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The dark side of esports – An analysis of cheating, doping, match-fixing, and their countermeasures

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Abstract

We analyze the prohibited behavior of esports teams in terms of cheating, doping, and match-fixing. In the theoretical part, we use a game theoretic model which highlights the incentive to cheat and potential countermeasures. Definitions are given for the terms cheating, doping and match-fixing, as well as organizations that impose sanctions against them, measures against the use of illegal aids, and concrete sanction with illustrated examples.

Keywords: esports, gaming, cheating, doping, match-fixing

Highlights

- Cheating is a problem in the economic system of esports.
- A theoretical model can be constructed to show the potential of doping in esports.
- In order to keep esports as a whole free from cheating, significant changes are needed to take place, especially in terms of detection and sanctioning.

Introduction

Not sticking to the rules might be harmful and might destroy the reputation of a single player, and can discredit a whole sport. Referees check the observance of the rules during play and special commissions and arbitration courts monitor the observance of the rules and impose drastic penalties if necessary. Not least because of the scandal surrounding doping implemented by the Russian government in traditional sports (Duval 2017), the fight against doping and other illegal aids is increasingly becoming the focus of public attention. In addition, measures against doping are being taken and strengthened. For a fair sporting competition, in which the better team wins under equal conditions, it is crucial that none of the teams use aids that violate the relevant regulations of the competition.

Esports refers to the competitive playing of computer and video games under sporting aspects (Schöber 2021). In esports, too, as in traditional sports, it is important for the fairness of the competition that no illegal aids are used. In addition to doping, in esports there can also be other illegal aids, the so-called cheats. In this paper, we consider the behavior of esports teams in terms of the use of illegal aids, in particular doping and cheating. We also consider match-fixing.

This paper is structured as follows: We present an overview of cheating, doping, and match-fixing in esports. For doping we use a game theoretic model to highlight the incentives to depart from the rules as well as some policy responses which can be used to reduce these incentives. Then we present measures taken against cheating in esports and also give examples of such measures. The last part concludes.

Cheating, doping, and match-fixing in esports: An overview

In order to be able to fight and penalize cheating in esports, it is necessary to describe the different methods of cheating that are used in esports. In competitive gaming, there are mainly two types of illegal aids: Cheating and doping. In addition, match-fixing can also be regarded as illegal behavior. In the following, all three actions are described.

Cheating

Cheating refers to the use of aids and the exploitation of bugs in the video game itself. In doing so, cheating violates the rules of the video game and/or the competition. In the literature, cheating is described as follows (Zuo et al. 2016, p. 496): “Cheating, as one type of unethical behavior, is defined as the act of breaking the rules in order to gain unfair advantage in a situation.”

Basically, cheating can be divided into different categories (Ghoshal 2019). Software cheats can have different characteristics. Cheat programs can, for example, ensure that the player can see through walls or that a weapon automatically aims and fires at the opponent in a split second. In addition, there are cheat codes that can be entered in a video game. Entering such cheat codes also results in the cheating player receiving unfair advantages, such as additional resources in the form of gold or other currencies in the game.

In addition, there are the so-called “distributed denial of service” (DDoS) attacks in online games (Ghoshal 2019). These target the online connection of the opposing player and flood it with unnecessary traffic. As a result, the video game is jerky and lags.

Organizers, publishers and other stakeholders in esports are continuously developing measures to prevent and combat cheating in esports. This applies, for example, to anti-cheating software (Czegledy 2021).

Cheats, for example, can be purchased with a subscription model. For example, the company “EngineOwning” offers cheats for various games for \$48 per 90 days of use (Ebaumsworld 2020). Such models provide cheating players with a certain level of security because the cheats are continuously developed and adapted to new developments in anti-cheating software.

In addition to these forms of cheating, there are also other forms of cheating. The eBiker Cameron Jeffers, for example, cheated at the British cycling's esports championships by using a manipulated, improved virtual bike, which was called a “Robo-Drive”. This is referred to as “robo-doping” (Reid 2019).

Cheating is not only a massive problem in esports, but also in gaming and affects games, such as Animal Crossing: New Horizons, which play no role in esports (Benti, Stadtmann 2021). Therefore, the will to fight cheating is also of interest to publishers outside of esports.

