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Governance in Esports: Studies on Organizational Legitimacy and Stakeholder Demands

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If you gonna do it, do it and try to be the best.

Don't be better than other people, be the best for you.

Unknown

Für Mich.

Acknowledgements

Heiko Heidenreich
January 2025

List of abbreviations

CSR	Corporate social responsibility
DotA 2	Defense of the Ancients 2
ESBD	eSport-Bund Deutschland
Esports	Electronic sports
IOC	International Olympic Committee
NAO	Network Administrative Organization
WESA	World eSports Association

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1. Introduction

In his *Diffusion of Innovation* theory, Rogers (1983, p. 1) stated that "[m]any innovations require a lengthy period, often of some years, from the time when they become available to the time when they are widely adopted". This idea is mirrored in a leisure activity that is no longer confined to basements or arcade halls but has turned into a worldwide phenomenon: Electronic sports (esports).

Most people know icons from traditional sports like Tiger Woods, Novak Djokovic, and LeBron James. In contrast, Oleksandr "s1mple" Kostyljev, Lee "Faker" Sang-Hyeok, and Kuro "KuroKy" Salehi Takhasomi are superstars in the world of esports and well-known among gaming communities. These individuals are recognized by millions who follow their gameplay as professional players while competing in international tournaments. In 2021, nearly 489.5 million people worldwide watched esports events at least occasionally. By 2025, this number is expected to grow to almost 641 million (Wccftech, 2022). Prize money is also rising. For example, the tournament "The International 2021" for the video game Defense of the Ancients 2 (DotA 2) offered an overall prize pool of over $40 million – up to this day the largest prize pool in esports history (eSports Earnings, 2024). However, it is important to view these numbers critically, as they may be inflated (Scholz, 2020). Nevertheless, reflecting on this development, esports has become an important part of mainstream culture and turned into a profitable business.

First used as a term in South Korea in the late 1990s (Schwartz, 2017), esports is defined as "competitive (pro and amateur) video gaming that is often coordinated by different leagues, ladders, and tournaments, and where players customarily belong to teams or other 'sporting' organizations who are sponsored by various business organizations" (Hamari & Sjöblom, 2017, p. 211). In simpler words, esports refers to playing video games on a competitive level (Jenny et al., 2017; Schwartz, 2017).

Esports evolved from video gaming as a leisure activity to a sports-like form of entertainment (Scholz, 2019). This transformation, known as *sportification*, involves using structures from traditional sports and applying them to a former leisure activity. The idea is to "allow a fair, pleasurable, and safe environment for individuals to compete and cooperate" (Heere, 2018, p. 23). Similar sportification processes have turned other activities like skateboarding and snowboarding into officially recognized sports, adopting governance structures from traditional sports (Strittmatter et al., 2019).

The esports ecosystem is complex, with many stakeholders striving for personal wealth (Scholz, 2019). At the top are the game developers and publishers[1], who control the core product – the video game itself (Funk et al., 2018). Game publishers hold the game's intellectual property rights, which makes them the most influential stakeholders (Abanazir, 2018; Karhulahti, 2017; Peng et al., 2020). As profit-driven enterprises, they use their games to achieve financial success (Abanazir, 2018; Funk et al., 2018). However, as esports rapidly grows and undergoes a sportification process, challenges such as cheating, match-fixing, and the use of performance-enhancing substances by players have become more prominent (Schubert et al., 2022, 2024). Esports faces criticism for its lack of robust governance structures to address these challenges, mainly because publishers "typically still see themselves first and foremost as a game *producer* – not sports provider" (Taylor, 2012, p. 166).

Due to its diversity and wide range of games and genres, esports reflects a Wild West scenario (Scholz, 2019). Establishing a governing body to regulate esports' various games, genres, and communities is hardly possible due to its fragmentation and publisher dominance (Abanazir, 2018; Fried et al., 2021; Macey et al., 2021). However, several organizations try to fill this gap by positioning themselves as non-profit governing bodies. They act at international (e.g., International Esports Federation), continental (e.g., European Esports Federation), and national (e.g., Korean e-Sports Association) levels, aligning their structures with traditional sports associations (Heidenreich et al., 2022). However, traditional sports benefit from a hierarchical governance structure that promotes consistency and stability (Croci & Forster, 2004), while esports' commercial nature requires a more flexible approach and highlights the need for tailored governance. A rigid governance model is incompatible with esports (Peng et al., 2020) and a stakeholder-driven approach, focusing on specific sub-areas of esports, is considered more effective (Kelly et al., 2022; Scholz, 2019).

With the rise of esports in the early 2000s, scientific publications in this field have increased. Research on consumption patterns, spectating behaviour, and fan dynamics (Anderson et al., 2021; Choi, 2019; Hamari & Sjöblom, 2017; Macey et al., 2022) became available as esports turned into a lucrative business. An academic and public debate has also emerged regarding whether esports can be recognized as a real sport (Funk et al., 2018; Hallmann & Giel, 2018;

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[1] The term "publisher" refers to the owners of a game's property rights and is used throughout. However, publishers and game developers are not always the same entities, and the division of rights may vary.

Tjønndal, 2021; van Hilvoorde & Pot, 2016). However, a solid analysis of esports governance is still missing in academic research (Funk et al., 2018; Heere, 2018). The tension between a profit-oriented environment and the need for substantial governance calls for a rethink of traditional hierarchical models in favour of more flexible approaches.

Efforts to create associations based on traditional sports frameworks already exist. However, questions remain about how these structures can align with publishers' economic interests and how non-profit organizations can fit in a profit-driven ecosystem. This dissertation does not aim to provide a definitive model for esports governance. Instead, it explores the integration of associational structures to esports and examines their suitability for esports' unique characteristics. In particular, the dissertation investigates esports associations' pursuit of legitimacy in a profit-oriented environment, considering esports fans as a crucial stakeholder. It focuses on fans' perceptions of these new organizational developments and the role of publishers in this context. The theoretical framework covers institutional theory and legitimacy, oppositionality and alternative leisure, sports and culture, organizational hybridity and corporate image and trust. Three articles address esports governance and form the main body of the dissertation. Two additional studies, conducted with the Department of Sports Physiology (today: Exercise Physiology and Metabolism) at the University of Bayreuth, highlight the diversity of esports research. These two studies count as an excursus and contribute to the discussion on whether esports should be classified as a sport and its ongoing sportification process. Both articles provide a foundation for further physiological investigations.

The upcoming sections place the dissertation within a broader context. The focus is on esports governance, explored in scientific articles 1, 2 and 3. The theoretical framework, introduced in the next section, incorporates stakeholder theory, network governance, and institutional logics. Section 3 outlines the research context focusing on esports and its ecosystem. A brief overview of the methodological approach is provided in section 4. Section 5 details the publication strategy and the author's contributions to each scientific article, followed by a summary of the key findings on esports governance in section 6. Section 7 offers explanations and justifications for the research in scientific articles 4 and 5. The dissertation concludes with a discussion in Section 8.

2. Theoretical background

2.1. Stakeholder theory

Stakeholder theory, introduced by Freeman (1984), has evolved into a key framework in business ethics and organizational management. A stakeholder is defined as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984, p. 46). Researchers categorize stakeholders regarding their relevance to an organization. Freeman (1984) identified internal and external stakeholders, prioritizing internal stakeholders due to their direct connection to an organization. Clarkson (1995) classified stakeholders as primary and secondary, with primary stakeholders being essential for an organization's survival. Scholz (2020) distinguishes between endemic and non-endemic stakeholders.

Building on Freeman's definition, Mitchell et al. (1997, p. 854) suggested a stakeholder classification based on three attributes: "(1) the stakeholder's power to influence the firm, (2) the legitimacy of the stakeholder's relationship with the firm, and (3) the urgency of the stakeholder's claim on the firm". Entities lacking these attributes are seen as irrelevant and are not considered stakeholders. Although being widely adopted, some researchers criticize this classification for not being comprehensive enough (e.g., Driscoll & Starik, 2004), its epistemological assumptions (e.g., Neville & Menguc, 2006), and contextual variables questioning its generalizability (e.g., Agle et al., 1999).

Stakeholder relationships and classification depend on an organisation's management (Freeman & Phillips, 2002). However, modern stakeholder theory has evolved to examine how organizations position themselves within broader networks, allowing for a stakeholder classification within an ecosystem (Friedman & Miles, 2002; Morrow & Idle, 2008; Rowley, 1997). The next section introduces network theory and network governance to explain the connections between actors in a wider network.

2.2. Networks and network governance

Networks are mainly discussed in a social context. However, they are important in public and private sectors (Provan & Kenis, 2007; Rhodes, 1996). A social network is defined as "a set of nodes (e.g. persons, organizations) linked by a set of social relationships (e.g. friendship, transfer of funds, overlapping membership) of a specified type" (Laumann et al., 1978, p. 458). Network research has shifted from an individual to an organizational focus,

emphasizing how organizations connect with others to manage uncertainty and meet resource needs (Burt, 1982; Gulati & Gargiulo, 1999).

Networks can be either formal or informal and can occur at different levels, including intra- or inter-organizational networks (Gutterman, 2023). This dissertation focuses on inter-organizational networks. These networks connect multiple organizations and often span multiple sectors where cross-sector collaborations among governments, businesses, non-profits, community groups, and the public are necessary to address complex challenges (Bryson et al., 2006; Conteh, 2013; Gutterman, 2023). They function "as a super-organism composed of their mixed goals, needs, values, and resources, moving towards a resultant direction" (Śliwa & Krzos, 2021, p. 72).

Organizations join networks "to gain legitimacy, serve clients more effectively, attract more resources, and address complex problems" (Provan & Kenis, 2007, p. 240). Powell (1990, p. 301) describes a network as "a distinctive form of coordinating economic activity". Rhodes (1996, p. 659) further notes that "networks are an alternative to, not a hybrid of, markets and hierarchies and they span the boundaries of the public, private and voluntary sectors".

Despite their importance, the governance of and within organizational networks is often neglected (Provan & Kenis, 2007). In general, governance in business (Fama & Jensen, 1983), nonprofit contexts (Provan, 1980) and public management (Hill & Lynn, 2005) refer to "monitor[ing] and control[ing] the behavior of management, who are hired to preside over the day-to-day activities of running the organization" (Provan & Kenis, 2007, p. 230). However, existing literature often overlooks governance in networks, mainly due to the autonomy of individual organizations (Provan & Kenis, 2007).

Governance is essential in networks to ensure goal-oriented participation and define clear boundaries. Following Provan and Kenis (2007), three network governance forms can be distinguished: Participant-Governed Network, while decentralized, "is governed by the network members themselves with no separate and unique governance entity" (p. 235). Lead Organization-Governed Network, which is centralized and coordinated by a single lead organization. This lead organization is responsible for "all major network-level activities and key decisions" (p. 236). The third form is Network Administrative Organization (NAO), where "a separate administrative entity is set up specifically to govern the network and its activities" (p. 237).

Regardless of the chosen form, networks face three fundamental tensions: flexibility vs. stability, efficiency vs. inclusiveness and internal vs. external legitimacy. These tensions, or *contradictory logics*, need to be managed appropriately (Provan & Kenis, 2007). The next section builds on multiple (contradictory) logics occurring within fields.

2.3. (Multiple) Institutional logics in organizational fields

Selznick (1948) was an early pioneer in analysing organizations within their institutional environments. Later, Parsons (1956) focused on how organizations interact within a broader system, usually society, and Meyer and Rowan (1977) recognized structural similarities among organizations within the same environment to enhance legitimacy. DiMaggio and Powell (1983) further explored how different pressures (coercive, normative, mimetic) cause organizations in the same field to align with each other, prioritizing legitimacy over efficiency.

Alford and Friedland (1985) introduced institutional logics focusing on the interactions between individuals, organizations and society. Thornton and Ocasio (1999) expanded this by adding the industry as an additional level. Scott (2001, p. 139) defines institutional logics as "belief systems and related practices that predominate in an organizational field" and an organizational field as "a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside of the field" (Scott, 1994, pp. 207–208). According to Waldorff (2010, p. 19), a field is understood as "an organizational field of interacting actors defined by multiple, potentially competing institutional orders or logics".

At the field level, the institutional logics concept views organizations as important parts of a larger social system (Hinings, 2012; Wooten & Hoffman, 2017) where institutional logics are defined as "organizing principles that shape the behaviour of field participants" (Reay & Hinings, 2009, p. 631).

