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E-Doping in E-sports in the Age of Artificial Intelligence.

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ABSTRACT
The rapid growth of esports has transformed competitive gaming into a global digital sports industry involving professional players, tournament organizers, and millions of spectators. However, this expansion has also introduced new challenges related to competitive integrity, particularly through the emergence of e-doping. E-doping refers to the use of technological or pharmacological interventions, including artificial intelligence-assisted software tools, automated scripts, and cognitive performance-enhancing substances, to gain unfair advantages in esports competitions. This study examines the legal and governance implications of AI-enabled cheating in esports and evaluates the adequacy of existing regulatory mechanisms designed to protect fair competition. Employing a mixed-method research design, the study combines doctrinal legal analysis with an empirical stakeholder questionnaire survey to assess perceptions regarding the prevalence and regulation of e-doping. The findings highlight significant regulatory gaps in esports governance and emphasize the need for stronger international cooperation, improved anti-cheat technologies, and clearer legal frameworks to safeguard integrity in digital sports.This paper argues that existing esports governance frameworks are structurally inadequate to address AI-enabled e-doping, and that the absence of binding contractual player protections, independent dispute resolution mechanisms, and a supranational regulatory authority constitutes a critical legal deficit requiring urgent reform. A central contribution of this paper is a principled legal distinction between permissible AI-assisted training and prohibited AI-enabled competitive cheating, which provides a normative foundation for future regulatory design..

Keywords: E-sports; E-doping; Artificial intelligence; Sports integrity; Esports governance.

INTRODUCTION:

1.1 Growth and Commercialization of Esports

Over the past two decades, esports has evolved from a niche form of digital entertainment into a highly organized global industry characterized by professional leagues, international tournaments, and substantial economic investments. Competitive gaming events now attract millions of spectators through online streaming platforms and live tournaments, while sponsorship agreements, media rights, and advertising revenues have transformed esports into a significant sector within the digital economy (Hamari and Sjöblom 2017). Major esports tournaments such as international championships and league competitions demonstrate the increasing commercialization of the sector, with prize pools and corporate partnerships reaching unprecedented levels.

The rapid growth of esports has also encouraged the institutionalization of competitive gaming through structured leagues, player contracts, and governance mechanisms developed by game publishers and tournament organizers (Scholz 2019). As a result, esports has increasingly been recognized as a form of organized competition comparable to traditional sports, raising important legal and regulatory questions concerning governance, integrity, and athlete protection (Jenny et al. 2017). Despite this progress, the regulatory landscape of esports remains fragmented due to the absence of a centralized global governing body responsible for overseeing competitive gaming.

1.2 Integrity Challenges in Digital Competitions

As esports continues to expand, concerns regarding competitive integrity have become a major issue for players, tournament organizers, and regulatory institutions. Fair competition is a fundamental principle in both traditional sports and digital competitions, ensuring that participants compete under equal conditions and that outcomes are determined by skill rather than unfair advantages (Holden et al. 2017).

However, the digital nature of esports introduces unique integrity challenges that differ significantly from those encountered in conventional sports. Unlike traditional athletic competitions, esports environments are highly dependent on software systems, online connectivity, and digital infrastructures. This technological dependence creates opportunities for manipulation through unauthorized software modifications, automated gameplay tools, and other forms of digital cheating (Reitman et al. 2020).

Moreover, esports competitions often occur in online or hybrid environments where monitoring mechanisms may be limited, thereby increasing the risk of unfair practices. These challenges have led to growing concerns among stakeholders regarding the effectiveness of existing anti-cheat systems and regulatory frameworks designed to safeguard competitive fairness.

1.3 Emergence of E-Doping in Esports

One of the most significant integrity concerns in esports is the emergence of **e-doping**, a term used to describe the use of technological or pharmacological methods to gain unfair advantages in digital competitions. E-doping may involve the use of software cheats such as aimbots and wallhacks, automated gameplay scripts, artificial intelligence–driven assistance tools, or cognitive performance-enhancing substances (Holden and Rodenberg 2021).

Recent technological advancements, particularly in the field of artificial intelligence, have further complicated the regulatory landscape of esports. AI technologies can be used to analyze gameplay patterns, predict opponent movements, and automate strategic decision-making processes. While such technologies may be legitimately employed for training and performance analysis, they can also be exploited to create sophisticated cheating tools that undermine fair competition.

The growing accessibility of AI-powered software has therefore intensified debates regarding the adequacy of existing esports governance mechanisms and anti-cheat technologies. Scholars have increasingly highlighted the need for stronger regulatory approaches capable of addressing emerging technological threats to competitive integrity in digital sports environments.