Still, cheating is a problem in esports. Combating cheating costs publishers and the organizers of competition money, as anti-cheating software and other measures against cheating have to be developed and implemented (Wochnik 2015). There is, therefore, an interest in clean competition, especially to support the economic system of esports through its credibility.

Cheats are offered with different payment models and are often tailored to the needs of individual players, for example, depending on the player's role on the team (Wochnik 2015).

Doping

Doping, which is familiar from traditional sports, is also a form of cheating. The Olympic Movement Anti-Doping Code defines doping as follows (Vieweg, Paul 2002, p. 1-2): “Doping is: 1. the use of an expedient (substance or method) which is potentially harmful to athletes' health and/or capable of enhancing their performance, or 2. the presence in the athlete's body of a Prohibited Substance or evidence of the use thereof or evidence of the use of a Prohibited Method.” The fight against doping is fundamentally important in sports in order to protect the economic system and provide consumers of sporting events with a clean sport, maintaining the credibility of the sport and, as a result, the consumers as well (Buechel et al. 2013).

In esports, for example, the drug Adderall is used for cheating. This drug is used to treat attention deficit hyperactivity disorder (Stanmyre 2015). Adderall has a stimulant and euphoric effect that can simultaneously focus attention. One player commented on the substance as follows:

“Typically, I would be exhausted, tired and lose motivation after only a couple hours, [...] With Adderall, I am able to play better than I ever have for up to 12 hours.” Matthew “MellowMajik” Murphy, a former semi-professional player in the shooter Halo, was playing Fortnite at the time of the testimony (Hamstead 2020).

The substance can be purchased over the Internet. One hundred tablets of Adderall, containing up to thirty milligrams, cost around US\$865 (Drugs.com 2021).

Doping: Some theoretical considerations

We use a game theoretic approach to model the strategic interaction between two teams regarding the doping decision. Hence, the choice of the numerical values – of course – drives the result of a prisoner's dilemma. Sensitivity analyses examine the stability of this result and

explore under which conditions the organizer can avoid doping becoming the dominant strategy.

We assume that the winner of a tournament receives a prize $PM = US\$1500$, based on the median tournament prize pool in 2021 (Esports Earnings 2022). Both teams have the same playing strength, so that the probabilities of winning are 50:50. If both teams play fairly, i.e., without doping, the expected value of the payoff is $pff * PM = 0.5 * 1500 = US\750 .

However, one team could play unfairly and thereby increase its probability of winning to $puf = 0.9$. This variable indicates the winning probability for the team playing unfairly (u) while the opponent is playing fair (f). Accordingly, the winning probability for the opponent who is playing fairly decreases to $pfu = 0.1$. However, expenses of $D = US\$100$ must be taken into account for doping, for example for buying 10 tablets of Adderall. Furthermore, with a low probability of $pd = 0.1$, the doping is detected and a fine of $F = US\$3000$ is imposed, which is twice the prize money. Thus, the expected payoff for a team playing unfairly while the other team is playing fair is

$$puf * PM - D - pd * F = 0.9 * 1500 - 100 - 0.1 * 3000 = 950 \quad (1)$$

The team playing fairly has a significantly reduced probability of winning and can only expect a payoff of $pfu * PM = 0.1 * 1500 = 150$. If both teams choose to play unfairly, the probabilities of winning are identical again $puu = 0.5$. However, since the (expected) cost for doping has to be taken into account, the payoffs for each team are only

$$puu * PM - D - pd * F = 0.5 * 1500 - 100 - 0.1 * 3000 = 350 \quad (2)$$

All combinations of strategies and the corresponding payoffs are displayed in Table 1.¹

Table 1 – Payoff matrix (\$)

		Team B	
		Unfair	Fair
Team A	Unfair	350 / 350	950 / 150
	Fair	150 / 950	750 / 750

It is necessary to examine which combination of strategies is likely to occur. To derive the solution, the concept of dominant strategies is applied:

- If Team A plays fairly, then Team B has to choose between fair (payoff 750) or unfair (payoff 950). Since the payoff of the unfair strategy is higher, this strategy is chosen.
- If Team A plays unfairly, Team B has to choose between fair (payoff 150) or unfair (payoff 350). Since the payoff of the unfair strategy is higher, this strategy is chosen.