Initially, institutional logics focused on understanding how fields moved from one dominant logic to another (Scott et al., 2000; Suddaby & Greenwood, 2005). Over time, discussions have shifted to consider multiple (conflicting) logics, acknowledging that more than one logic can coexist within a field, though usually one is more dominant (Hinings, 2012; Reay & Hinings, 2009).

Institutional logics provide a framework for theory and research to analyse "organizations, markets, industries, inter-organizational networks, geographic communities, and

organizational fields" (Thornton & Ocasio, 2008, p. 106). Dominant logics are established by advantaged actors within a field who set operational guidelines (Brint & Karabel, 1991; DiMaggio & Powell, 1983; Fligstein, 1993). When a new logic enters a field, tensions arise until one logic dominates or a hybrid emerges (DiMaggio & Powell, 1983; Glynn & Lounsbury, 2005; Hensmans, 2003; Hoffmann, 1999; Thornton et al., 2005).

A common approach in the existing literature is to discuss institutional logics from a dichotomous perspective with social and market logics as opposing extremes (Tuckerman et al., 2024). Market logic emphasizes hierarchical decision-making for resource efficiency and profitability, while social logic focuses on addressing social needs and creating positive change (Pache & Santos, 2013; Tuckerman et al., 2024). Tuckerman et al. (2024) introduced community logic to bridge the gap between these extremes, giving priority to community needs and values.

Research showed that multiple institutional logics can coexist within organizational fields. Reay and Hinings (2009) explored how organizations navigated conflicting logics in Canada's healthcare sector, identifying mechanisms to manage rivalry between medical professionalism and business-like healthcare. Pinch and Sunley (2015) examined the shift from social care logic to market logic in social enterprises, highlighting how managers balance competing logics. In sports, Skirstad and Chelladurai (2011) showed that multiple logics can coexist within a multisport club, indicating its membership in several organizational fields.

To summarize this, organizational fields, where multiple institutional logics exist or occur over time, are subject to tensions. These tensions can be managed through collaborative relationships. Kenis and Knoke (2002) observed, that in most institutional theory, particularly while analysing organizational fields, explicit network elements are absent. As a solution, they combined the amorphous field with the abstract network concept in the *organizational field network concept*. An organizational field network is defined as "a configuration of interorganizational relations among all the organizations that are members of an organizational field" (Kenis & Knoke, 2002, p. 275).

The above-discussed theoretical concepts are important to understanding esports' unique characteristics and stakeholders, interconnected in a distinct business model network. This will be highlighted in the next section with a focus on esports' historical development and its ecosystem.

3. Research context

3.1. Esports – A brief history

Video gaming developed because of advancements in computer technology. Early games like Bertie the Brain (1950) and Spacewar! (1962) were among the first to bring competitive elements into video games (Zhouxiang, 2022). The Intergalactic Spacewar Olympics is considered the first competitive gaming event and was hosted by Stanford University in 1972 (Taylor, 2012). During the 1970s and 1980s, the rise of commercial video games and organized tournaments started to connect video gaming with competitive elements (Borowy & Jin, 2013; Kubey, 1982; Zhouxiang, 2022).

In the 1990s, the availability of personal computers and technological advancements in internet access revolutionized gaming. South Korea, with its PC bangs[2] and high-speed internet availability, pioneered regulated esports at this time (Borowy & Jin, 2013; Seo, 2013), building a successful ecosystem that had a global impact (Jin, 2010; Pizzo et al., 2022). During this time, the community played a crucial role, as many of today's major esports titles emerged from game modifications created by passionate individual enthusiasts detached from commercial interests. These "mods" laid the foundation for important esports titles like Counter-Strike and DotA 2. This underscores the crucial role that the community has played in shaping the esports ecosystem as it exists today (Ashton, 2019; Xue et al., 2019). In general, a community forms around a specific game or genre, consisting of players and fans who interact in a virtual environment (Peng et al., 2020; Xue et al., 2019).

In the 2000s, international tournaments experienced significant growth (Scholz, 2019). The engagement from game publishers, funders and esports teams was key to establishing recognized international competitions and turning esports into a thriving industry and mainstream (Pizzo et al., 2022).

Today, esports has grown from a niche activity into a global phenomenon, with professionally organized leagues and tournaments across a wide range of games and genres[3]. This shift has created a complex network with many different stakeholders which will be discussed in the following section.

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[2] Former internet cafés in South Korea (Seo, 2013).

[3] See Pizzo et al. (2022) for a brief overview of existing genres and games.

3.2. The esports ecosystem

Several frameworks have been developed to map stakeholders and their relationships, depending on context and perspective (Pizzo et al., 2022)[4]. A recent approach applies the concept of business model networks to esports (Jin, 2022). Scholz (2019) describes the esports industry as a network of interconnected stakeholders, each with its own business model. However, these separate models are linked, forming a unified business model network where resources and profits are shared to sustain the ecosystem. Scholz's overall business model framework (Figure 1) organizes stakeholders into concentric layers, with players, "subsequently, the target audience and the customer" (Scholz, 2020, p. 7), at the centre. This structure encourages efficient operation, mutual benefits, and the growth of the overall network (Scholz, 2019).

A key concept in such a network is "coopetition", where stakeholders, despite being competitors, cooperate to develop a shared vision and develop a unified industry strategy (Bouncken et al., 2015; Scholz, 2019). This collaboration helps organizations to align their goals and strategies, benefiting the entire industry (Scholz, 2019). This approach, known as co-destiny (Davidow & Malone, 1992), combined with coopetition, can converge the business model network, driving collective success and innovation (Scholz, 2019).

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[4] See Besombes (2019) for several context-specific frameworks.
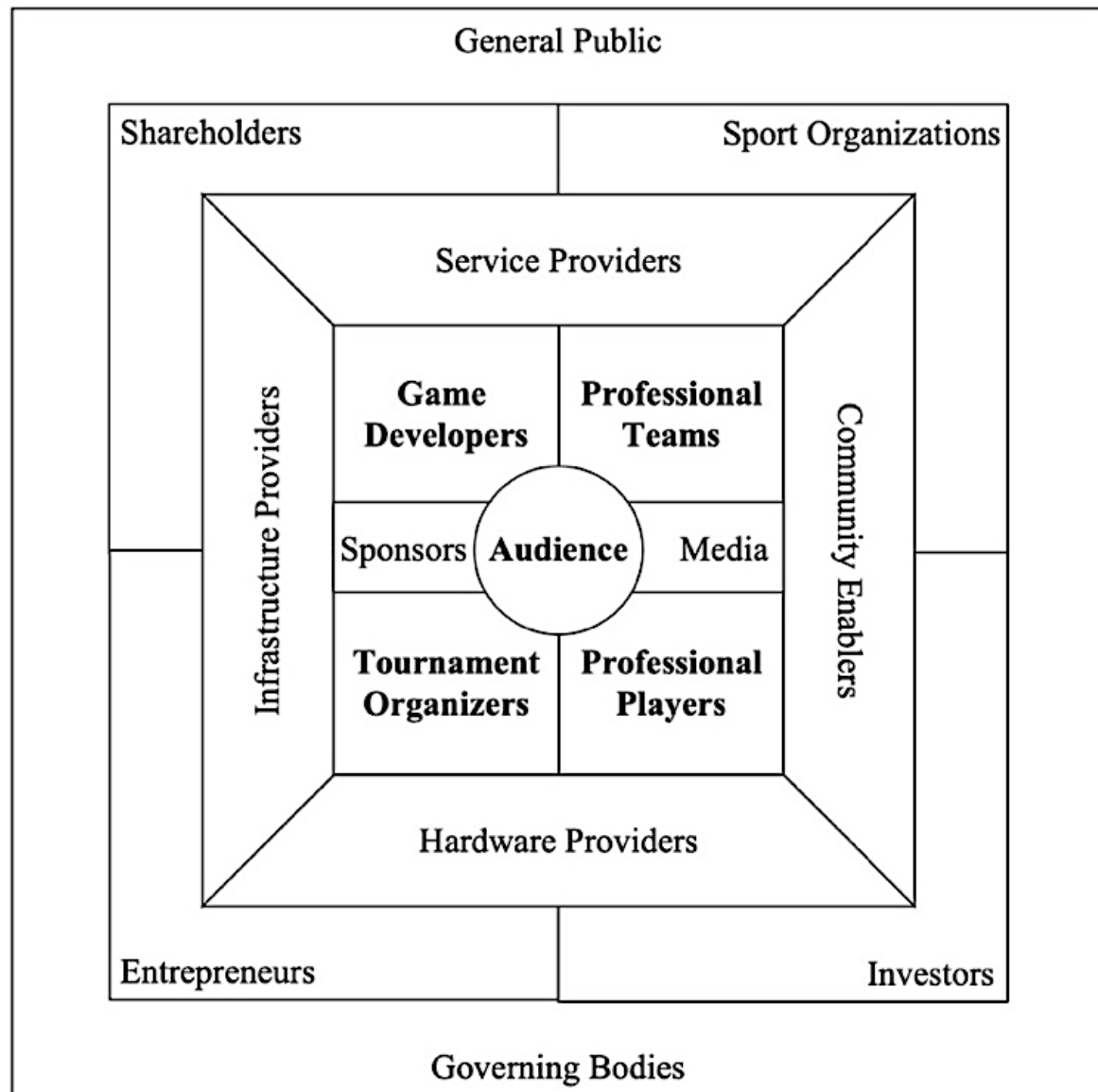
Figure 1. The esports business network (Scholz, 2019)

Scholz (2019) emphasized that esports is a dynamic environment, where constant changes and tensions arise as new stakeholders join the network. Peng et al. (2020) highlighted the need to include esports associations, federations, and other non-profit organizations as new stakeholders. These actors introduce important social mechanisms and exchange conditions into the business network. While these non-profit actors might seem irrelevant from a business perspective, ignoring them can limit the understanding and sustainability of the ecosystem from a governance standpoint. Accordingly, Peng et al. (2020, p. 7) argued: "Despite the discrepancies in their governing approaches, the role of publishers is essentially similar across various esports and was perceived to be at the centre of the esports governance

network". This perspective contrasts with Scholz's business model network, which places the audience/players at the centre.

In conclusion, incorporating non-profit actors adds another layer of complexity, requiring reconsidering the esports business model to ensure sustainable governance. The different perspectives and competing interests create tensions among stakeholders. This highlights the need for further research on esports governance. This dissertation comprises three scientific articles on esports governance, each utilizing distinct methodological approaches, which will be detailed in the following section.

4. Methodological approach

This section highlights the methods used in this dissertation and provides an overview of the logical and thematic connections between the scientific articles. It also briefly highlights the author's learnings through the application of different research methods.

The main goal of research is to generate knowledge. This is done using different methodological approaches which suit the research context and questions (Schönberner, 2022). Scientific research often uses either qualitative or quantitative methods. While many believe that qualitative research is circular and inductive, and quantitative research is linear and deductive, both approaches share important similarities in objectivity, perspective, and data analysis. Recognising this helps to bridge the gap between the two, encouraging a more integrated approach (Baur, 2019).

Combining methods, known as "triangulation", was first introduced by Webb et al. (1966). While triangulation is often associated with scientific rigour and precision, it is more than just a bridge between quantitative and qualitative research. It should be seen as a fundamental principle for any research that seeks to advance scientific knowledge (Oppermann, 2000).

This dissertation consists of three articles investigating esports governance, using both quantitative and qualitative research methods *throughout* the studies. Scientific article 1 is based on a purely qualitative approach. The second article combined both qualitative and quantitative methods, while the third article followed a quantitative approach.

Academic research often distinguishes between conceptual and empirical research *within* studies, though many studies integrate both. Conceptual research focuses on developing theories and concepts, while empirical research tests these ideas using data (MacInnis, 2011). The three articles on esports governance are interconnected empirical studies that integrate

both conceptual and empirical approaches. Each article begins with a conceptual framework to define key concepts and set the context, followed by using qualitative or quantitative data to empirically answer the research questions.