1.4 Research Objectives and Scope of the Study

In light of these developments, the present study aims to examine the phenomenon of **e-doping in esports within the broader context of artificial intelligence and sports governance**. The study seeks to analyse how AI-enabled cheating mechanisms challenge existing regulatory frameworks and to evaluate the effectiveness of current governance structures in maintaining competitive fairness.

Specifically, the research pursues three key objectives. First, it conceptualizes the notion of e-doping and identifies the technological mechanisms through which unfair advantages may be obtained in esports competitions. Second, it analyses the existing governance and regulatory frameworks that seek to address integrity issues in competitive gaming. Third, the study incorporates empirical insights through a stakeholder questionnaire survey in order to assess perceptions regarding the prevalence of AI-enabled cheating and the adequacy of current anti-cheat mechanisms.

By combining doctrinal legal analysis with empirical stakeholder perspectives, the study contributes to the emerging field of esports law and governance. The findings are intended to inform policy discussions on strengthening regulatory frameworks capable of protecting integrity and fairness in the rapidly evolving esports ecosystem. The central argument of this paper is threefold: first, that existing esports governance structures are legally insufficient to address AI-enabled e-doping because they concentrate regulatory authority in private publishers without adequate due process protections for players; second, that a principled legal distinction between permissible AI-assisted training and prohibited in-match AI enhancement is both necessary and achievable, and constitutes this paper's primary normative contribution; and third, that the esports industry has reached a regulatory threshold at which voluntary self-regulation is no longer adequate and some form of institutionalized, independent oversight — whether industry-created or state-supported — is legally and ethically required.

2. LITERATURE REVIEW

The rapid expansion of esports has attracted growing scholarly attention across disciplines including sports management, digital media studies, and sports law. Researchers have examined the evolution of esports as a form of organized competition, its economic significance, and the governance challenges associated with competitive gaming. As esports continues to develop into a global industry, issues relating to integrity, regulation, and technological manipulation have become central concerns in the academic literature.

Early studies on esports primarily focused on defining the nature of competitive gaming and its relationship to traditional sports. Hamari and Sjöblom (2017) examined the motivations behind esports spectatorship and highlighted the increasing professionalization of competitive gaming through organized tournaments, sponsorship agreements, and media broadcasting. Similarly, Jenny et al. (2017) explored whether esports should be considered a legitimate form of sport, arguing that competitive gaming shares several characteristics with traditional athletic competition, including structured rules, skill-based performance, and organized competitive systems.

Subsequent scholarship has emphasized the rapid commercialization of esports and its transformation into a global entertainment industry. Scholz (2019) observed that esports has evolved into a complex ecosystem involving game publishers, professional teams, tournament organizers, and streaming platforms. This commercialization has significantly increased financial incentives for players and organizations, resulting in heightened competition and professionalization within the esports sector. As prize pools and sponsorship opportunities continue to expand, maintaining competitive integrity has become an increasingly important issue for esports stakeholders.

One of the most distinctive aspects of esports governance highlighted in the literature is the dominant role played by game publishers in regulating competitive environments. Unlike traditional sports, which are typically governed by international federations and standardized regulatory institutions, esports competitions are largely controlled by private corporations that own the intellectual property rights to the games used in tournaments (Jenny et al. 2017). Holden, Edelman, and Rodenberg (2017) argue that this publisher-cantered governance model creates legal and regulatory challenges, particularly with regard to transparency, accountability, and dispute resolution. The absence of a unified international governing body further complicates the establishment of consistent regulatory standards across different esports titles and competitive platforms.

Another important area of research concerns the issue of cheating and integrity threats in esports competitions.

Reitman et al. (2020) conducted a comprehensive review of esports scholarship and identified cheating as one of the key challenges affecting competitive gaming environments. Because esports competitions occur within digital infrastructures, players may exploit software vulnerabilities, use unauthorized third-party programs, or manipulate gameplay mechanics to gain unfair advantages. These practices undermine the credibility of esports tournaments and raise concerns about the effectiveness of existing anti-cheat technologies.

More recently, scholars have begun to explore the concept of e-doping, which refers to the use of technological or pharmacological methods to enhance performance in esports competitions. Holden and Rodenberg (2021) note that e-doping may involve the use of software-based cheating tools such as aimbots, automated gameplay scripts, and other technological modifications that artificially improve player performance. In addition to software manipulation, some studies have also raised concerns regarding the use of cognitive performance-enhancing substances that improve concentration and reaction speed during competitive gaming sessions.