Regardless of which strategy Team A chooses, Team B's best response is always the unfair strategy. Thus, playing unfairly represents a dominant strategy. Since the game is symmetric, unfair also represents the dominant strategy for Team B. Thus, the upper left cell is an equilibrium in dominant strategies.

The unfair/unfair combination of strategies also represents a Nash equilibrium. No player has an incentive to change his own strategy given his opponent's strategy. This outcome is also called a prisoner's dilemma. The payoffs are not Pareto optimal: Both teams would increase

¹ Other assumptions are: simultaneous play, game repeated once (one-shot-game), risk neutrality of all players, meaning players solely focus on their expected value of payoffs.

their expected payoffs if they could agree on a fair strategy. However, such an agreement is not stable, since both teams would have an incentive to deviate from this strategy.

From these theoretical considerations, the following insights can be gained:

- Playing unfairly represents a dominant strategy.
- If both teams dope, an equilibrium is established which is not Pareto optimal.

The organizer of the game might try to influence the outcome by increasing the expected cost of doping. The organizer can do this by increasing the probability of detection, or by setting the amount of the fine and penalty particularly high. A long ban would imply that the team cannot generate prize money in the future. For example – ceteris paribus – an increase in the probability of detection from $pd = 0.1$ to $pd = 0.17$ would eliminate the incentive to dope in the numerical example.

$$puf * PM - D - pd \uparrow * F = 0.9 * 1500 - 100 - 0.17 \uparrow * 3000 = 740 \quad (3)$$

The same result holds if the fine for doping were to increase to above $F = US\$5000$ – compared to the basic scenario where the detection probability is $pd = 0.1$:

$$puf * PM - D - pd * F \uparrow = 0.9 * 1500 - 100 - 0.1 * 5001 \uparrow = 749.9 \quad (4)$$

Match-fixing

Match-fixing means that a team bets against itself with a betting provider, for example, and then intentionally loses the match in order to collect the betting premium. Match-fixing is also a significant problem in esports because much of the money in the esports market is based on betting. In 2020, the total was up to US\$13 billion (Nicola 2020). In terms of prize money, about US\$122 million was distributed in 2020 (Esports Earnings 2021). In 2020, the volume of esports bets were thus around 107 times higher than the volume of prize money. Accordingly, it is reasonable to assume that there are players and teams betting against themselves in order to achieve higher profits through match-fixing than would be possible through prize money.

Summary of cheating, doping, and match-fixing

The presented methods of using illegal aids make it clear that cheating is a problem in esports. This can be deduced not least by the fact that even well-known professional organizations and players have been caught cheating in esports (Townsend 2019).

Cheating is becoming more common in many computer and video games, including the use of Adderall, for example. This applies to the esports scene of the first-person shooter Call of Duty (Akshon Esports 2021), among others.

Now that different types of violations have been described, the institutions, measures, and sanctions that take place against cheating in esports will be described.

Countermeasures against cheating, doping, and match-fixing in esports

As the esports market is a growing market in terms of prize money paid out, player salary structures, and volume of sponsorship deals, further action is needed to regulate esports (Holden et al. 2017). This stems from the fact that the greater the opportunities for monetary gain, the greater the incentives to cheat (Holt, Roth 2004). There are different sanctioning institutions, measures, and sanctioning options, as illustrated below.

Sanctioning institutions, measures and sanctions

Sanctioning institutions are organizations, companies, or other entities that have defined measures against cheating in esports and can impose resulting sanctions for violations of these measures. Measures are actions, devices, and controls that address cheating in esports, such as anti-cheating tools, penalty catalogs, and policies. Sanctions, in turn, are punishments directed against cheaters in case of the violation of the measures by the sanctioning institutions.

In esports, there are different institutions that can impose penalties. In the following, the institutions are described and the measures they define as well as the resulting sanctions are presented.

In the case of the sanctioning institutions, there is a clear difference from traditional sports, as in particular a comparable market participant to the publishers in esports are missing in traditional sports. Publishers take on a special role in the esports market, as they own the rights to the computer and video games. This means that publishers own the trademark and exploitation rights of the computer and video games they publish. The term computer games here refers to games played on a personal computer, while video games are the games played on all other platforms, such as consoles and smartphones. Ultimately, therefore, publishers decide what happens to their computer and video games, who hosts the tournaments, and who is allowed to participate in the tournaments (Vitale 2020).