All three studies centred around specific cases. According to Flyvbjerg (2011), selecting a case is about deciding what will be explored, rather than choosing a specific method. An individual case can be studied in various ways (e.g., qualitatively, quantitatively, analytically, hermeneutically, or through mixed methods). By focusing on specific cases, the author gained valuable and deeper insights into esports governance which can be a basis for future studies. Figure 2 summarizes the overall methodological approach of this dissertation on esports governance.
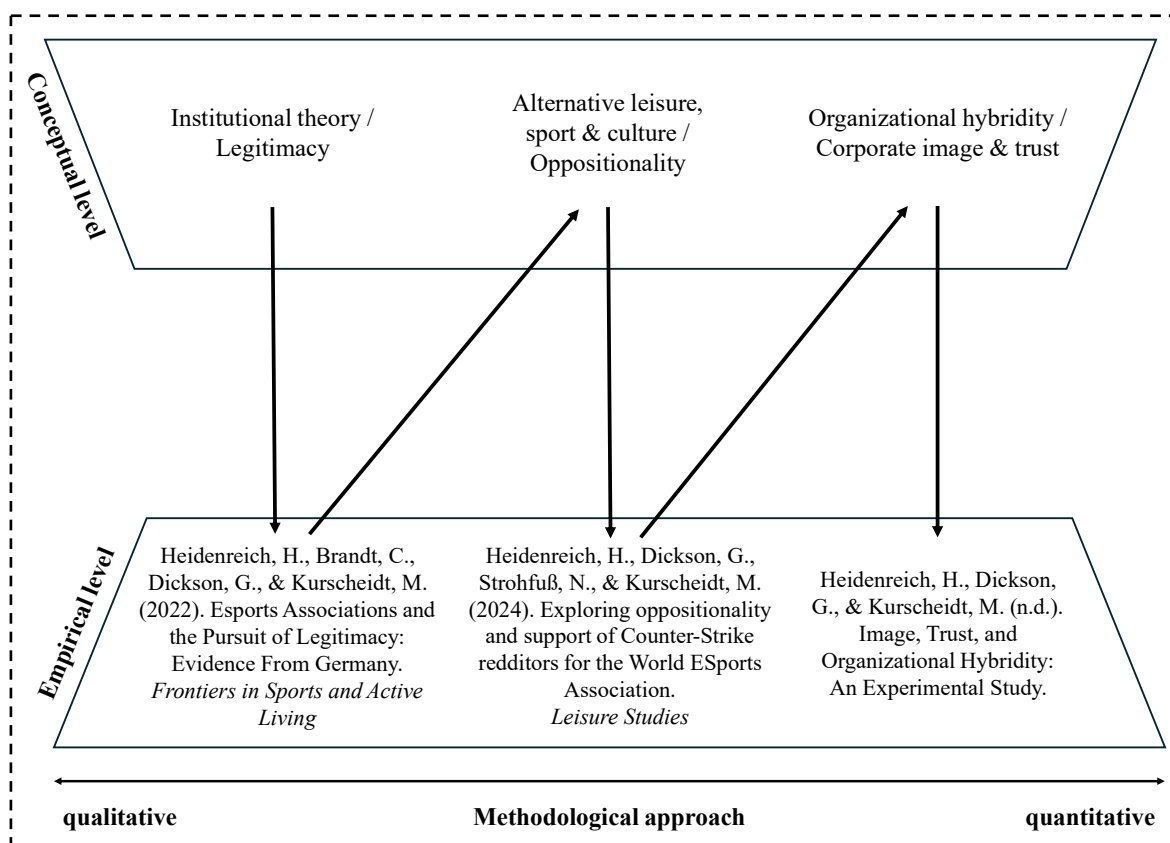
Figure 2. Methodological framework (own illustration)

Scientific article 1 explores governance practices in two esports associations by conducting qualitative interviews and analysing documents to uncover their operations, structures, and strategies for gaining legitimacy. The data was analysed using Kuckartz's (2014) qualitative content analysis with MAXQDA12 software. The study focused on the World eSports Association (WESA) and the eSport-Bund Deutschland (ESBD). Interviewees criticized that

these associations struggle with awareness and recognition, which aligns with previous studies recognizing resistance within the esports community towards institutionalization (Hayday et al., 2021).

Scientific article 2 builds on these findings by analysing fans' sentiments expressed on Reddit about associational governance models, with a focus on WESA. The study used sentiment analysis to classify comments as positive, neutral, or negative, collected between July and October 2022. The qualitative data was then analysed using quantitative frequency analyses and further explored through qualitative content analysis. This approach provided a nuanced understanding of fan sentiments on associational structures.

Scientific article 3, inspired by fans' criticisms of esports associations found in scientific article 2, initially aimed to explore the potential role of game publishers as governing bodies. However, after discussions with co-authors, the focus expanded to examine organizational hybridity and how hybrid organizational identities impact external perceptions of corporate image and trust. The study tested these ideas using scenarios involving Riot Games' different identities – as a publisher, a governing authority, and a socially responsible organization. A single-factor, between-subjects experiment was conducted, with data analysed using SmartPLS 4 and Stata/SE (version 17).

Throughout these studies, the author developed important skills in different methodological approaches. Both qualitative interviews and document analysis in scientific article 1 laid the groundwork for case study research. Sentiment analysis in scientific article 2 challenged the author to work with large text datasets, highlighting the importance of manual coding techniques. Scientific article 3 provided experience in designing and conducting quantitative experiments, testing hypotheses, and using statistical software to analyse consumer perceptions. This underscores the value of combining conceptual and empirical research, showing that a strong theoretical base and clear methodological approaches enhance the interpretation of data. Using diverse methods offered a solid understanding of esports governance from different angles.

5. Publication strategy and author contributions

Scientific articles 1, 2 and 3 were developed within a comprehensive and sequentially structured concept (Figure 2) and form the main body of this dissertation on esports governance. Each research question emerged during the research process of the individual articles or through discussions with other researchers. Scientific articles 4 and 5 count as an

excursus. Considering the interdisciplinary nature of esports, the scientific articles were published across different academic fields.

Scientific article 1 was published in the open-access journal *Frontiers in Sports and Active Living* as part of the research topic "eSports and Digitalisation of Sports". This journal was an ideal fit, given its multidisciplinary approach to covering all aspects of sports. The first article offers an overview of esports governance and explores the legitimacy of established esports governing bodies. The lead author (further: the author) conceived the initial idea with Markus Kurscheidt and Geoff Dickson and was responsible for collecting and analysing data from documents and interviews and writing the first draft. Ongoing discussions with co-authors Christian Brandt, Geoff Dickson, and Markus Kurscheidt helped refine the draft.

Scientific article 2, titled "Exploring oppositionality and support of Counter-Strike redditors for the World Esports Association" examines esports' sportification process and its ongoing transformation from a former leisure activity into a sports activity. Given this focus, *Leisure Studies* was chosen as the target journal for this article. The author led the research process from the initial idea to data analysis, developing the theoretical framework in collaboration with Geoff Dickson and was responsible for data collection and analysis. The author also wrote the first version of the manuscript. Nikolas Strohfuß was involved in the data coding process. Geoff Dickson guided the research process through intensive discussions on theory and methodology.

The idea for scientific article 3, titled "Image, Trust, and Organizational Hybridity: An Experimental Study" came from intensive discussions with the co-authors and was primarily driven by the author in collaboration with Geoff Dickson. Geoff Dickson helped refine the study by defining the correct terminology and sharpening the study's focus. The author was responsible for the experimental design, creating the online questionnaire, and collecting the data. Additionally, the author cleaned and analysed the data. Markus Kurscheidt reviewed the data and contributed his expertise in data analysis. This included performing additional robustness tests to ensure accurate results. At the time of the dissertation's submission and evaluation, the study had been under review by Sport Management Review. Ultimately not being accepted for publication, it is currently revised for submission to another high-impact peer-reviewed journal.

Scientific article 4, "Energy Expenditure during eSports – A Case Report" was published in the *German Journal of Sports Medicine*, a leading journal in German sports medicine during the COVID-19 period. Scientific article 5, "Acute Effects of Esports on the Cardiovascular

System and Energy Expenditure in Amateur Esports Players" is a follow-up study and was published in *Frontiers in Sports and Active Living* under the research topic "Sedentary Behavior and Health Outcome. Origins, Mechanisms and Policy".

The author initiated both collaborative research projects with the Department of Exercise Physiology and Metabolism to explore esports and its relation to traditional sports from a physiological perspective. In both articles, the author contributed his expertise in esports, primarily supporting the lead authors, Sandra Haupt and Rebecca Zimmer, in recruiting participants. The author also collaborated on developing the theoretical framework, ensuring accurate definitions of esports, terminology, and contextual relationships. The laboratory work was conducted by Rebecca Zimmer, Sandra Haupt, and Alina Wolf. They developed the test protocols, which were approved by the local ethics committee of the University of Bayreuth. Together with the author and chair lead Walter Schmidt, they co-wrote the initial drafts and all authors participated in the final revision of the respective article.

Table 1 provides a detailed overview of the scientific articles, the selected journals for publication as well as the author's contributions to each research project.

Table 1. Author contributions

	Title	Year	Journal	Authors	Study Design*	Data Collection	Data analysis	First draft**	Final Revision***	Journal Revision****
Esports Governance	Esports Associations and the Pursuit of Legitimacy: Evidence From Germany	2022	Frontiers in Sports and Active Living	Heiko Heidenreich (HH) Christian Brandt (CB) Geoff Dickson (GD) Markus Kurscheidt (MK)	HH, GD, MK	HH	HH, CB	HH, CB, GD, MK	HH, CB, GD, MK	HH
	Exploring oppositionality and support of Counter-Strike redditors for the World ESports Association	2024	Leisure Studies	Heiko Heidenreich (HH) Geoff Dickson (GD) Nicolas Strohfuß (NS) Markus Kurscheidt (MK)	HH, GD	HH	HH, NS	HH, GD	HH, GD, MK, NS	HH, GD
	Image, Trust, and Organizational Hybridity: An Experimental Study	nd	Currently being revised for re-submission.	Heiko Heidenreich (HH) Geoff Dickson (GD) Markus Kurscheidt (MK)	HH, GD, MK	HH	HH, MK	HH, GD	HH, GD, MK	-
Excursus	Energy Expenditure during eSports – A Case Report	2021	Deutsche Zeitschrift für Sportmedizin/ German Journal of Sports Medicine	Sandra Haupt (SH) Alina Wolf (AW) Heiko Heidenreich (HH) Walter Schmidt (WS)	SH, AW, HH	SH, AW, HH	SH, AW	SH, AW, HH	SH, AW, HH, WS	SH, AW, HH, WS
	Acute Effects of Esports on the Cardiovascular System and Energy Expenditure in Amateur Esports Players	2022	Frontiers in Sports and Active Living	Rebecca Zimmer (RZ) Sandra Haupt (SH) Heiko Heidenreich (HH) Walter Schmidt (WS)	RZ, SH, HH	RZ, SH, HH	RZ, SH	RZ, SH, HH	RZ, SH, HH, WS	RZ, SH

*Initial idea, theoretical & conceptual framework, methodological approach; ** First written manuscript draft; *** Final manuscript revision before submission; ****Manuscript revision(s) after journal feedback

6. Findings on esports governance

6.1. Scientific article 1: Esports Associations and the Pursuit of Legitimacy: Evidence From Germany

Scientific article 1 serves as a starting point for this dissertation. It explores common legitimacy strategies from neo-institutional theory, specifically looking at the WESA and the ESBD as cases.

Traditional sports are governed by a complex network of independent, non-profit organizations, with international federations serving as the apex bodies (Chappelet, 2010). In contrast, esports lacks such a hierarchical structure and regulative standards are missing. Instead, esports is primarily regulated by game publishers, who are the key stakeholders in a network of profit-driven entities (Peng et al., 2020). As esports continues to grow, non-profit associations and federations entered the esports' business-driven network. However, their involvement raises tensions and questions about their legitimacy.

This study primarily draws on institutional theory, focusing on the concepts of isomorphism and legitimacy. Isomorphism refers to the phenomenon where organizations within a specific field align structurally and behaviourally to counter external pressure and expectations (DiMaggio & Powell, 1983). This alignment combined with legitimacy strategies (conformance, selection, manipulation, and creation) can effectively secure an organization's legitimacy (Suchman, 1995; Zimmerman & Zeitz, 2002).

The study employed a qualitative case study design, using documents and semi-structured interviews as data sources. Documents included official publications, reports, and online content from both associations. Semi-structured interviews with key stakeholders were conducted to uncover the strategies each association used to gain legitimacy.

The findings reveal that WESA and ESBD primarily focus on conformance and manipulation. Both align with traditional sports associations by adopting similar structures, such as non-profit status and member representation. WESA's manipulation strategy involves engaging with commercial stakeholders and operating in a closed system. In contrast, ESBD emphasizes political lobbying and partnerships with successful organizations across esports.