The emergence of artificial intelligence technologies has further complicated the issue of cheating in esports. Advances in machine learning and predictive analytics have enabled the development of sophisticated tools capable of analyzing gameplay patterns, predicting opponent movements, and automating strategic decisions. While such technologies may be used for legitimate training purposes, they also create opportunities for AI-enabled cheating mechanisms that are difficult to detect using conventional anti-cheat systems (Parshakov and Zavertiaeva 2020). As a result, scholars increasingly emphasize the need for more advanced technological monitoring systems and stronger regulatory frameworks capable of addressing emerging integrity threats.

Despite the growing body of research on esports governance and integrity issues, relatively limited attention has been devoted to examining AI-driven e-doping from a legal and regulatory perspective. Much of the existing literature focuses on technological or managerial aspects of esports, while the legal implications of AI-enabled cheating remain underexplored. Given the rapid advancement of artificial intelligence technologies and their potential misuse in competitive gaming environments, further research is required to analyze the regulatory challenges posed by e-doping and to identify governance mechanisms capable of safeguarding fair competition.

In response to this gap, the present study examines the phenomenon of e-doping in esports within the broader context of artificial intelligence and sports governance. By combining doctrinal legal analysis with empirical stakeholder perspectives, the research seeks to contribute to the emerging field of esports law and provide insights into the development of more effective regulatory frameworks for maintaining competitive integrity in digital sports.

3. CONCEPTUALISING E-DOPING IN ESPORTS

3.1 Definition and Forms of E-Doping

The concept of **e-doping** has emerged in scholarly discourse to describe practices in esports where players employ technological or pharmacological means to gain unfair advantages in digital competitions. Unlike traditional sports doping, which primarily involves the use of prohibited substances to enhance physical performance, e-doping encompasses a broader range of interventions including software manipulation, hardware modifications, automated scripts, and cognitive performance-enhancing drugs (Holden et al. 2017). These practices undermine the principle of fair competition and threaten the credibility of esports tournaments.

In the esports environment, cheating mechanisms are largely facilitated through the manipulation of game software or the exploitation of system vulnerabilities. Common forms of digital cheating include **aimbots**, which automatically adjust a player's aim to target opponents with greater precision, and **wallhacks**, which allow players to see through in-game obstacles or walls. Other techniques include automated gameplay scripts, macro programs that execute complex commands with minimal user input, and the use of unauthorized third-party software designed to alter game mechanics (Reitman et al. 2020).

In addition to technological methods, concerns have also been raised regarding the use of **cognitive performance-enhancing substances**, such as stimulants that improve concentration and reaction time. These substances may provide players with advantages during prolonged competitive sessions where mental endurance and rapid decision-making are essential. The convergence of technological and pharmacological enhancements has therefore expanded the scope of e-doping beyond conventional cheating practices.

Scholars have noted that the increasing professionalization of esports has intensified the incentives for players to engage in unfair practices in order to secure competitive success and financial rewards (Scholz 2019). As esports tournaments continue to offer substantial prize pools and career opportunities, maintaining competitive integrity has become a critical challenge for the industry.

3.2 Artificial Intelligence and Digital Cheating Technologies

Recent advancements in **artificial intelligence (AI)** have significantly transformed the technological landscape of esports, introducing new tools capable of analysing gameplay patterns, predicting opponent behaviour, and optimizing strategic decision-making. While AI technologies are increasingly used in legitimate contexts such as player training, performance analysis, and game development, they also create opportunities for sophisticated forms of digital cheating.

AI-enabled cheating tools can utilize machine learning algorithms to analyze large volumes of gameplay data and generate automated responses during competitive matches. For example, predictive algorithms may anticipate an opponent's movement patterns and automatically adjust targeting mechanisms to increase

accuracy. Such technologies blur the line between legitimate performance assistance and unfair technological enhancement (Parshakov and Zavertiaeva 2020).

Another emerging concern involves the development of **automated gameplay agents or bots** capable of performing complex in-game actions without direct human control. These systems may replicate human decision-making processes while operating with greater speed and precision, thereby undermining the skill-based nature of competitive gaming. The increasing accessibility of AI-driven tools has therefore raised significant questions regarding the ability of current anti-cheat systems to detect and prevent technologically advanced cheating mechanisms.