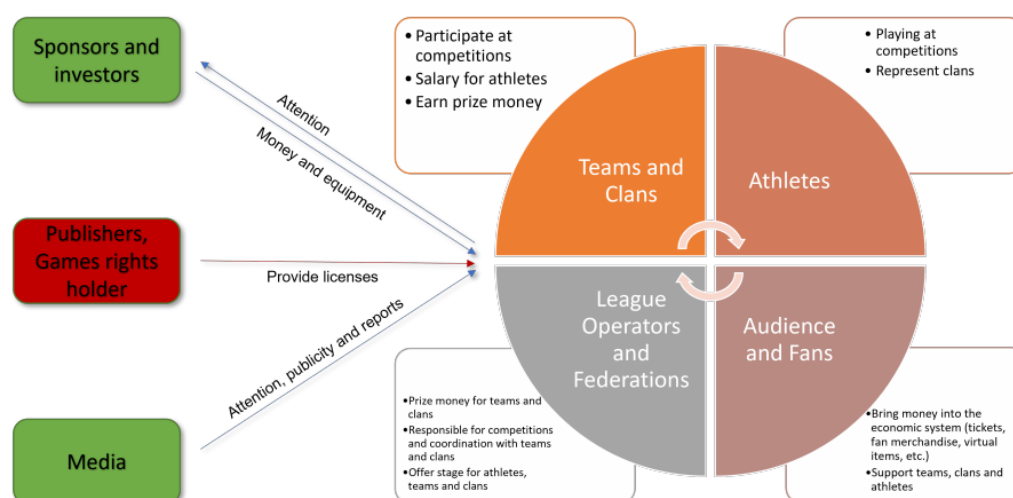


Figure 1 – Ecosystem of esports

Figure 1 shows the economic system of professional esports. The various stakeholders are shown, as are the relationships between them. In addition, the interactions resulting from these relationships are shown. Without the granting of rights by publishers to third parties, the entire economic system of esports would not function. Therefore, sustainable and effective sanctions by publishers could be, for example, that certain teams, players or organizers who have violated the regulations are excluded from competing in games of the publisher.

In addition, there are publishers who also act as organizers. They thus perform two tasks in the economic system of esports at the same time. An example of such a publisher is Riot Games, with the world championship in the computer game League of Legends (Liquipedia 2021a). On the one hand, Riot Games is the developer and manufacturer of the game, but on

the other hand, it is also the organizer of the world championships. Thus, there are overlapping and multiple functions among the organizations in the economic system of esports, which makes it difficult to draw a precise line and make a generally valid statement as to which organization is primarily responsible for sanctioning illicit means.

Currently, there is no overarching, international institution for sanctioning misconduct in esports that is recognized by the entire esports scene (Green 2016). However, such organizations exist on a national level, in particular the Korean e-Sports Association (KeSPA) in South Korea, which works closely with government agencies and can impose generally recognized sanctions (Purchase 2014).

Another example of an organisation working at the national level is in Germany, where the eSport-Bund Deutschland (ESBD), have established their own rules of ethics and conduct. For example, the ESBD has a code of ethics and conduct which regulates, among other things, that the organizer of the competition must impose sanctions against cheating (ESBD, 2018, pp. 4-5). In addition, the ESBD maintains an arbitration tribunal to resolve disputes between its members. One such dispute may be fraud with sanctions ranging from administrative fines of up to €10,000 to expulsion from the ESBD (ESBD, 2019, pp. 16-18). Whether and to what extent these regulations are recognized and applied is not apparent.

On an international level, there is the Esports Integrity Commission (ESIC). Among other things, ESIC has the task of protecting the integrity of esports and taking action against cheating, for example (ESIC 2021a). In August 2021, for example, the organization imposed five-year bans on two players (Field Level Media 2021). Members of the organization include esports competition organizers such as the Blast Pro Series, Allied Esports, and Dreamhack (ESIC 2021b). Major publishers such as Riot Games, Blizzard Entertainment, and Valve Corporation are not members of ESIC.