An important finding is the concept of partial legitimacy. Both WESA and ESBD can achieve partial legitimacy due to the fragmented esports ecosystem and the dominance of

publishers. While adopting structures from traditional sports can secure legitimacy (DiMaggio & Powell, 1983), this approach is less effective in esports. Imitations should be adapted to esports specificities. Additionally, relying on manipulation as a strategy is fragile, as many objectives require partnerships or government support, increasing dependence. Associations should focus on a stakeholder-oriented approach, filling niches such as tournament organization or talent promotion.

6.2. Scientific article 2: Exploring oppositionality and support of Counter-Strike redditors for the World ESports Association

Participants interviewed in study 1 emphasized esports fans as key stakeholders within the network, highlighting its historically shaped self-image. Study 2 underscores the crucial role of fans in shaping the future growth of the esports network (Donnelly, 2008). In doing so, this study examines sentiments from fans within a Counter-Strike community towards the WESA.

The transformation of video gaming from a casual activity into competitive esports, known as sportification, has led to adopting structures from traditional sports (Heere, 2018). However, esports communities are strongly opposed to organisations that try to exploit them (Huettermann et al., 2020). Many self-proclaimed esports associations exist, but there might be resistance within the community towards such organizations (Hayday et al., 2021).

This study examines Counter-Strike Redditors' sentiments towards WESA through sentiment analysis using a manual coding approach. From 861 Reddit comments, 938 sentiments were extracted[5]. Negative sentiments outweighed positive ones, with 77% of comments being negative, 19% neutral, and 4% positive. The primary negative sentiments focus on the perceived disbenefits of WESA's influence, including concerns about monopolization, poor governance, and corruption. Commenters criticize WESA for restricting competition and aligning too closely with its parent company, the Electronic Sports League. Despite the negativity, some comments highlight potential benefits, such as improved player conditions, standardized regulations, and the potential to legitimize and grow esports.

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[5] A single comment can express multiple sentiments simultaneously.

The results confirm that the esports community opposes institutionalization and boundaries (Hayday et al., 2021) and institutions that seek to gain advantages at the cost of communities are being rejected (Huettermann et al., 2020). Furthermore, the study highlights that esports is stuck in its institutionalization process due to publisher dominance and the absence of an overall governing body. However, positive sentiments align with the findings of scientific article 1, suggesting that associations can effectively play a supportive role within the profit-driven esports network, even if tensions arise due to opposed interests.

6.3. Scientific article 3: Image, Trust, and Organizational Hybridity: An Experimental Study

In scientific articles 1 and 2, the focus was on exploring the role of non-profit associations in esports. The findings indicated that these organizations lack regulatory authority, and the esports community tends to resist structured governance and formal institutionalization. Therefore, this study initially aimed to analyse if publishers, beyond their primary role as publishers, function as de facto governing bodies. However, the focus expanded to address consumer perceptions of corporate image and trust within hybrid organizations.

In doing so, scientific article 3 builds on the concept of organizational hybridity, where organizations expand their activities beyond their original scope, sometimes incorporating conflicting elements to manage external and internal pressures (Mair et al., 2015; Pache & Santos, 2013; Vakkuri & Johanson, 2018; Meyer & Rowan, 1977; Selznick, 1957; Stinchcombe, 1965). Using the publisher Riot Games, study 3 investigates how gaming consumers perceive different identities of the organization – publisher, governing authority, and socially responsible organization. While prior research has primarily focused on internal stakeholder perceptions, the study uniquely sheds light on external stakeholder perspectives, particularly in the context of the rapidly evolving esports market.

The study employed a single-factor, between-subjects experimental design to evaluate consumer perceptions of Riot Games' corporate image and trust across different identities, with participants randomly assigned to one of three experimental groups. A total of 507 participants completed the online questionnaire between October and December 2023. The research consists of two distinct experimental studies. Study 1 explores differences in perceived corporate image across the groups, focusing on antecedents that may influence corporate image. Study 2 investigates the relationship between corporate image and trust perceptions while accounting for the confounding effects of esports and brand fan identity.

No significant differences in corporate image were found across the identities of publisher, governing authority, and CSR, with Riot Games' identity as a publisher dominating perceptions. The CSR identity was seen as less credible, potentially harming corporate image and trust. Expertise, integrity, benevolence, and shared values significantly shaped corporate image, while communication did not play a major role, especially in the esports context. The study confirmed a strong link between corporate image and trust, with brand fan identity positively influencing both cognitive and affective trust, while esports fan identity mainly impacted affective trust, highlighting the emotional nature of competitive gaming. The results offer valuable insights into the complexity of managing organizational hybridity in esports and highlight that gaming consumers may not fully embrace this hybridity.

7. Findings excursus

While researching esports governance, the author became engaged in debates, both academic and public, about whether esports is a real sport or not. The global COVID-19 pandemic, beginning in 2020, accelerated this discussion as the cancellation of many traditional sports events enhanced the perception of esports as an alternative among younger generations.

Initial research on this topic revealed two key scientific articles in 2018. Jenny et al. (2017) explored whether esports meet the definitional criteria of a sport, while Hallmann and Giel (2018) analysed the applicability of five essential characteristics of sports to esports. Furthermore, experts note that esports athletes experience stress levels like those of traditional sports athletes (Schütz, 2016).

In his research on esports' institutionalization process (scientific article 2), the author examined the concept of sportification, which is crucial for understanding the transformation of a recreational activity into a sport-like discipline (Heere, 2018). This prompted him to question the term "sport" within esports and its broader implications. Additionally, scientific article 1 highlights how the lack of recognition for esports as a sport in Germany limits the operational capabilities of associations. Although this dissertation does not address whether associations gain more influence after esports is recognized as a sport, the author aimed to contribute to this debate. To advance this effort, he proposed a collaborative research project to Walter Schmidt, the former head of the Department of Sports Physiology at the University of Bayreuth. This project, which extended beyond the author's focus on esports governance, resulted in scientific articles 4 and 5. Published in journals specializing in physiological research, these articles contribute to the ongoing discussion about the sportification of

esports and its classification as a sport, providing a foundation for further physiological studies.

7.1. Scientific article 4: Energy Expenditure during eSports – A Case Report

While esports emerged as an alternative for young people, its sedentary nature and related poor posture raised health concerns such as metabolic disturbances and mental health issues (Zwibel et al., 2019). However, experts argue that e-athletes experience cortisol levels comparable to those of racing drivers, with heart rates up to 160-180 bpm, similar to the intensity of marathon runners (Schütz, 2016). It is currently unclear whether cardiovascular stress in esports leads to increased energy expenditure, like endurance training, and if it might have positive health effects. This study is the first to compare energy expenditure during an esports session with that of a cycle ergometer exercise of similar duration, aiming to determine whether esports involves physical strain or is purely a source of mental stress.

In this pilot study, the initial idea was to investigate more than 10 participants. However, due to COVID-19 restrictions, only one participant was able to complete the entire test. An amateur esports player (32 years old, 184 cm, 60 kg) performed a 30-minute video game session on a PlayStation 4 while heart rate and spiroergometric parameters were measured. Blood samples were taken to determine lactate and glucose concentrations. On a different day, the participant completed a 30-minute cycling test, with heart rate matched to the level reached during the esports session by adjusting the exercise intensity. The same parameters were measured.

During the esports session, heart rate increased from 85 to 137 b/pm and remained elevated. Heart rate was matched accordingly during the ergometer exercise. $\dot{V}O_2$ and energy expenditure were significantly higher during the ergometer exercise (VO2-ergometer: 0.721 L/min, esports: 0.28 L/min; EE-Ergometer: 3.55 kcal/min, esports: 1.38 kJ/min). Blood glucose increased slightly during the esports unit while decreased during the ergometer exercise (esports: +0,7 mmol/L, ergometer: -2,2 mmol/L).

In summary, the results (85-137 b/pm) do not match the predicted heart rate of approximately 160-180 b/pm for e-athletes. This indicates that the physiological responses during esports significantly differ from those in traditional physical exercise and increased heart rate is not accompanied by increased energy expenditure. The positive health benefits typically linked to physical activity cannot be observed in esports. The increased heart rate is the result of a pure mental stress response. This is supported by the contrasting glucose concentration levels

in esports compared to those observed during physical exercise. The study concludes that esports cannot be considered as an alternative to traditional physical activities from a physiological perspective.

7.2. Scientific article 5: Acute Effects of Esports on the Cardiovascular System and Energy Expenditure in Amateur Esports Players

Scientific article 5 is a follow-up study, addressing the limited explanatory power of scientific article 4. It seeks to investigate how esports affects the cardiovascular system and energy expenditure in amateur players.

This study focuses explicitly on amateur esports players. Notably, there is a significant gap in research concerning the metabolic changes and cardiovascular stress associated with esports.

To assess whether esports should be classified as a purely sedentary activity or as a form of physical or mental stress, the study measured respiratory and cardiovascular parameters, energy expenditure, and levels of blood glucose, lactate, and cortisol.

The study involved thirty male amateur esports players aged 23.1 ± 3.0 years, with an average of 12.3 hours per week spent on esports. The gaming session, playing FIFA 20 or Counter-Strike: Global Offensive, was structured into three phases: pre-gaming (10 minutes), gaming (30 minutes), and post-gaming (10 minutes). Respiratory and cardiovascular parameters (oxygen uptake (O_2), carbon dioxide output (CO_2), heart rate (HR), cardiac output (CO), stroke volume (SV), respiratory exchange ratio (RER), and ventilation (VE)) were constantly monitored. Blood samples were taken to measure glucose, lactate, and cortisol levels.

The results reveal no significant changes in the following parameters during the gaming session: oxygen uptake, carbon dioxide output, energy expenditure, stroke volume, or lactate levels. However, heart rate, blood glucose, and cortisol levels significantly decreased after the gaming session. Heart rate dropped from 82 ± 11 bpm (0.5 min into gaming) to 74 ± 13 bpm ($p < 0.01$), and cortisol levels reduced from 3.1 ± 2.9 ng/ml (pre-gaming) to 2.2 ± 2.3 ng/ml ($p < 0.01$). These findings suggest that a 30-minute amateur esports session does not significantly impact metabolism or energy expenditure. The study indicates that amateur esports may not provide the health benefits of traditional sports, reinforcing the sedentary nature of gaming. Extensive hours of amateur esports per week could contribute to long-term health risks like cardiovascular disease and type 2 diabetes.

8. Discussion

This dissertation aimed to investigate emerging non-profit associational structures within the business-driven ecosystem of esports, evaluating their suitability for the industry's unique characteristics. The research examined how esports associations can seek legitimacy in a profit-oriented environment and their role alongside profit-driven entities. Five scientific articles structure the dissertation:

- **Scientific article 1** investigates the legitimacy strategies pursued by established esports associations.
- **Scientific article 2** explores esports fans' sentiments towards emerging associational structures.
- **Scientific article 3** explores consumer perceptions of Riot Games' corporate image and trust, towards its hybrid identities as a publisher, governing authority, and socially responsible organization.
- **Scientific articles 4 and 5** contribute as an excursus to the ongoing debate on recognizing esports as real sports and comparing physiological parameters in esports with traditional sports.

Across the articles, this dissertation reveals the following key insights:

- **Role of associations:** Esports operates as a closed, profit-driven system dominated by game publishers. This creates a legitimacy gap for non-profit esports associations, relegating them to supportive roles. By filling niches within the business ecosystem, they can gain partial legitimacy.
- **Fans' Oppositionality and support**: Fans as an essential part of the esports ecosystem often resist and reject associational structures. Despite mainly negative sentiments, fans still assign a supportive role to these associations.
- **Publishers' hybrid identities**: Gaming consumers primarily support publisher dominance. While their focus remains on producing and selling games, they are increasingly responsible for managing and nurturing their gaming communities, balancing commercial objectives with community engagement. These different identities are rarely recognized by consumers and, in some cases, are even viewed critically.
- **Excursus:** Esports primarily induce mental stress rather than physical exercise. While engaging and entertaining, esports lack the health benefits of traditional sports.

Based on the findings, several key points have been already discussed. Scientific article 1 discussed the potential and sense of applying associational structures from traditional sports to esports, emphasizing the role of associations in supporting key stakeholders, particularly game publishers. It also discussed how gaining partial legitimacy within these structures can help associations to be more accepted and integrated into the broader esports ecosystem. Scientific article 2 discussed the esports' institutionalization and sportification process, and why esports fans' oppositionality tends to be short-lasting with limited impact on governance structures. Scientific article 3 discussed the lack of awareness among fans regarding the different identities of game publishers and how distinct antecedents can contribute to affective image management.