Furthermore, AI-based cheating technologies can evolve dynamically, making them more difficult to detect through traditional rule-based anti-cheat software. As a result, esports regulators and developers face an ongoing technological "arms race" in which cheating methods continuously adapt to bypass detection mechanisms. This dynamic environment highlights the need for more sophisticated regulatory strategies and technological countermeasures capable of addressing AI-enabled cheating in esports competitions.A critical regulatory challenge is the absence of a clear normative boundary between permissible and prohibited AI use in competitive esports. This paper proposes the following distinction as a foundational contribution to regulatory design. Permissible AI use includes pre-match applications such as opponent scouting tools, post-match performance analytics, coaching support systems, and training simulations that operate entirely outside the live competitive environment and do not interact with the game client during play. Prohibited AI use, by contrast, encompasses any AI-driven tool that operates during a live match to provide real-time decision-making support, targeting assistance, predictive movement analysis, or automated in-game actions that substitute for or augment the player's own skill during competition. The determining criterion is temporal and operational: AI that assists preparation is legitimate; AI that substitutes or enhances live human performance within a competitive match constitutes e-doping. This distinction provides a workable legal standard that governance bodies, publishers, and arbitral tribunals can apply when adjudicating integrity disputes.

3.3 Comparison with Traditional Sports Doping

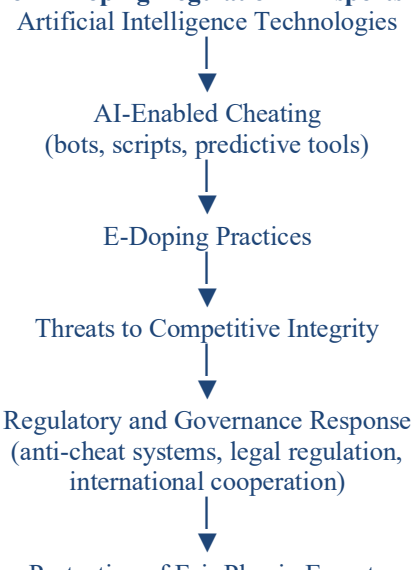
Although e-doping shares conceptual similarities with doping practices in traditional sports, important differences exist in terms of mechanisms, detection methods, and governance structures. In conventional athletic competitions, doping typically involves the use of prohibited substances that enhance physical strength, endurance, or recovery. International organizations such as the **World Anti-Doping Agency (WADA)** have established comprehensive regulatory frameworks that define banned substances, testing procedures, and disciplinary sanctions (Mazzeo 2019).

In contrast, e-doping in esports primarily involves **technological manipulation rather than biological enhancement**. Instead of chemical substances, players may rely on software tools, hardware modifications, or algorithmic assistance to gain competitive advantages. Detecting such practices is often more complex because cheating may occur through subtle modifications to digital systems rather than through measurable physiological changes.

Another significant distinction concerns governance structures. Traditional sports operate within hierarchical regulatory systems governed by international federations and standardized anti-doping policies. Esports, however, is largely regulated by **private game publishers and tournament organizers**, resulting in fragmented governance arrangements and inconsistent enforcement mechanisms (Jenny et al. 2017). This decentralized structure complicates efforts to establish unified integrity standards across different esports titles and competitive platforms.

Despite these differences, both traditional doping and e-doping raise fundamental ethical concerns regarding fairness, transparency, and the legitimacy of competition. As esports continues to mature as a professional sporting ecosystem, many scholars argue that stronger regulatory frameworks inspired by traditional sports governance may be necessary to protect competitive integrity in digital gaming environments.

3.4 Conceptual Research Model: Conceptual Model of E-Doping Regulation in Esports



The conceptual framework presented in Fig. 1 illustrates the relationship between emerging artificial intelligence technologies, the development of e-doping practices in esports, and the resulting challenges to competitive integrity. The model proposes that technological advancements in AI enable sophisticated cheating mechanisms, which subsequently create governance and regulatory challenges for esports institutions. These challenges necessitate regulatory responses including enhanced anti-cheat systems, governance reforms, and international cooperation aimed at protecting fair play in

competitive gaming.

4. GOVERNANCE AND LEGAL FRAMEWORK OF ESPORTS

4.1 Structure of Esports Governance

The governance structure of esports differs significantly from that of traditional sports. Conventional sports are typically governed by hierarchical regulatory bodies such as international federations and national associations that establish standardized rules, disciplinary procedures, and anti-doping frameworks. In contrast, esports governance is largely decentralized and controlled by **private game publishers**, tournament organizers, and commercial entities that manage competitive events and enforce regulations within their respective gaming ecosystems (Scholz 2019).

Game developers and publishers play a central role in the governance of esports because they retain intellectual property rights over the games used in competitive tournaments. This ownership grants publishers the authority to determine the rules of competition, implement anti-cheat mechanisms, and regulate player conduct. As a result, the governance of esports is often fragmented across different gaming titles, with each publisher maintaining its own regulatory framework and enforcement policies (Jenny et al. 2017).

