public appeal. eSports have presented an abrupt progression with respect to prizes, as shown in Figure 25, with more than a 327 USD combined prize pool in 2020.

Figure 25- Combined eSports Prize Pool



Adapted from Strive (2020)

Some works also point the relevance of the investment inflow to the eSports industry, such as the EUR 3.9 billion additional investments made in 2018, with 56% being from Venture Capital firms (Deloitte, 2019). Additionally, the industry has experienced an increase in

Mergers and Acquisitions. These inflows have not only been becoming individually larger, but more numerous. In 2014, there were just 4 global investments in eSports, whereas in 2018 there were 68 of those investments (Deloitte, 2019)

The traditional sports industry, mainly the franchises have been attempting to increase the performance of the entertainment product. As described in Literature Review, if enough performance enhancements occur, radical innovation could be halted, and incumbents might sustain due to Sail Ship Effect or due to new product generations.

In April 2021, the Super League was founded by top-performing European soccer teams and attempted to create a closed-league system. Even though the project was discontinued, with heavy criticism by different classes of stakeholders, it shows innovation attempts in the traditional sports context.

Traditional franchises have also joined other genres. In 2015, the Turkish soccer team Besiktas Istanbul opens its eSports club, participating in *League of Legends* championships. In a short lifespan, many other franchises have followed that trend, starting their own teams, or partnering up with preexisting eSports teams (Deloitte, 2019). In 2016, Paris Saint German, one of the most prestigious soccer clubs, started its eSports division, forming teams for *League of Legends*, *Dota* 2, *Fortnite*, FIFA, among others. Some leagues, such as NBA, have been experiencing a similar attempt by creating their own virtual league associated to the game publishers (notably Electronic Arts Sports).

The effectiveness of this exploratory effort by sports incumbents, however, is questionable. None of the 10 most valuable or top champions franchises is a club-related one. One possible cause is related to underinvestment by traditional clubs. This hypothesis is feasible, since traditional franchises possibly favor their core business and, thus, may overlook their eSports teams. Additionally, the titles that this sort of team has been victorious are mainly

in the sports simulator genre, which is approximately 5% of the consumed eSports content (SullyGnome, 2020).

When it comes to traditional sports, the addressable market suggests to be fairly saturated (Merwin et al., 2018) and therefore not many drivers lead to its growth in terms of audience and assiduity (Candela & Jakee, 2018). Even though the adoption of traditional sports consumption via Internet is a phenomenon, surveys show a steady fan base (Merwin et al., 2018). The traditional sports industry has been experiencing some attempts to follow that digital consumption trend by creating streaming platforms (such as ESPN+), social media content generation, for instance. In spite of that, the adoption by traditional sports fans to those channels seems to be limited (Nielsen, 2020). Also, that embracement shows a likelihood of switch by linear consumption fans to digital consumption, but not a significant adoption to digital consumers into the traditional sports industry (Nielsen, 2020). That could mean that Internet consumption is just slowly shifting the channel within the industry, but not creating expressive extra demand.

5. DISCUSSION

Considering the three blocks of analysis conducted in the previous sections, some insights may be pointed out.

Firstly, the assessed paradigm shift has shown to heavily rely on the adoption by the demand-side, or audience. As explored in different sections, the increase of audience feeds the eSports industry because the key stakeholders benefit directly or indirectly from greater demand. That allows a greater inflow of resources from sponsors, investors, media vehicles, and the public. Conversely, decreasing audience leads to the opposite direction. It is extremely relevant to stress the lack of available and reliable data to promote a definite s-curve of adoption for traditional sports. Therefore, it is only possible to provide a preliminary answer to the central question of paradigm shift.

Regarding the performance of eSports, for both players and viewers, the generational change and the new generations' increased relatability and willingness to interact and to consume digital content leads to the belief of increasing performance. Also, the capacity of eSports' developers to modify and offer more appealing and novel content continuously reinforces that sloping trend. Furthermore, the technological trend of enhanced connectivity, software, and hardware drives the possibility for eSports to add more complexity and appeal to both gameplay and game watching, reinforcing the increasing performance. A summary of these main assessed dimensions is shown in Table 6.

Table 6 - Summary of Dimensions Regarding the Innovation

Dimension	**Aspects**
Environment	Digital consumption trend. Generational shift towards more relatability to technology. Infrastructure development and technological advances allow more Internet inclusion and with better quality.
Industry	Publishers provide novel and engaging content constantly with rapid feedback from the fan community.
Innovation dynamics	The changing mentality and embracement of digital consumption among individuals drives the paradigm adoption from the demand-side. The development of complementary systems, such as Internet connectivity and video streaming, lays ground to a more consistent and possible paradigm. The dominant design regarding process innovation seems to have reached a certain maturity, with a game-as-a-service approach and a publisher-centered model.