The author will put the results and discussions into context by examining them through network governance and multiple institutional logics. This analysis highlights the critical role of non-profit actors in the esports ecosystem and how they can be integrated into a profit-focused environment. The argument is that esports associations can contribute to the balance and integrity of the esports business landscape by filling the gaps left by profit-driven entities, effectively bridging the gap between the market and social logic through community logic.

Macey et al. (2021) highlight that esports' rapid growth and grassroots nature make it difficult to establish cohesive governance. While various esports associations try to implement traditional governance structures, Peng et al. (2020) argue that these models do not fit well with esports' unique dynamics. This aligns with scientific article 1, which shows that associations can effectively engage stakeholders and can build partial legitimacy by focusing on specific niches. Similarly, Kelly et al. (2022) and Scholz (2019) argue that a one-size-fits-all governance approach is unsuitable for esports due to its diversity and constant evolution, suggesting a more tailored and flexible approach instead.

The concept of a business model network can be such an approach. Scholz (2019) offers a general business model network and places players at the centre as the main profit drivers (Figure 1). However, this player-centric focus may not be ideal for esports governance. Peng et al. (2020) identified associations and federations as new stakeholders entering the network. They emphasized that game publishers, as intellectual property holders, must be considered as the dominant actors in esports governance. This is supported by findings from the scientific articles. Given this perspective, the esports ecosystem can be better understood through the concept of an organizational field network, where all stakeholders are considered

part of an organizational field connected by inter-organizational relationships (Kenis & Knoke, 2002). This approach can foster cross-sector collaboration among multiple actors (Bryson et al., 2006; Conteh, 2013; Gutterman, 2023) while also enhancing the legitimacy of associations within the network (Provan & Kenis, 2007). Additionally, this approach can also promote coopetition which is common and essential for the beneficial development and convergence of the overall network (Bouncken et al., 2015; Scholz, 2019).

Building on this, when new stakeholders join an established network, conflicts of interest can create tensions. This is evident in esports, where tensions arise, such as fans opposing esports associations as new stakeholders entering the network (scientific article 2). Institutional theory explores these tensions by examining the existence of multiple and sometimes conflicting logics within a field (DiMaggio & Powell, 1983; Glynn & Lounsbury, 2005; Hensmans, 2003; Hoffmann, 1999; Thornton et al., 2005).

Multiple logics can coexist even if one may dominate (Pinch & Sunley, 2015; Reay & Hinings, 2009; Skirstad & Chelladurai, 2011). Literature often discusses social and market logic as two extremes (Tuckerman et al., 2024). In esports, both logics exist. The dominant one is market logic, with actors focusing on profit-sharing to sustain the business model, supported by a large audience (Scholz, 2020) which exists and engages mainly on virtual platforms in different communities (Peng et al., 2020). The social logic is evident in esports' vibrant community culture and non-profit historical developments, where early enthusiasts modified games and organised the first tournaments (Ashton, 2019; Xue et al., 2019). These communities foster connections among players and fans while sharing common interests in and interacting with the respective games they play (Xue et al., 2019). Bridging this gap between market and social logic is considered community logic (Tuckerman et al., 2024).

Esports associations can act as this bridge. On the one side, they must think more economically and entrepreneurially while interacting with the business actors to gain legitimacy. On the other side, they can support esports' grassroots development to make the fragmented landscape more coherent. These results align with Strittmatter et al. (2019), introducing an *in-between*-logic bridging two diverging logics (industry- and nation-based logic) to counter fragmentation in international freestyle snowboarding. Figure 3 summarises the idea of bridging market and social logic with community logic.
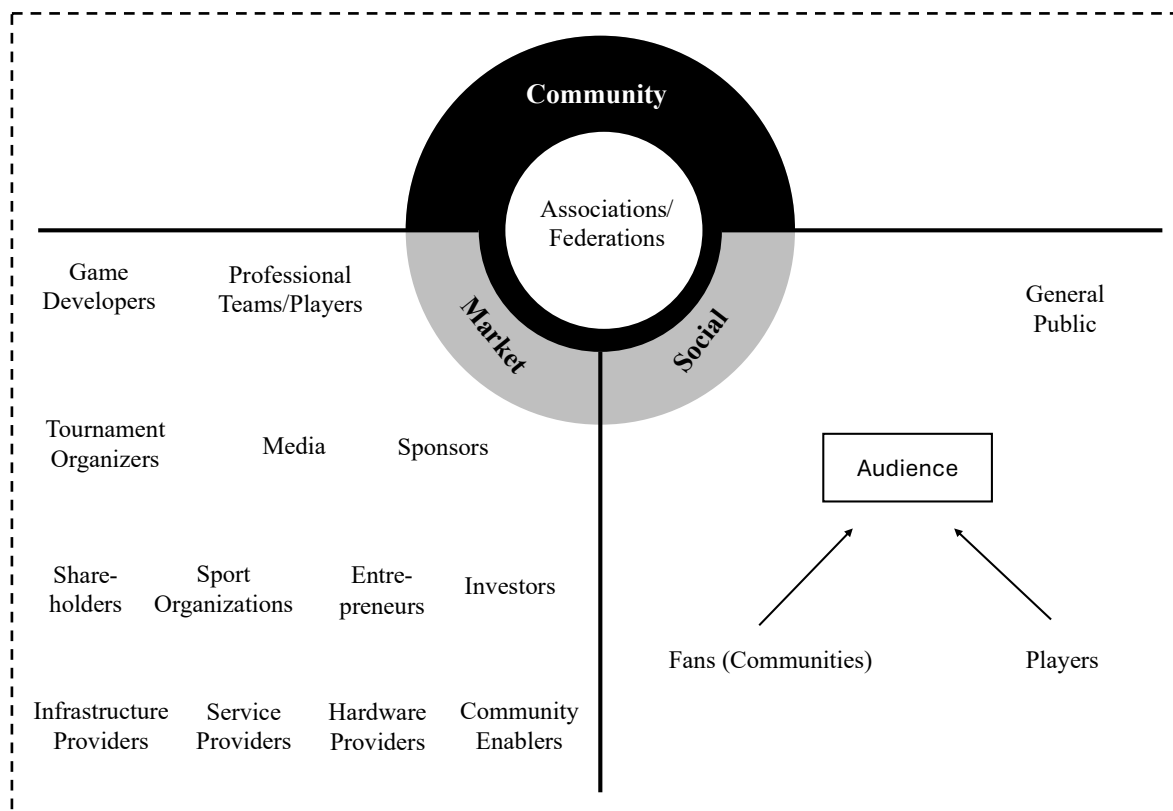
Figure 3. Market, social and community logic within the esports field network (own illustration)

In Figure 3, stakeholders following the market logic are adapted from Scholz's (2019) business model network (Figure 1). The esports audience, consisting of players and fans, together with the general public, embodies the social logic (Scholz, 2020). The general public plays a crucial role as a platform for social discourse on the pros and cons of esports, acting as a key stakeholder that shapes and reflects esports' social surroundings (Scholz, 2019). These perspectives and discussions influence how esports is perceived and understood within society. Associations and federations are illustrated as a link between the market and the social logic. This aligns with Peng et al. (2020), who argue that publishers primarily focus on elite esports, showing limited interest in governing the broader ecosystem. It also supports findings from scientific article 3, which emphasizes that publishers are mainly recognized for their core role in video game production. By taking on responsibilities beyond the publishers' focus, other actors, such as associations or federations, can step in and take on a regulatory role (scientific article 1), facilitating network governance. However, legitimacy issues remain (Provan & Kenis, 2007). Scientific articles 1 and 2 have shown that associations, particularly their roles and functions, are not well known among fans and other stakeholders. A recent study by Schubert et al. (2024) has confirmed this. A sustainable network requires high status and credibility of all internal and

external groups (Peng et al., 2020). This must first be accomplished by new stakeholders, such as associations and federations, also towards fans and other stakeholders. Otherwise, tensions arise, and these new stakeholders may be rejected (scientific article 2).

While this dissertation provides valuable insights, it is important to acknowledge certain limitations that suggest opportunities for further research. The classification in Figure 3 represents governance at an overall network level. However, the esports network is composed of many distinct business models (Scholz, 2019). Future research on esports governance should explore the concept of multiple business model networks within the ecosystem, forming an interconnected business model network (Scholz, 2019). It would be valuable to investigate how these distinct business models interact with esports associations and how they incorporate non-profit structures into their operations.

The focus on specific cases, such as the associations in scientific articles 1 and 2 and Riot Games as a publisher in scientific article 3, means that the findings may not be universally applicable. South Korea serves as a pioneer in global esports, where the industry is culturally embedded. Esports' varying levels of acceptance across different countries can significantly impact the effectiveness and perception of associations (Peng et al., 2020). Applying the theoretical and methodological approaches from this dissertation to other contexts, such as the Korea e-Sports Association (Taylor, 2012), could offer new insights into the association's acceptance among fans and their perceptions of associational structures. Furthermore, while Riot Games' regulatory approach is a focal point of this dissertation, other publishers adopt different strategies (Scholz, 2019). Exploring external perceptions in cases involving other publishers could lead to valuable comparisons highlighting diverse regulatory approaches. By addressing these limitations, future research can expand the scope of esports governance studies, providing a broader understanding of the industry's dynamics across various cultural and regulatory landscapes. Research in this area is underway. The author, in collaboration with Leon Janßen from the University of Bayreuth and Felix Wachholz from the University of Innsbruck, is conducting a comparative study to understand fans' perceptions of esports associations in Germany (ESBD) and Austria (eSport Verband Österreich). Despite the geographical and cultural similarities between the two countries, both esports associations differ significantly in terms of maturity and established structures. The manuscript is submitted to the special issue "Integrity, Health and Governance Issues in Esports and Virtual Sports" in *Performance Enhancement & Health*.

Gaming has become a global phenomenon, fascinating millions worldwide as a form of leisure entertainment and esports on a professional level. However, the term "sports" in esports remains controversial, as it challenges the traditional definition of sports, which typically involves physical and motor skills. This terminology also risks downplaying serious health issues linked to gaming, such as sedentary lifestyles or other serious dysfunctions (Zwibel et al., 2019). Although being considered as an excursus, scientific articles 4 and 5 provide valuable insights, not just from a physiological perspective but also concerning esports ongoing sportification process. Sportification has led to the transformation of former leisure activities into recognized sports (Heere, 2018; Strittmatter et al., 2019). As illustrated in scientific article 2, esports is stuck in its sportification process. Significant health risks can contribute to this. Therefore, it is important to continue research on esports in the medical and physiological fields. Both studies only provide short-term effects. Further research can focus on the long-term effects of prolonged gaming sessions. A comparison to overtraining in traditional sports can be another valuable research approach. However, at this point, it is important to note that using traditional sports to explain esports is challenging, as sports often lack a clear definition themselves and the debate over what qualifies as a sport or not is mainly political (de Zoeten & Koenecke, 2023). Physiological parameters are just one of many criteria in this discussion. Furthermore, the International Olympic Committee's (IOC) decision to introduce the Olympic Esports Games as a standalone event in Saudi Arabia starting in 2025 – and continuing for 12 years – marks a new phase in esports' institutionalization process (International Olympic Committee, 2024). This raises questions about how the IOC will approach esports governance, given the fragmented nature of regulatory structures, diverse gaming communities, and variable governance models across different regions. It also prompts reflection on how such international recognition might influence whether esports is officially classified as a sport or considered to serve the public interest, particularly in countries where it has not yet been formally acknowledged.

This dissertation examined the presence of multiple logics in esports, offering insights that can help manage diverging logics in other emerging sports activities as they develop into organized sports. A current example is Roundnet, an activity initially organized and regulated by Spikeball, the commercial brand that invented the game. As a result, both terms are often used interchangeably for naming the game (Ludwa & Lieberman, 2018; Paul et al., 2024). While research on Roundnet/Spikeball is limited, and no scientific articles currently address its upcoming development on governance and regulation, parallels can be drawn to

esports and snowboarding (Strittmatter et al., 2019). The governance research in this dissertation and beyond can guide practitioners in understanding multiple, often conflicting logics in emerging activities and how to navigate them. Moreover, they need to understand that these emerging activities are often deeply connected to their communities, whose needs and perspectives must be considered.