In addition to publishers, several professional tournament organizers and esports leagues contribute to the governance ecosystem. Organizations such as global tournament platforms and esports leagues establish competition rules, disciplinary guidelines, and eligibility requirements for participating players and teams. However, these regulatory arrangements are primarily contractual and lack the institutional uniformity commonly found in traditional sports governance systems (Holden et al. 2017). Consequently, questions remain regarding accountability, transparency, and regulatory consistency within the esports industry.

4.2 Anti-Cheating Policies and Industry Regulations

In response to growing concerns about cheating and unfair practices, esports stakeholders have developed a range of **anti-cheat policies and technological enforcement mechanisms** designed to maintain competitive integrity. Most game publishers employ specialized anti-cheat software systems that monitor gameplay activity and detect unauthorized modifications to game files or system processes. These systems are designed to identify suspicious behavioral patterns, detect the use of third-party software, and prevent players from gaining unfair technological advantages (Reitman et al. 2020).

Anti-cheat enforcement typically involves automated detection tools combined with manual investigation by tournament administrators or integrity committees. Players found to have violated anti-cheat regulations may face disciplinary sanctions including temporary suspensions, permanent bans from tournaments, or disqualification from competitions. These measures are intended to deter cheating behaviour and preserve the credibility of esports tournaments.

Despite these efforts, the effectiveness of anti-cheat systems remains a subject of ongoing debate. Cheating technologies often evolve rapidly, enabling developers of illicit software to circumvent detection mechanisms. Moreover, many anti-cheat systems rely on proprietary technologies that lack transparency, making it difficult for external stakeholders to assess their reliability or fairness. Scholars have therefore emphasized the importance of strengthening integrity monitoring systems and improving cooperation between developers, tournament organizers, and regulatory institutions in order to address emerging forms of digital cheating (Parshakov and Zavertiaeva 2020).

Another regulatory concern relates to the contractual nature of esports governance. Unlike traditional sports, where disciplinary decisions may be subject to independent arbitration or oversight by international governing bodies, esports disputes are often resolved through private contractual arrangements established by publishers or tournament organizers. This situation raises legal questions regarding due process, dispute resolution mechanisms, and the protection of player rights within the esports ecosystem.From a contract law perspective, the relationship between professional esports players and publishers or tournament organizers is typically governed by standard-form player agreements, participation terms, and codes of conduct. These instruments confer extensive unilateral authority upon publishers to impose bans, disqualifications, and financial penalties in response to alleged anti-cheat violations. However, the asymmetric bargaining power inherent in these agreements raises serious concerns under principles of unconscionability and procedural fairness. Players facing account termination or competitive exclusion on the basis of AI-based anti-cheat detections often have no contractual right to an independent review, no right to examine the evidence against them, and no access to neutral arbitration. The legal standard applied by proprietary anti-cheat systems is rarely disclosed, meaning players cannot assess whether the system's methodology is reliable or proportionate. This opacity is particularly problematic given that AI-based detection systems are susceptible to false positives, and a wrongful ban can irreparably damage a professional player's career and livelihood. Jurisdictions with developed sports arbitration infrastructure, such as those that apply Court of Arbitration for Sport (CAS) principles, provide a comparative model for the procedural protections that esports governance currently lacks. This paper argues that player contracts in esports should be required to include minimum due process guarantees as a condition of participation in institutionally recognized tournaments, including the right to notice of allegations, access to evidence, an opportunity to respond, and a right of appeal before an independent adjudicative body.

4.3 Regulatory Gaps and Emerging Legal Challenges

Although esports have developed a variety of regulatory mechanisms aimed at addressing cheating and misconduct, significant governance gaps remain. One of the most prominent challenges is the absence of a **unified international regulatory authority** responsible for overseeing esports competitions across different games

and platforms. The fragmented governance structure of esports complicates efforts to establish standardized integrity policies and coordinated enforcement strategies.

Another major challenge involves the rapid evolution of technological cheating tools, particularly those enabled by artificial intelligence. AI-driven systems can analyse gameplay data, predict opponent behaviour, and automate complex in-game actions, making them increasingly difficult to detect using traditional anti-cheat technologies. As a result, esports regulators must continually adapt their monitoring systems to address new forms of digital manipulation.

Legal scholars have also highlighted concerns regarding the intersection of esports governance with broader issues of intellectual property rights, data protection, and cybersecurity. Because esports competitions rely heavily on proprietary software platforms controlled by private publishers, regulatory authority is often concentrated in corporate entities rather than independent sports institutions. This arrangement creates potential conflicts between commercial interests and the need to protect competitive integrity (Holden and Rodenberg 2021).