Measures and sanctions to combat doping and match-fixing are also part of the tasks and responsibilities of ESIC (ESIC 2021c). Regarding anti-doping measures, ESIC writes on its own website (ESIC 2021d), for example:

“The Anti-Doping Policy is adopted and implemented as part of ESIC's continuing efforts to maintain the integrity, popularity and public image of esports as well as the health and safety of all players, by providing:

- (a) an effective means to deter any Participant from engaging in doping whilst participating in esports competitions;
- (b) clarity about the definition of prohibited substances in esports;
- (c) a mechanism for approval of prohibited substances as part of a verified therapeutic regime,
- (d) a robust disciplinary process pursuant to which an anti-doping rule violation can be dealt with fairly, with certainty and in an expeditious manner.”

The organization thus establishes rules, provides lists naming banned substances, monitors compliance with the rules, and takes action against any violations with sanctions.

In addition to ESIC, organizers of competitions can also sanction misconduct. For example, Electronic Sports League (ESL) has global rules that apply to all its competitions and in all disciplines. On the topic of cheating, for example, ESL defines the following sanctions if a cheating incident is discovered (ESL 2021): “Disqualification from the tournament, results voided, forfeiture of prize money, ban between 2 years and lifetime depending on age and

level of player and nature/size of tournament and how the player cheated. Cheating at a professional level (i.e., where qualification for a professional event is at stake) should normally result in a 5-year ban, but, in aggravating circumstances, can result in a lifetime ban.”

The organization's global regulations also include punitive measures for doping (ESL 2021): “Mild cases of doping will be punished with a warning and possibly minor penalty points for the participant. Severe cases (i.e., use of drugs containing performance enhancing substances, like Adderall) will be punished as follows: Results voided, ban of between 1 and 2 years, forfeiture of prize money (if discovered before the end of a tournament, disqualification).”

Thus, the penalties depend heavily on the type of doping. Players can also receive penalty points. Depending on the type and number of penalty points, these are associated with any punitive measures. When it comes to doping, ESL has also developed a guideline against doping together with Germany's national anti-doping agency, which, among other things, provides for doping controls at competitions (ESL 2015). Furthermore, the ESL is a member of ESIC, so that its measures are also supported by ESL.

In match-fixing, penalties range from temporary suspensions and fines for first offenses, to lifetime suspensions for second offenses (ESL 2021):

“For second and subsequent offences, participants should expect far harsher sanctions and in all likelihood a lifetime ban from esports.”

ESL also cooperates with licensees. These cooperation partners of ESL are responsible for the organization of national competitions (Freaks 4U Gaming 2021). At the same time, the licensees also cooperate with publishers (Prime League 2021a). The licensees and publishers may have their own set of rules (Prime League 2021b).

Another possibility of a sanctioning organization is the ‘clans’ and teams to which players are contracted. Such contracts resemble an employment relationship with obligations on both the employer and employee sides. Such contracts often also regulate actions and consequences resulting from doping, cheating and other cheating by the player. This ranges from fines and criminal law aspects to termination of the employment contract (Schöber, Schatzke 2021).

There have also been disputes before state courts regarding cases of fraud in esports. In particular, cases are known in which convicted cheaters have tried to find their way back into the esports scene via the courts (Singh Rawat 2020). But publishers also go through the courts to take action against cheaters and other cheats. This is done on the one hand through lawsuits against providers of cheating methods (Carpenter 2021), and on the other hand through lawsuits against the cheating players themselves (MacLeod 2021).

It is clear that the number of sanctioning organizations and the scope of actions and methods of sanctioning are not clearly identifiable and are sometimes confusing. There are institutions that perform multiple roles in the economic system of esports and are in turn members of other institutions at the same time. In addition, it is not always clear which institution is decisive for the rules and sanctions and whether the sanctions of different organizations partly contradict each other. However, since the rights to computer and video games are held by the publishers, it can be assumed that their position of power is particularly strong in comparison.

Now that the sanctioning organizations, measures against cheating, and methods of sanctioning have been described, examples of measures against cheating will be presented. In addition, the special role of publishers in esports will be discussed. Which negative effects the role of publishers can have when it comes to political aspects will also be discussed.

Special position of publishers: Political aspects

Publishers hold the rights to computer and video games. Accordingly, publishers decide what happens to their games, at which competitions they may be played, and what content is transported with the games. For example, games can be used to convey political messages (Shamsrizi 2021) or historical contexts as historical slander (Ziegener 2021).