This dissertation adds to the ongoing discussion about esports governance by offering a detailed analysis of how non-profit associations can fit into the unique landscape of esports. The research findings show that integrating new stakeholders, such as associations, into the existing business model is a complex task. However, these associations can gain partial legitimacy by adopting a supportive role that complements the activities of other stakeholders within the ecosystem. Even though esports fans are often sceptical about regulatory structures, there's a growing acknowledgement of the potential benefits that associations can add, such as better regulation, player protection, support, and the promotion of fair competition. Therefore, positioning them as a regulative entity between the dominant market logic on the one side and the social logic on the other side can be a solution to integrate them as legitimate actors, mainly because publishers see themselves as businesses and not providers of sports. However, the future of esports governance will likely depend on the ability of these emerging associations to demonstrate their value to other stakeholders, navigate the complex relationships with game publishers, address the diverse needs of the entire network and overcome the fragmented acceptance of esports as a real sport across different cultures and countries.

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10. Appendix: Scientific articles

Scientific article 1

Heidenreich, H., Brandt, C., Dickson, G., & Kurscheidt, M. (2022). Esports Associations and the Pursuit of Legitimacy: Evidence From Germany. *Frontiers in Sports and Active Living*, *4*, 1–13. https://doi.org/10.3389/fspor.2022.869151

Scientific article 2

Heidenreich, H., Dickson, G., Strohfuß, N., & Kurscheidt, M. (2024). Exploring oppositionality and support of Counter-Strike redditors for the World ESports Association. *Leisure Studies, 43*(4), 662–676. https://doi.org/10.1080/02614367.2023.2243655

Scientific article 3

Heidenreich, H., Dickson, G., & Kurscheidt, M. (nd). Image, Trust, and Organizational Hybridity: An Experimental Study.

Currently being revised for re-submission.

Scientific article 4

Haupt, S., Wolf, A., Heidenreich, H., & Schmidt, W. (2021). Energy Expenditure during eSports – A Case Report. *Deutsche Zeitschrift für Sportmedizin/German Journal of Sports Medicine, 72*(1), 36–40. https://doi.org/10.5960/dzsm.2020.463

Scientific article 5

Zimmer, R., Haupt, S., Heidenreich, H., & Schmidt, W. (2022). Acute Effects of Esports on the Cardiovascular System and Energy Expenditure in Amateur Esports Players. *Frontiers in Sports and Active Living*, *4*, 1–9. https://doi.org/10.3389/fspor.2022.824006

Scientific article 1: Esports Associations and the Pursuit of Legitimacy: Evidence From Germany

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Esports Associations and the Pursuit of Legitimacy: Evidence From Germany

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The dominant position of esports game publishers is a fundamental difference between the systemic governance of esports and traditional sports. There are no such equivalent organizations in traditional sports. As for-profit corporations, the publishers develop and market the electronic games as their commercial products and thus, possess exclusive property rights. Publishers control the virtual sporting environment and the rules of the game. In conventional sports, by contrast, non-profit associations administer their sports with the core task of developing the sport by regulations, playing rules, and licensing. There are, however, esports associations which resemble traditional leagues and national governing bodies. Given this, we explore how esports associations pursue legitimacy. This study is empirically motivated by the recent emergence of two esports associations in the insightful case of Germany and examines the pursuit of legitimacy by the World Esports Association (WESA) and the eSport-Bund Deutschland e.V. (ESBD). The study is based on a content analysis of 55 documents and nine interviews with relevant stakeholders. The findings show that the esports associations rely on conformance and manipulation strategies by transferring existing structures from traditional sports to esports. The most effective practices are lobbying for social and public acceptance of esports and creating supportive networks for esports development. While publishers possess an undisputed and taken-for-granted legitimacy based on their product property rights, esports associations struggle for recognition and acceptance. They may still have a long way to go, given that established associations in conventional sports have a history for decades. Yet, esports associations need to accept publisher dominance. Thus, they can only claim *partial legitimacy* within the esports ecosystem by targeting segments of stakeholders. Management, policy and theoretical implications of this key insight are finally presented.

Keywords: electronic gaming, sports governance, sports organization, institutional theory, conformance, manipulation, partial legitimacy

INTRODUCTION

Since the end of the 19th century, sports have been governed by an independent and non-profit network of international and continental federations, national sports organizations, as well as local, regional/provincial sports organizations, and both amateur and professional clubs and their associated leagues. The international federations, as apex organizations, are responsible for

establishing rules and the format of international competitions (Chappelet, 2010) and are (almost always) undisputed as the legitimate governing bodies for their respective sports (Croci and Forster, 2004). However, this pyramidal structure cannot be reconciled with electronic sports (esports) because of the dominant position of corporate game publishers and developers.[1] The key component of esports—the video game—depends on digital operating systems developed by these economic enterprises (Funk et al., 2018). Peng et al. (2020) consider game publishers the essential key stakeholder in the esports ecosystem. In most cases, they are developers, publishers, and, notably, the exclusive owners of the decisive property rights (Karhulahti, 2017; Abanazir, 2018; Peng et al., 2020). As commercial enterprises, game developers primarily pursue profit-oriented intentions (Abanazir, 2018; Funk et al., 2018).

This is somewhat ironic given that many of today's most successful esports games have their origin in non-commercial modifications of existing games designed and coded by enthusiastic gamers. Thus, the concept of community has a concise self-understanding in esports (Ashton, 2019; Xue et al., 2019). In contrast to traditional sports, the gaming community could not initially rely on an already developed system of clubs and associations. Instead, publishers created structures for this target group (eSport-Bund Deutschland e.V., 2018b; Scholz, 2019). Therefore, esports lack organizational and regulatory non-profit mechanisms omnipresent in traditional sports. A regulative and recognized governing body has yet to overcome game publishers' legitimacy and market-dominating position. Nevertheless, international (e.g., International Esports Federation, World ESports Association), continental (European Esports Federation), and national associations (e.g., Korean e-Sports Association, eSport-Bund Deutschland e.V., Japan Esports Union) have emerged in recent years.

Still, esports' prevailing regulatory principles remain unidentifiable (Peng et al., 2020). Scholz (2019) argued that these principles are unwritten but recognizable—even if not at first glance. Loose structures, publisher dominance, the self-image of the individual communities, and a large number of players create a metaphorical Wild West scenario. While in traditional sports, rules, regulations and systemic hierarchies constrained organizational activities, "the eSports industry, until now, has kept its start-up mentality" (Scholz, 2019, p. 111). This freedom initially shaped esports and provides countless opportunities to develop new and innovative ideas and structures. Abanazir (2018) claims that it is almost impossible to establish an umbrella organization for esports which regulates existing games, tournaments, and publishers. A standardized approach with a rigid governance model and the transfer of narratives from traditional sports is not well suited for esports (Peng et al., 2020). This is because "eSports is a collection of competitive gaming, and therefore not governable, as sports in their entirety are not manageable." (Scholz, 2019, p. 111f.). A focus on a stakeholder-driven approach is necessary as governance is

more fruitful in this context, which focuses on specific aspects of esports, such as individual teams or games (Kelly et al., 2022). However, esports is subject to the regulations of the respective publisher. This specific setting challenges traditional understandings of sport governance, particularly the role of associations in a profit-driven industry.

Given these intriguing developments and observations on the systemic governance of esports, in-depth research on the institutionalization of esports is highly relevant. Summerley (2020) provides initial approaches by examining similarities and differences in the institutionalization of traditional sports and esports. Most existing publications are preoccupied with debating whether or not esports are sports (van Hilvoorde and Pot, 2016; Funk et al., 2018; Hallmann and Giel, 2018). In this study, we consider esports as a real economic and, above all, social phenomenon and do not engage in its status as a sport. Thus, our study is an initial attempt to better understand the organizations behind the socioeconomic phenomenon of esports. Funk et al. (2018) and Heere (2018) claim that beyond rather descriptive observations on stakeholder interests and relationships, a theoretically sound analysis of institutionalization processes in esports is missing.

Scholz (2019) systematically categorized the different stakeholders in the esports ecosystem. He differentiates between primary (i.e., game developer, tournament organizer, professional teams and players, providers, and communities) and secondary stakeholders (i.e., governing bodies, sports organizations, sponsors, general public, investors, entrepreneurs, media, and shareholders). The multidimensional character of esports is also, and above all, reflected in the variety of genres into which the various game titles can be classified. Popular esports genres are first-person shooter games (e.g., Counter-Strike: Global Offensive), multiplayer online battle arenas (e.g., League of Legends and Defense of the Ancients II), real-time strategy games (e.g., StarCraft II), and sport simulations (e.g. FIFA) (Funk et al., 2018). See Besombes (2019) for a more nuanced overview of different genres and games. According to Hamari and Sjöblom (2017), esports operate in organized formats within various leagues and tournaments at the non-elite and or elite level. Esports events are watched by live, online, and broadcast audiences and can acquire millions of viewers (Funk et al., 2018). The esports ecosystem is subject to a constant change. These include new games, new genres, new tournaments and leagues, the emergence of new shareholders, as well as mergers and acquisitions. Nevertheless, esports multidimensional and dynamic character with different players and the multitude of existing games and genres is often neglected in previous research (Scholz, 2019).

To improve our understanding of esports' novel and complex governance, we focus on recent events in the German esports industry. The German esports industry is well developed and is one of the largest revenue-generating regions in the world (Deloitte Development LLC, 2020). In terms of esports penetration, Germany (33% in total; 7% occasional consumers, 11% regular consumers, 5% hardcore consumers) lags behind its direct neighbor Poland with a total of 52% (23% occasional consumers, 20% regular consumers, 9% hardcore consumers).

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[1]We use the term *publisher* throughout for the owners of the property rights of the games. However, publishers and game developers are not always the same corporations and the division of rights may differ.

Thus, Germany is only average when compared to other European countries, lagging behind esports strongholds such as Spain and Italy (Deloitte Development LLC, 2021a). Despite this, Germany is home to many elite esports players and unique top-tier competitions. The most important esports organization in Germany is the Electronic Sports League (ESL), headquartered in Cologne and host of major esports events such as the IEM Cologne. Unique tournament formats such as the Virtual Bundesliga and the regular season matches of the European League of Legends Championships (LEC) are based in Germany and attract large German companies as investors and sponsors (Deloitte Development LLC, 2021b). In addition to these organizations primarily focused on business and competition, Germany is also home to recently founded esports associations.

The first esports associations emerged in the first decade of the 2000s (Seo, 2013). Since 2016, different esports associations have been founded in Germany to represent stakeholders' interests. To develop professional esports, ESL founded the World ESports Association (WESA) in 2016 (World ESports Association, 2022). Whilst nominally an association, WESA is essentially the governing body of an esports league. As a reaction to the growing esports audience, the eSport-Bund Deutschland e.V.[2] (ESBD) was initiated in 2017 as a non-profit association to govern esports in Germany. In 2022, ESBD has 67 members, mainly teams and clubs, as well as consultants, event organizers and content producers. ESBD is mainly focused on amateur athletes and teams (eSport-Bund Deutschland e.V., 2018c). ESBD has similarities with a traditional national sports-governing body (also known as a national sports organization or federation). The emergence of WESA and ESBD reflects the substantial growth and professionalization of esports in Germany. From a methodological perspective, the two newly founded associations provide a fruitful context for qualitative fieldwork on the institutionalization of associations within the esports ecosystem.

Against this backdrop, this study shifts the academic conversation on esports governance toward governing bodies. These organizations are all-powerful in traditional sports but live in the shadow of game developers in esports. We pursue the following research question: *How do German-based esports associations pursue legitimacy?* More specifically, we examine critically the legitimacy-seeking activities of WESA and ESBD.

THEORETICAL FRAMEWORK: THE CONCEPT OF LEGITIMACY

In line with neo-institutional theory, legitimacy provides the theoretical framework for our analysis. Early institutionalists (Meyer and Rowan, 1977; Zucker, 1977; DiMaggio and Powell, 1983; Meyer and Scott, 1983) observe substantial similarity among organizations operating in the same environment. This similarity results from structural and behavioral alignment to meet external pressure and accompany social expectations. Known as institutional isomorphism, this construct is crucial for organizations to secure legitimacy. Three mechanisms of

institutional isomorphism can be distinguished: (1) coercive, (2) mimetic, and (3) normative (DiMaggio and Powell, 1983), even though the different types cannot always be empirically delineated. Instead, organizations do not adopt them one-to-one without situational adaptions. Organizations focus on individual case-specific solutions resulting from integrating new ideas and models into existing structures (Sahlin and Wedlin, 2013).