Furthermore, the global nature of esports competitions introduces jurisdictional complexities. Players, teams, and tournament organizers frequently operate across multiple countries, each with distinct legal frameworks governing digital technologies, gambling regulations, and sports governance. These cross-border dynamics complicate enforcement mechanisms and may hinder efforts to establish consistent regulatory standards.

In light of these challenges, scholars and policymakers have increasingly emphasized the need for **more coordinated governance frameworks** capable of addressing integrity risks within esports. Such frameworks may involve enhanced collaboration between game publishers, tournament organizers, regulatory institutions, and international sports organizations in order to develop more effective policies for preventing cheating and safeguarding fair competition in digital sports environments.

4.4 Regulatory Authority, Jurisdiction, and Player Rights in Anti-Cheat Proceedings

A foundational question for esports law is who holds regulatory authority over competitive integrity, and within which legal system that authority is exercisable. Unlike traditional sports bodies such as FIFA or the International Olympic Committee, which exercise quasi-public regulatory authority recognized under national and international law, esports publishers exercise authority derived purely from intellectual property ownership and private contract. This distinction has profound legal consequences. When a publisher bans a player for alleged AI-assisted cheating, that action is not reviewable by a sports arbitral tribunal unless the relevant player agreement expressly provides for such review. There is no equivalent of the World Anti-Doping Code, no standardized burden of proof, and no minimum evidentiary standard that anti-cheat accusations must satisfy before sanctions are imposed. The result is a system in which the accuser, adjudicator, and enforcer are the same private entity, raising structural concerns under principles of natural justice and administrative fairness recognized across common law and civil law jurisdictions. Jurisdictionally, the global nature of esports further complicates enforcement. A player domiciled in South Korea competing in a European-based tournament under terms governed by a Californian publisher's end-user licence agreement may have no practical access to legal redress in any single forum. The lack of a harmonized esports arbitration convention or treaty leaves players without a predictable neutral forum. This paper argues that the esports industry requires, at minimum, a recognized centre for esports dispute resolution — analogous to the Court of Arbitration for Sport — with jurisdiction over integrity disputes involving AI-enabled cheating allegations, enforceable player rights to a fair hearing, and transparent evidentiary standards for AI-based anti-cheat evidence.

5. RESEARCH METHODOLOGY

This study adopts a **mixed-method research approach** combining doctrinal legal analysis with an empirical stakeholder questionnaire survey to examine the challenges of e-doping in esports.

5.1 Doctrinal Legal Analysis

The doctrinal component analyses existing literature, esports governance frameworks, anti-cheat policies, and regulatory mechanisms related to competitive gaming. Academic articles, policy reports, and legal commentaries on esports governance and digital cheating were reviewed to understand the regulatory landscape.

5.2 Stakeholder Questionnaire Survey

To complement the doctrinal analysis, a **structured questionnaire survey** was conducted among key stakeholders in the esports ecosystem, including professional players, tournament organizers, developers, and legal experts. A purposive sampling method was used to select respondents with relevant knowledge of esports competitions.

5.3 Data Analysis

The survey responses were analysed using **descriptive statistical techniques**, such as percentage and frequency analysis, to identify stakeholder perceptions regarding AI-enabled cheating and the effectiveness of existing anti-cheat mechanisms.

6. STAKEHOLDER PERCEPTIONS ON AI-ENABLED E-DOPING

This section presents the findings of the stakeholder questionnaire survey conducted to assess perceptions regarding **AI-enabled cheating and e-doping in esports competitions**. The survey targeted participants involved in the esports ecosystem, including professional players, tournament organizers, developers, and legal experts. A total of **52 responses** were received.

6.1 Profile of Respondents

The respondents represented different stakeholder groups within the esports community. Table 1 presents the distribution of participants according to their role in the

esports ecosystem.

Table 1 Respondent Profile

Stakeholder Category	Number of Respondents	Percentage
Professional players	18	34.6%
Tournament organizers	10	19.2%
Game developers	8	15.4%
Esports analysts/coaches	9	17.3%
Legal experts	7	13.5%