Applied to esports, publishers can accordingly fuel or prevent political positioning. An example of this is a competition in the computer game *Hearthstone*, which was held in 2019. In the wake of political protests in Hong Kong, player Chung “Blitzchung” Ng Wai positioned himself in support of the protests in an interview after one of his games. As a result, the game's publisher Blizzard Entertainment banned the player, retained the prize money he had won, and simultaneously banned the two Taiwanese broadcasters who had conducted the interview (Everington 2019). This example illustrates the influence that publishers have on esports and the role that political circumstances can play.

Examples of measures and sanctions against cheating

To deal with the problem of cheating, many publishers and tournament organizers work with anti-cheating software that is supposed to detect cheating programs. An example of this is the program Vanguard, which a player must have installed on the computer in order to play the tactical shooter VALORANT from the publisher Riot Games. Such programs are not without controversy, as they can dive deep into the player's computer system and collect data, something that could be questionable in terms of data protection (Banerjee 2020). In the case of the tactical shooter Counter-Strike: Global Offensive (CS:GO) from the publisher Valve Corporation, on the other hand, the competition organizer FACEIT works with its own anti-cheat software, which is necessary if one wants to complete games via the organizer's website, for example (FACEIT 2021).

Numerous examples prove that cheating is a significant problem in professional esports. This is also shown by incidents of cheating by prominent and successful esports players. The French CS:GO player Hovik “KQLY” Tovmassian, for example, became world champion in 2013 and European champion in 2014, among other titles (Liquipedia 2021b). In 2014, the publisher's anti-cheat software (Valve Anti-Cheat, VAC for short) convicted the player of cheating. This was followed by the player being banned from all competitions by Valve Corporation and his team being disqualified from an upcoming tournament (Turner 2021). His teammate Gordon “Sf” Giry was also convicted of cheating at the same time and suffered the same consequences (Chardakov 2014). He had also previously been European champion with the French national team (Liquipedia 2021c).

Another case that generated media interest was cheating by the Indian CS:GO player Nikhil “forsaken” Kumawat. This player, from the OpTic.India organization, had already attracted attention several times due to an unusual way of playing. When he played with his team at the Chinese tournament eXTREMESLAND, he was, for this reason, closely observed by the admins, and his computer was examined. He had hidden cheating software in an application called “word.exe” in order to disguise the cheating in this way and make the cheat look like Microsoft's well-known writing program (Porter 2018). When the tournament admins noticed this, he tried to delete the cheat in front of cameras, but was still convicted of cheating (Good 2018).

Cheaters caught cheating sometimes face significant penalties. For example, during a livestream, the South Korean *Overwatch* player “KiD x” was observed using an Aimbot, which

is a program that does the aiming for the player. As a result, he was banned for life by publisher Blizzard Entertainment.

The player “Diablo” was caught cheating in the game Call of Duty 4: Modern Warfare, using another form of cheating, namely playing the account of another, weaker player in order to allow him to participate in a competition in an unfair way. Both players were banned for six months (Townsend 2019).

Another well-known example is the case of cheating in the game Fortnite by Jarvis “FaZe Jarvis” Khatri. Although he did not cheat in a competition, he demonstrated how an aimbot works in an online stream during gameplay and cheated as a result. By using an aimbot, a weapon automatically and accurately aims and fires at enemies. In addition, he had looked over the shoulder of another player while he had used cheats in an online stream. As a consequence, the publisher Epic Games banned the player from the game for life, even though he had not used the cheat in a competition (Perez 2019).

In addition to players, other individuals may also be involved in cheating. Such cheating is not limited to cheating software, but can also take other forms. The Danish CS:GO coach Nicolai “HUNDEN” Petersen, for example, was noticed several times for cheating. Initially, it was found he (along with numerous other coaches) exploited a bug in the game, i.e., an error in the programming, in order to be able to view areas of the map during a game that should not actually be visible. He further testified that several players on the team knew about the use of the bug (Polhamus 2021). The involvement in the cheating on the part of one player, namely Nikolaj “niko” Kristensen, was later confirmed by ESIC in a report on the facts (ESIC 2021e). The player was exonerated by the report at the same time due to mitigating circumstances, including Asperger's syndrome, which resulted in a reduction of guilt. In doing so, the report makes clear that the player was manipulated by the coach to assist the coach in bug exploitation (ESIC 2021e).