Elaborated by the author.

In terms of the traditional sports industry and its attempts to sustain, the provided analysis suggests a lack of efficacy. For instance, the unsuccessful establishment of the Super League, which does not even apply to all mass sports, but specifically to soccer. The establishment of new leagues would cause a competition among leagues that the industry has not experienced since the consolidation of the incumbents, which took place more than a century ago.

The increasing focus towards streaming and digital platforms is perhaps the most adherent to a new product generation of the traditional sports entertainment product. Nevertheless, it does not pose an over qualifying increment because the alternative entertainment products, eSports and video streaming, are much ahead in this matter, inherently relying on the digital consumption.

Finally, for that sustainment to uphold, it could occur due to high necessity of building complementary assets or to the incapacity of benefiting from the innovative technology. As explored in the Five Forces of Porter analysis conducted, the eSports industry is mostly not faced by a high entry barrier. Developers are the exception to that because they are the component that most enjoys first-mover advantage or network effects. Nevertheless, the development of complementarity is not a barrier in this industry, mainly due to its digital nature. This aspect present in the Strategy Analysis is much linked to the definition of the paradigm of the Innovation Analysis. The complementors and complementary assets (most linked to software, hardware, and connectivity) are not specific to eSports and are widely available.

The capacity to prevent incumbents from incorporating the technology offered by the entrants derives from the exclusivity nature of the Intellectual Property that safeguards undue use, copy, and distribution of the eSports videogames titles. Regarding joining and partnering up to eSports tournaments, as some traditional leagues currently attempt has shown to be insufficient to retain an audience increasingly more interested in consuming eSports, especially due to genre limitations, since these traditional leagues are in a certain degree confined to the sports simulation genre, shown to attract near 5% of the video consumption. Traditional teams and clubs have been experimenting this exploration of the eSports environment, but there is no reasonable evidence that suggests these clubs are competent in this new industry.

Regarding the possible paradigm shift, however, non-endemic sponsors and advertisers are, as pointed out in Literature Review, driven by the necessity of reaching and impacting the

audience. Consequently, for that increased public of viewers, therefore, these stakeholders under the assessed hypothesis would likely shift if audience size discrepancy became increasingly favorable to eSports. Additionally, some works point to an increasing and high acceptance of the eSports public to non-endemic brands (Deloitte, 2019), which could further facilitate a smoother transition of focus by sponsors and advertisers.

Under this possible paradigm shift, leagues, teams, and media vehicles, which are the most likely to be disrupted, do not seem to present intense cognitive inertia. The digital trend is a widely known phenomenon and, therefore, action inertia would provide adequate explanation for their failure to joining the emerging paradigm. In other words, incumbents have available information for understanding this abrupt change in the market. However, an entrapment within their current industry (with high sunk costs and branding linked to traditional sports) would limit their options and thus, likely lead to ineffective responses, configuring action inertia.

That alignment to other works' conclusions, such as Candela & Jakee (2018) pointing to a replacement of traditional sports by eSports, corroborates the standpoint. However, as abovementioned, further quantitative studies are necessary to provide statistically relevant audience analysis and to make predictive models.

6. CONCLUSION

The goal of this work was to analyze the eSports industry with the ultimate intention to answer the questioning whether the traditional sports' paradigm is suffering a replacement in favor of eSports.

Initially, this thesis performed a Literature Review, collecting pertinent theories and concepts related to Management Engineering that would support and provide tools and methods to conduct the analysis and the discussion to reach an answer to the central question of this work.

With an initial contextualizing overview, it was possible do sequentially apply theories, models, and notions from distinct sources and areas of knowledge, notably Sports Economics, Strategic Analysis, and Innovation Management, to sufficiently explore the paradigm shift put in question. Based on this extensive collection of analyses, a discussion was necessary to compile the results of those and reach an endpoint.

Given the discussed factors, it is adequate to conclude that qualitative factors, assessed in the analytical process, suggest a likelihood of a paradigm shift, mainly due to digital consumption, generational change, and novel content creation. Even though this is consistent to other works and their lines of thought, further quantitative assessments must be made to provide robustness and statistical reliance to the matter, especially regarding audience size and its representativity.

Some stakeholders may benefit from this work with an increased comprehension of the innovation dynamics combined with the pointed drivers. Aspiring game publishers could additionally benefit from the content analysis, to then become aware of the threats of violent content videogames, and from the knowledge of the existence of entry barriers. These aspects could guide them into reconsidering or even repositioning their products.

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