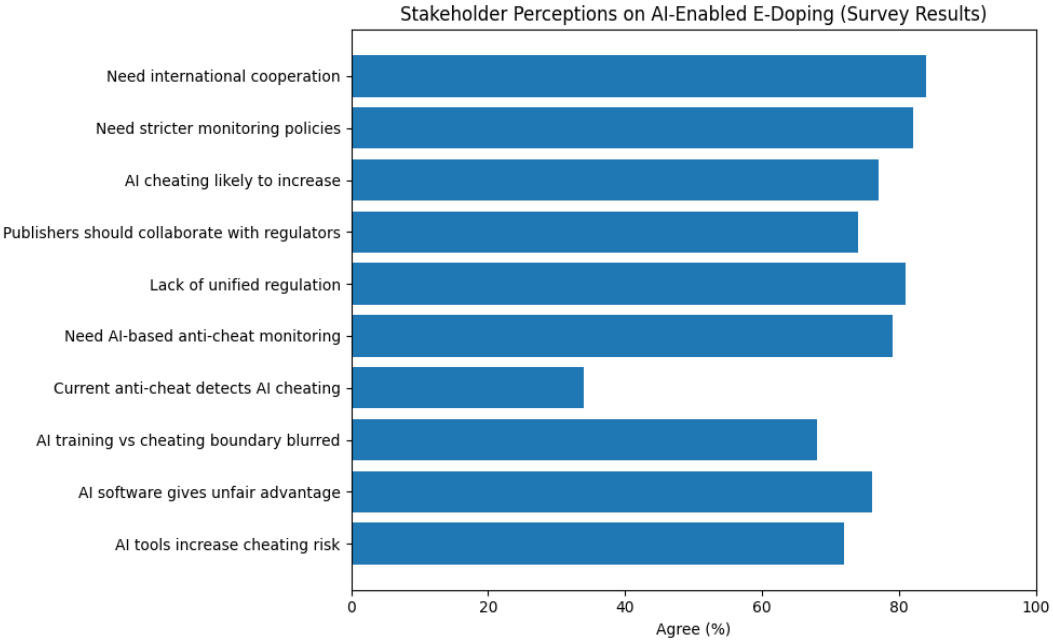
6.2 Perceptions on AI-Enabled Cheating

Respondents were asked to indicate their level of agreement with statements relating to the use of artificial intelligence in esports cheating.

Table 2 Stakeholder Views on AI-Based Cheating

No.	Survey Statement	Agree (%)	Neutral (%)	Disagree (%)
1	Artificial intelligence tools increase the risk of cheating in esports competitions	72	18	10
2	AI-assisted software can provide players with unfair competitive advantages	76	15	9
3	AI-based gameplay analysis tools may blur the boundary between training assistance and cheating	68	20	12
4	Current anti-cheat technologies are capable of detecting AI-enabled cheating	34	29	37
5	Esports tournaments should adopt more advanced AI-based anti-cheat monitoring systems	79	14	7
6	The esports industry currently lacks a unified regulatory framework addressing e-doping	81	12	7
7	Game publishers should collaborate with independent regulatory bodies to prevent cheating	74	16	10
8	AI-driven cheating tools are likely to become more common in esports competitions	77	17	6

No.	Survey Statement	Agree (%)	Neutral (%)	Disagree (%)
9	Professional esports competitions should introduce stricter monitoring and integrity policies	82	11	7
10	International cooperation is necessary to regulate AI-enabled cheating in esports	84	10	6



The survey results indicate that a majority of respondents believe that artificial intelligence technologies increase the risk of cheating in esports competitions. Most participants also expressed concern that existing anti-cheat systems may not be sufficiently effective in detecting AI-enabled cheating tools. Furthermore, respondents strongly supported the need for stronger regulatory frameworks, advanced monitoring technologies, and greater international cooperation to safeguard competitive integrity in esports.

6.3 Legal and Regulatory Interpretation of Survey Findings

The survey data, read through a legal and regulatory lens, yields several significant conclusions that go beyond descriptive observation. First, the finding that 81% of respondents believe esports lacks a unified regulatory framework addressing e-doping is not merely a perception about industry organization — it is evidence of a governance legitimacy deficit. In legal terms, this means that disciplinary decisions affecting players' professional and economic rights are being made by private actors operating without standardized procedural rules, defined evidentiary standards, or external accountability. This is a condition that most legal systems would consider incompatible with fairness norms in any context where binding sanctions are imposed on individuals. Second, the fact that only 34% of respondents believe current anti-cheat technologies are capable of detecting AI-enabled cheating has direct legal implications for the validity of bans and sanctions. If the detection systems are unreliable — as the majority of surveyed stakeholders believe — then sanctions imposed on their basis may not satisfy the standard of proof required to justify career-altering penalties. This raises the question of whether publisher-imposed bans grounded in AI detection evidence would withstand legal scrutiny before an independent tribunal applying a civil standard of proof. Third, the 82% support for stricter monitoring and integrity policies, and the 84% support for international cooperation, reflect stakeholder consensus that the current self-regulatory model is insufficient. From a regulatory theory perspective, this level of stakeholder dissatisfaction with private governance typically precedes and legitimizes the introduction of public or hybrid regulatory oversight. The survey findings, therefore, do not simply describe a problem — they collectively make the normative case that esports governance has reached a threshold where continued reliance on unilateral publisher authority is legally and institutionally untenable.