The coach received a multi-year suspension from ESIC associated events (Polhamus 2021). Secondly, the coach disclosed secret information about tactics to third parties. As a consequence, his team fired him and began legal action for breach of contract (esports.com 2021).

Examples of measures and sanctions against doping

The doping case of the CS:GO team from the U.S. organization Cloud9 is arguably the most well-known. At least one player of the team used the substance Adderall at the ESL One Katowice 2015 tournament (Wolf 2015). There were no penalties for the players, and until a few years ago, there was little to no doping control at competitions (Hamstead 2020). For some years now, doping controls have increasingly taken place in esports competitions. At the 2018 World Cup in the soccer simulation game FIFA, for example, doping tests were conducted analogous to similar tests in traditional sports (Harris 2018).

Players caught doping face, for example, suspensions, contractual penalties, termination of employment, and termination of sponsorships. However, new forms of doping complicate testing and doping controls, which tend to be more scarce in esports as it is, although doping is a growing problem in esports (Holden et al. 2017).

Examples of measures and sanctions against match-fixing

Examples of match-fixing from the esports scene include the North American match-fixing scandal surrounding CS:GO team iBUYPOWER or the case of StarCraft II pro Ma “sAviOr” Jae Yoon.

iBUYPOWER had intentionally lost to team NetcodeGuides.com in 2014 after the team's players had previously bet on their own defeat. iBUYPOWER was the clear favorite in the match (Liquipedia 2021d). As a result of the cheating, four players were banned for life from all competitions by the publisher (Chardakov 2015).

South Korean StarCraft II player Ma “sAviOr” Jae Yoon was considered one of the best players in the world. In 2010, match-fixing incidents in games of his were revealed. As a consequence, he was stripped of several titles. In addition, he was legally prosecuted in South Korea and had to serve 120 community service hours, as well as a suspended sentence of two years (Liquipedia 2021e).

Criminal investigations against match-fixing fraudsters are also underway in other countries. For example, the Federal Bureau of Investigation (FBI), the U.S federal law enforcement agency, investigated match-fixing fraud in the United States. The FBI also cooperated with ESIC in this process. As a result, in the course of the investigation, the players were not only banned from the relevant competition and banned from all further events, but also face further criminal investigation (Robertson 2021).

Summary of countermeasures against cheating, doping, and match-fixing in esports

It is clear that the methods used to detect cheating vary greatly in their intensity and scope. While the cheating and match-fixing in esports are investigated with many different tools and punished comprehensively, this is less the case with doping in comparison. Nevertheless, all three methods of cheating are significant problems in esports, and are often employed by cheaters.

Conclusion

The potential earnings in esports, especially from winning prize money and esports betting, are enormous and amount to many millions of US dollars. At the same time, the measures against cheating in esports have many gaps, are not uniformly regulated, and can be circumvented at various points. Furthermore, sanctions against detected cheating are not stringently regulated. At the same time, the instrument of monetary penalties is almost completely absent in esports. Additionally, the cost of fraud remedies is low.

Based on a game theoretic approach, it became clear that a dominant strategy using cheating means might be worthwhile for teams and players. The potential profit is very high compared to the threat of sanctions if the cheating is detected. At the same time, a team that does not cheat and plays against a cheating team would be at such a disadvantage that winning would be unlikely. Therefore, it is possible that both teams might choose a dominant strategy. First, so as not to be at a disadvantage against the other team. Second, because the potential gain, subtracting potential penalties and the cost of cheating resources, is higher than if a team plays without cheating resources and loses the game. Further, the potential profit for a team cheating alone is also higher than if both teams were playing without the use of cheating means, because the prize money in competitions and winnings from betting in esports are significantly higher than the cost of cheating means or potential sanctions. Furthermore, the likelihood of being caught is not very high due to patchy measures as well as a confusing landscape of sanctioning institutions. A more unified landscape of sanctioning institutions would be needed to better address and combat the problem situations. In addition, further measures would have to be taken against fraud, such as comprehensive doping controls. Existing measures would have to be intensified. Furthermore, the level of sanctions would have to be adjusted so that any fraud discovered would be associated with considerable costs for players and also teams.

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