Legitimacy is closely linked to the cultural support that an organization can provide for its environment and audiences (Suchman, 1995). Ruef and Scott (1998) state that the degree of legitimacy depends on the evaluation of all involved stakeholders concerning different organizational aspects. These considerations are closely linked to where legitimacy comes from (Deephouse and Suchman (2013) and for what it is used (Suchman, 1995). Both internal and external interest groups must be considered by organizations when pursuing legitimacy. This is most notably the result of the varying interests and views that stakeholders have concerning the legitimacy of an organization (Ruef and Scott, 1998). Stakeholders will only collaborate with legitimized organizations (Deephouse et al., 2017). Meyer and Rowan (1977) note that organizations with a lack of "acceptable legitimated accounts of their activities [...] are more vulnerable to claims that they are negligent, irrational or unnecessary." (p. 349 f.). According to Weber (1968), the importance of legitimacy lies in its ability to align organizational action with fundamental social values. An organization's formal structure (e.g., offices, departments, positions, and programs), is explicitly linked to its objectives, procedures, and policies (Meyer and Rowan, 1977). The evaluation of activities and the course of action (i.e., an organization's purposeful and goal-oriented work to meet individual and social values, norms, beliefs, and definitions) is socially constructed (Díez-Martín et al., 2021) and subjectively created due to different views of stakeholders. Suchman (1995, p. 574) wrote, "Legitimacy is a perception or assumption in that it represents a reaction of observers to the organization as they see it; thus, legitimacy is possessed objectively, yet created subjectively." Therefore, the activities of an organization, aligned with the overall goals and the perception and evaluation by the respective stakeholders, are essential to ensure legitimacy.

Organizational legitimacy is "the perceived appropriateness of an organization to a social system in terms of rules, values, norms, and definitions" (Deephouse et al., 2017, p. 32). Suchman (1995) argued that an organization can proactively seek to gain, maintain, and recover legitimacy. Gaining legitimacy is essential for new entrepreneurial organizations (Aldrich and Fiol, 1994). Consequently, the organization has the task of identifying suitable actions that enhance its legitimacy in eyes of stakeholders (Ruef and Scott, 1998). A considerable body of research highlights how new organizations acquire legitimacy by conforming to existing norms and values (Meyer and Rowan, 1977; DiMaggio and Powell, 1983).

There is uncertainty about how new organizations can best acquire this legitimacy (Zimmerman and Zeitz, 2002; Bitektine, 2011). Suchman (1995) offers three different strategies for gaining legitimacy: (1) conform to existing environments and adapt preexisting environmental standards, (2) select among environments to ensure audience support, and (3) manipulate

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[2]e.V. (eingetragener Verein) designates a registered non-profit organization in Germany, benefitting from tax exemptions.

TABLE 1 | Legitimacy strategies and characteristics.

Strategy	Characteristics	Source
Conformance	- Positioning in an existing institutional regime - Considering demands and expectations of existing structures or influential stakeholders - Align with already existing norms and rules	Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Suchman, 1995; Mitchell et al., 1997; Zimmerman and Zeitz, 2002; Scherer et al., 2013
Selection	- Choice of a suitable and favorable geographical environment providing similar scripts, rules, norms, and values	Suchman, 1995; Zimmerman and Zeitz, 2002
Manipulation	- Counter existing cultural beliefs - Influencing social expectations using strategic instruments of public relations, e.g., lobbying or teaming up with already well-established organizations - Proactive promulgation of new destructive needs beneficial to the organization	Oliver, 1991; Suchman, 1995; Zimmerman and Zeitz, 2002; Scherer et al., 2013
Creation	- Developing new rules and regulations - Contradict social structures - Providing new scripts, rules, norms, values, and models for unprecedented new approaches	Aldrich and Fiol, 1994; Zimmerman and Zeitz, 2002

environments to promulgate new cultural beliefs. Zimmerman and Zeitz (2002) propose a further strategy: (4) creation of the environment. **Table 1** summarizes the characteristics of the four strategies.

Legitimacy can be pursued using these strategies individually or in some combination. Legitimacy is confronted with measurement problems because "legitimacy is not directly observable" (Zimmerman and Zeitz, 2002, p. 418). Proposed measurement instruments "are not generalizable to other contexts, do not integrate the different approaches to assessing legitimacy, nor do they explain their suitability for specific contexts." (Díez-Martín et al., 2021, p. 100). The multiplicity of measurement instruments increases scientists' uncertainty about which instrument is appropriate for each context. However, the lack of measurement is rooted in the subjectivity of the construct, which is exclusively limited to the attitudes and conscious and unconscious decisions of social actors. Measuring legitimacy is closely linked to evaluating organizational actions. Accordingly, some evaluations focus on specific groups of evaluators and measure legitimacy through media, customers, or regulators. Furthermore, different scales are applied to measure the construct. Other approaches measure legitimacy through linked typologies (Díez-Martín et al., 2021). Legitimacy researchers use quantitative content analysis (Deephouse, 1996; Ruef and Scott, 1998; Deephouse and Carter, 2005) or qualitative

TABLE 2 | Number of documents by initial and final sample.

Organization	Number of documents	
	Initial sample	Final sample
eSport-Bund Deutschland e.V.	53	38
World ESports Association	29	17
Total	82	55

case studies combined with qualitative interviews (Rutherford and Buller, 2007; Low and Johnston, 2008; Goodstein and Velamuri, 2009).

MATERIALS AND METHODS

We examine the legitimacy-seeking strategies of two German-based esports associations: (1) the World ESports Association (WESA) and (2) the eSport-Bund Deutschland e.V. (ESBD). In line with the previous studies on legitimacy, we choose a qualitative case study. A case study approach is suitable given the reliance on qualitative data (Zimmerman and Zeitz, 2002). Yin (2018) suggests six potential sources of evidence for case studies. We rely on two sources of qualitative data: documents and semi-structured interviews.

Documents
The documents analyzed in the study were website information, official press releases, and news retrieved from the associations' websites from 2016–2021 (WESA) and 2017–2021 (ESBD). 2016 and 2017 represent the founding years for the associations. The initial search generated 82 documents. As a first step, all available documents published by the associations since their foundation were read completely and screened to determine their relevance to the research question. In a second step, the documents were examined for indications of associations' efforts to acquire legitimacy. We removed reports on market data, news on market developments, and association personnel matters. Documents that provided information on new partnerships, strategies, goals, and activities were retained for further analysis. As the data are self-reported by the associations, the selected documents were discussed in detail by two authors in a final step. The final data set consisted of 55 documents. **Table 2** shows the selected documents, separated by initial sample and final selected sources. The documents ranged in length from 200 to 3,000 words.

Semi-structured Interviews
Semi-structured, guideline-based interviews were also conducted *via* online video, audio-recorded, and then transcribed. The interviews provided a complementary data source to the documents. Interviewees had backgrounds in association work, across the amateur and professional esports spectrum. The initial intention was to include each stakeholder group by conducting one interview. As the most important stakeholder

Interview	Participant	Description	Duration of interview (in min)
1	Esports Athlete	Amateur esports player, former clan member (conducted *via* video)	00:48:10
2	Esports Athlete	Semi-professional esports player, active clan member and league player (conducted *via* video)	00:35:46
3	Esports Athlete	Semi-professional esports player, active clan member and league player (conducted *via* video)	00:44:39
4	Esports Athlete	Former professional esports athlete (Counter-Strike 1.6)	00:26:31
5	Professional Esports Team	Business Operations Manager esports	00:43:59
6	Professional Esports Team	Project Manager esports	00:49:48
7	Esports Event Organizer	Head of Public Relations	00:37:24
8	Esports Marketer	Sales Manager esports	00:40:48
9	Esports Association	Member of executive board	00:53:27

group, publishers were of particular interest in examining their view toward the emerging associational work in esports. However, our invitations were either unanswered or declined. Although publishers could not be included in our analysis, the ecosystem consists of many different stakeholder groups with a legitimate interest in esports associations. Notwithstanding this limitation, our sample of respondents still allows us to assess the legitimacy seeking strategies of both esports associations.

An interview guide was developed and structured according to four main topics: (1) development of the current model, (2) esports ecosystem and the publisher's dominant position, (3) perceptions of associations' legitimacy from a stakeholder's perspective, and (4) likely future developments. Subtle adjustments were made for each participant to reflect their organization's position in the esports ecosystem. Nine interviews were conducted between July and September 2019, each lasting between 26 and 53 min. **Table 3** summarizes all interview information.

Coding and Category Development

Data coding and category development for interviews and documents was conducted using MAXQDA12 software. A systematic and theory-guided approach to text analysis is mandatory to summarize the linguistic material and enable coding. Therefore, we followed the qualitative content analysis guidelines of Kuckartz (2014). Codes were developed according to the legitimacy strategies proposed by Zimmerman and Zeitz (2002). The underlying characteristics are presented in **Table 1**. Hence, the four strategies of (1) *conformance,* (2) *selection,* (3) *manipulation,* and (4) *creation* become the main categories for our analysis. Afterward, the research team reflected and discussed the relations between (sub-)categories and associations' legitimacy. The coding of the initial material was done in German. Citations used in this paper were translated into English. To avoid textual distortion due to the translation process, two authors fluent in both English and German (re-)translated the statements.

There is a potential risk for biases in data analysis due to the experience with the observed phenomenon by involved researchers (Berger, 2015). To limit this, a diverse research team was established. One research team member is an esports insider and, thus, close to the object of investigation. The other three researchers make no claims to insider status. The research team was also comprised of authors from different national and institutional backgrounds and academic career stages (two junior researchers and two senior researchers). The research team members also possessed expertise in a variety of scientific disciplines (i.e., organizational theory, management, economics, governance, and sociology). All of these ensured a multiperspective view on the phenomenon, enabled constructive bilateral and critical conversations among the research team, this ensuring reflexivity.

RESULTS

WESA and ESBD pursue different legitimacy seeking strategies. And not every strategy is equally relevant. Selection and creation are not as relevant as conformance and manipulation. Although the two organizations are located in German cities (i.e., the ESL as the founder of WESA in Cologne and ESBD in Berlin), a choice of geographical location as a strategy was not identified. Furthermore, creation is not applicable according to the initial definition (refer **Table 1**), although conformance and creation are difficult to separate. However, our results show more of a transfer or alignment with existing norms than creating new structures.

Each association will be analyzed individually to ensure a transparent and structured reporting of our results. The following similarities could be identified.

Common Legitimacy Strategies

A legitimacy-seeking strategy shared by both WESA and ESBD is to transfer structures from traditional sports to esports. Results show a common orientation toward established associations in traditional sports as part of conformance as a strategy: "A traditional sports association has a great deal of know-how in many areas, which is also reflected in esports." (Int_7;

Esports Event Organizer). According to our analysis, this concerns different fields: the adaption of primary organizational forms, the proclamation of representing members' interests, and establishing tournaments and leagues. In addition, both organizations choose the organizational form of a registered non-profit association. WESA, as a more professional and international organization, is registered in Switzerland, as many international sports associations. ESBD is registered in Germany, similar to national sports associations. All the associations examined are formally constituted by a general statute, a purpose, and an executive board. Above all, the purpose is formulated with a clear non-profit orientation in both associations' statutes. While the statutes of ESBD are accessible on the association's website, WESA statutes are not accessible to the general public. We obtained WESA statutes from the commercial register in Switzerland.

The associations formulated goals to promote esports in general and create overarching standards. WESA focuses on regulating tournaments and leagues on a professional level. ESBD tries to cover talent development and setting standards mainly for amateur esports. Both consider themselves as responsible for dealing with their respective members and interests. This internal structure corresponds to that of most traditional sports associations.

> "ESBD sees itself as an association of esports clubs and active players. [...] I try to help strengthen esports' social position, make proven structures from traditional sports fruitful in esports, and bridge the gap between the classic world of sports and esports. There is a lot to learn from each other [...]." (Int_9; Esports Association)

Again, both associations imitate strategies from traditional sports organizations, described by conformance as a strategy. One interviewee refers to WESA as the "champions league of esports" which "is also organized according to the classic methods of sports marketing and sports organization." (Int_9; Esports Association)

Second, besides adapting established associational structures, we identified manipulation as another strategy pursued by both associations. More precisely, both associations created partnerships with well-established organizations. More details are presented separately for WESA and ESBD in the results section. The selection of partners is based on the objectives pursued. Partnerships are predominantly only established if they are advantageous for the targeted organizational environment of the association. WESA mainly focuses on commercial stakeholders. ESBD tries to improve connections to national and local governments and politicians as powerful actors in the German sports governance (Kurscheidt and Deitersen-Wieber, 2011). Conversely, other stakeholders do not consider associations as beneficial partners: "I do not think an association [...] would help us at the moment if we would work with them." (Int_6; Professional Esports Team).