7. DISCUSSION: LEGAL AND ETHICAL IMPLICATIONS

The findings of the stakeholder survey highlight growing concerns regarding the **impact of artificial intelligence–**

enabled cheating on esports integrity. A majority of respondents indicated that AI-assisted tools may create unfair competitive advantages and pose challenges for existing anti-cheat mechanisms. These perceptions reflect broader concerns in the literature regarding the evolving technological nature of cheating in digital competitions (Holden et al. 2017; Reitman et al. 2020).

From a regulatory perspective, the results suggest that **current governance structures in esports may be insufficient to address emerging forms of e-doping**. Unlike traditional sports, esports lack a unified international regulatory body responsible for enforcing integrity standards. As a result, regulatory responsibility remains fragmented among game publishers and tournament organizers.

The findings also raise important **ethical considerations related to fairness and transparency in competitive gaming**. Artificial intelligence technologies may provide legitimate performance analysis and training support; however, their misuse for automated gameplay or predictive targeting can undermine the skill-based nature of esports competitions.

Overall, the study suggests that addressing AI-enabled e-doping requires **stronger governance frameworks, improved anti-cheat technologies, and greater collaboration among esports stakeholders**. These measures are essential to safeguard competitive integrity and maintain trust in professional esports tournaments.

Beyond the immediate policy implications, the findings support a more fundamental legal argument: the current esports governance model is not a neutral or adequate substitute for law. Publisher-controlled regulatory systems derive their legitimacy solely from contractual consent, yet the conditions under which players consent — typically through non-negotiable standard-form terms as a precondition for professional participation — are structurally coercive. When those systems impose serious professional and financial sanctions on the basis of opaque AI detection methods, the absence of independent oversight is not a regulatory gap to be incrementally reformed; it is a failure of the rule of law as applied to a significant professional sector. The ethical dimension identified in the survey — the blurring between legitimate AI training tools and prohibited in-match cheating — also has legal significance. Without a codified definition of what constitutes AI-enabled e-doping, disciplinary decisions lack the legal certainty that natural justice requires. Players cannot comply with rules they cannot clearly identify, and adjudicators cannot apply standards that do not yet exist. The regulatory agenda for esports law must therefore begin with definition and codification before it can meaningfully proceed to enforcement. This paper's proposed distinction between pre-match AI assistance and in-match AI substitution provides a starting point for that codification.

8. POLICY RECOMMENDATIONS

8.1 Strengthening Anti-Cheat Technologies

Esports organizations should invest in **advanced AI-based anti-cheat systems** capable of detecting automated gameplay tools, predictive targeting algorithms, and other technologically sophisticated cheating mechanisms. Continuous technological monitoring is essential to maintain competitive integrity.

8.2 Development of Standardized Integrity Guidelines

The esports industry should develop **standardized integrity and anti-cheating guidelines** applicable across major competitive gaming platforms. Such guidelines would help ensure consistency in enforcement mechanisms and disciplinary procedures.

8.3 Institutional Collaboration Among Stakeholders

Effective regulation requires **cooperation between game publishers, tournament organizers, esports associations, and legal institutions**. Collaborative governance structures can improve transparency and strengthen enforcement against digital cheating practices.

8.4 International Regulatory Coordination

Given the global nature of esports competitions, policymakers should encourage **international coordination in esports governance**. Establishing shared regulatory frameworks and integrity standards would help address cross-border challenges related to AI-enabled e-doping.

9. CONCLUSION

The rapid growth of esports has transformed competitive gaming into a global professional industry. However, this expansion has also introduced new challenges related to **competitive integrity and digital cheating**, particularly through the emergence of **AI-enabled e-doping practices**. The findings of this study indicate that stakeholders perceive artificial intelligence technologies as increasing the risk of unfair advantages in esports competitions.

The analysis also highlights important **regulatory and governance gaps** within the esports ecosystem. Unlike traditional sports governed by centralized institutions and standardized anti-doping frameworks, esports regulation remains fragmented and largely controlled by private game publishers. This governance structure may limit the effectiveness of current anti-cheat mechanisms in addressing technologically sophisticated cheating tools.

The study emphasizes the need for **stronger integrity frameworks, advanced anti-cheat technologies, and greater institutional cooperation among esports stakeholders**. As artificial intelligence continues to evolve, regulatory strategies must adapt to ensure fairness, transparency, and trust in competitive gaming. Future research should further examine technological and legal approaches capable of addressing emerging integrity risks in esports competitions

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