The following two subsections will reflect each association by focusing on activities and strategies in the pursuit of legitimacy.

World ESports Association (WESA)

WESA was founded in 2016 as "the result of joint efforts between industry-leading professional esports teams and ESL." ESL is a German esports organizer and production company that produces video game competitions worldwide and is the self-proclaimed "world's largest esports company" (World ESports Association, 2022). The eight founding esports teams were Fnatic, Natus Vincere, EnVyUs, Virtus.pro, G2 Esports, FaZe, Mousesports, and Ninjas in Pyjamas. At its peak, there were 13 teams. The opening statement on the WESA website proclaims WESA as an "open and inclusive organization that will further professionalize esports by introducing elements of player representation, standardized regulations, and revenue sharing for teams." (World ESports Association, 2022).

WESA's primary purpose is to serve the economic driven goals of the parent organization, ESL. Hence, the power of WESA teams is limited. Analyzing further cooperation with other profit-oriented and beneficial companies emphasizes this perception. WESA affiliated teams financially benefit from their membership and have representation on WESA's decision-making groups. According to one interview partner:

> "WESA was then the first attempt to say, 'Hey, we are forming a community with teams, and from now on, we will work together with the teams, who will then also have a veto in [...] the supervisory board or in the committee.' (Int_8; Esports Event Organizer)

Nevertheless, three out of six WESA board members are ESL representatives, ensuring ESL interests are protected and maximized. WESA is focused only on elite/professional esports. Non elite and or amateur esports is not a consideration. Professional teams are the only organizations affiliated to WESA. Publishers are best described as partner organizations, but not members or affiliated organizations of the league/association. The underlying concept is an economically oriented business model to achieve financial goals:

> "WESA is a commercial institution that aims to bring together the world's best esports teams, bind them, and organize competitions on this platform [...]. Thus, it is a commercial marketing platform, a commercial league structure/platform that is focused on making money [...]." (Int_9; Esports Association)

Also important to WESA ecosystem are the streaming providers relevant because they broadcast and pay for the matches organized by ESL. The nature of esports also makes it necessary for WESA to partner with game publishers. The Pro League for *Counter-Strike: Global Offensive* (published by Valve Corporation) was established in 2016, and in 2017 for *Paladins: Champions of the Realm* (published by Hi-Rez Studios). However, neither publisher is a WESA member. In this context, one interviewee described WESA as a "Swiss army knife of league organization, hopefully attracting as many publishers and media partners as possible in the future. That is potentially a nine-digit million-dollar business." (Int_9; Esports Association).

Establishing networks to relevant stakeholders of the ecosystem belongs to the theoretical concept of manipulation.

WESA's ability to acquire legitimacy was impacted by decisions of certain esports teams to not affiliate. For example, leading non-German Counter-Strike teams such as Astralis, Vitality, or Team Liquid are not members. Domestically, also absent was Berlin International Gaming (BIG).

According to our data, WESA does not try to connect to other stakeholders outside the esports ecosystem. We found no evidence of lobbying local, national, or supranational governments or traditional sports organizations. WESA does not pursue manipulation strategies toward fans and viewers, although it explicitly addresses all participants in the esports ecosystem. These stakeholders are served indirectly as the focus of WESA is on "what interests the consumers" (Int_9; Esports Association).

In 2020, the ESL established the *Louvre Agreement*, which, amongst other things, excluded WESA as the league's governing body. Since the Louvre Agreement was announced, neither the news section of the website or its twitter feed have been updated. Even though WESA seems inactive, those in charge want to continue organizing other game titles under the association's umbrella (ESL Gaming GmbH, 2020; The Esports Observer, 2020).

Furthermore, at the beginning of 2021, Hi-Rez Studios—the developer and publisher of *Paladins*—withdrew its involvement in esports (including the Paladins Pro Circuit) to focus on improving *Paladins* as a game as distinct from esports. WESA did not publish any statement on this decision. Moreover, it is unknown to what extent WESA was involved in this decision. WESA's legitimacy was always limited given it was linked to only two game titles. However, the loss of *Paladins* exacerbated the situation.

Our analysis shows that WESA was a reliable and essential regulatory body for the target group. This created a platform for different stakeholders (Buser et al., 2022), including professional esports teams. The autonomy of WESA can indeed be doubted given it was founded by ESL. With the integration of commercial companies, WESA represents a closed system and, thus, ensures the economic success of ESL. The withdrawal of WESA as a regulatory body for the two ESL Pro leagues proves the organization's dependence on the ESL.

In summary, the legitimacy of WESA derives from both its members (professional esports teams) and the competitive league structures (in cooperation with the ESL and broadcasters like Facebook). Due to the Louvre Agreement, the organization lost the latter within a year. Teaming up with traditional sports is not considered. Furthermore, there is no political lobbying to meet the association's goals. Results suggest that the organization mainly uses manipulation as a legitimacy seeking strategy. Integrating professional esports teams into a closed, for-profit system is the main focus of WESA to build legitimacy.

However, a focus on specific stakeholder groups results in a lack of acceptance for the organization from the outside. Allegations of corruption due to their dependency on ESL will not enhance external stakeholders' perceptions of WESA's legitimacy. The lack of persuasion in publisher support for their activities indicates a further lack of recognition beyond their organization and members. The decision by Hi-Rez Studios to withdraw *Paladins* from the ESL Pro League reinforces this statement. As mentioned above, the statutes are not open to public inspection, which further contributes to a low level of transparency.

ESport-Bund Deutschland e.V. (ESBD)

ESBD considers itself as the association responsible for organized esports in Germany. The aim is bring order to the fragmented German esports landscape. Our results show that ESBD is strongly oriented toward the structures of member associations from traditional sports: "ESBD is a traditional association. Just like sports associations." (Int_9; Esports Association). Accordingly, conformance as a strategy to gain legitimacy can be observed, as they imitate structures from legitimate sports associations. The alignment with internal structures of traditional sports associations has already been mentioned above.

ESBD is focused on implementing the pyramidal-hierarchical structure evident within the traditional sports system. (Self-)organized amateur esports form the basis of this system, but ESBD has also sought links with professional teams: "Yes, they have already been here. We talked to them once, but they are more traditional in terms of grassroots sports." (Int_6; Professional Esports Team). According to our interview partner, no further cooperation was established, because ESBD could not offer anything to the professional team.

Since 2019, ESBD established an amateur league for association-registered grassroots teams. In establishing the league, ESBD sought a broad and unique competition structure for amateur and non-elite players. ESBD wanted to make self-organized competitions redundant, by providing a transparent and credible league system. Amateur teams compete in four disciplines: *Counter-Strike: Global Offensive*, *StarCraft II*, *Rocket League*, and *League of Legends*. As an ESBD member, the ESL acts as the league's organizer. In traditional German sports, the associations organize competitions and set their rules with international federations (Chappelet, 2010). ESBD leagues are not connected to professional leagues and neither do they attract all amateur teams. Therefore, setting up an own league for amateur clubs is a kind of mimicry related to the strategy of conformance and not creation, as they are not successfully created structures or rules.

ESBD seeks to have a cooperative relationship with the traditional sports system:

> "Overall, we are striving for a collaborative relationship with traditional sports and its structures in the short and medium-term: the mutual exchange of expertise and experience is independent of any possible organizational integration into the organized sport and can be expanded through concrete cooperation and joint projects." (eSport-Bund Deutschland e.V., 2018b).

The activities in this area are many and varied. For example, ESBD supports traditional sports clubs that have integrated esports as a separate division. The main goal of this cooperation is

to transfer traditional sports organizational knowledge to esports, for example, standards of training organization or the integration of voluntary work.

> "The goal of these cooperations is to actively shape the integration of esports into sports society, to transfer sports organizational knowledge from the traditional area e.g., training design, integrity assurance, volunteer organization, and to make this knowledge available for the continuous further development of esports—both in terms of sports and society." (eSport-Bund Deutschland e.V., 2018b).

Besides conformance, ESBD uses manipulation in the pursuit of legitimacy by focusing on partnerships *across* esports. Partnering with successful and well-established organizations generate a higher impact and growth (Zimmerman and Zeitz, 2002). Alliances with professional teams (e.g., Berlin International Gaming, Unicorns of Love), event organizers (e.g., ESL, Freaks 4U Gaming), and amateur esports clubs (e.g., Leipzig eSports e.V., Magdeburg eSports e.V.) are part of their network to generate potential synergies. Membership is granted upon application. Applicants must either be an organizer of an esports gaming operation or actively participate in such.

In another legitimacy seeking action, ESBD sought and became affiliated with the newly founded European Esports Federation, as well as the International Esports Federation. As one interviewee noted, ESBD "took the leadership" toward this development (Int_9; Esports Association). This is a strategy of conformance, as it copies the hierarchical structures of traditional sports.

In terms of lobbying and public relations work, ESBD tries to strengthen its position. According to our results, politics plays an essential role in this context. ESBD initially focused on regional and national political institutions as well as essential decision-makers to generate an understanding of esports and its essential functions and structures among the general public:

> "The social acceptance for esports exists, and it is strong. We now want to achieve a sustainable and deep integration of esports. To this end, we will initially accompany politics in particular on this core topic." (eSport-Bund Deutschland e.V., 2018a).

In particular, press releases and news items suggest that the most critical issue in cooperation with political decision-makers is the recognition of esports as a sports activity. ESBD's involvement in political events and debates are content of these published items. This goal has been pursued vigorously since the associations' foundation until today without only modest success. ESBD proclaimed a small victory, when in 2019, German immigration law was revised to provide esports athletes with the same visa and travel requirements as elite athletes. WESA also participated in this lobbying campaign, motivated by more streamlined processes to bring non-German esports athletes to Germany to play in events. This concession raises esports, at least in this respect, to the same level as other sports—one of ESBDs main approaches for legitimacy. The press statement concerning this

topic expressed ESBD's pursuit for legitimacy. ESBD emphasize the importance of their success, even if the effect is limited, especially for an amateur organization. However, they proclaim: "The visa issue has blocked the development of the German esports landscape for years." (eSport-Bund Deutschland e.V., 2019).

In summary, our results show that emerging esports associations in Germany use conformance and manipulation as major legitimacy strategies. This is manifested by aligning their associational structures to those evident in traditional sports organizations and the implementation of beneficial networks to enhance stakeholder perceptions of legitimacy. Both interviews and documents provided equal evidence of the two associations' approaches. **Table 4** provides an overview of the complementary use of the two sources and an excerpt of additional exemplary statements that highlight conformance and manipulation strategies used by the associations.

DISCUSSION

This study sought to identifying the legitimacy strategies pursued by German-based esports associations. The remainder of this discussion is divided into three subsections. In the first two sections, conformance, and manipulation are discussed as legitimacy-creating strategies. The third section discusses the stakeholder-oriented approach of associations, which offers them a unique proposition in the fragmented esports landscape. Constructs from the scientific literature support our reasoning.

Does Institutional Isomorphism Always Legitimize?

In traditional sports, there are independent, self-regulating, and non-profit-oriented (global) organizations that are well accepted as the legitimate governing body for each sports (Croci and Forster, 2004; Chappelet, 2010). It is therefore unsurprising that new esports associations start to exhibit the same characteristics of these organizations. Both WESA and ESBD use conformance to establish a transparent and basic structure for their organization. The associations examined are characterized by their constitution with statutes, articles, and standard binding and longer-term goals, varying to represent members' interests. The establishment and support of leagues are inherent to associations from traditional sports. The associations' approach reflects mimetic isomorphism (DiMaggio and Powell, 1983). Uncertainty about the future and the uncertain survival of an organization encourages it to align with dominant organizations and their structure and actions: "When goals are ambiguous, or when the environment creates symbolic uncertainty, organizations may model themselves on other organizations." (DiMaggio and Powell, 1983, p. 151). This isomorphism usually achieves a taken-for-grantedness that finally secures legitimacy.

Our results suggest that the transfer of structures from traditional sports does not necessarily ensure legitimacy. This

TABLE 4 | Selected exemplary interview statements and documents citations.

Strategy and characteristics	Source	
	Interviews	Documents
Conformance - Positioning in an existing institutional regime - Considering demands and expectations of existing structures or influential stakeholders - Align with already existing norms and rules	[…] As I said, the way they build up the whole casting around esports is one hundred percent copied from traditional sports or partly improved from those areas, and therefore it all looks very professional at the moment. (Int_8; Eports Marketer) Establish a structure that ensures that everyone deals with each other in a cultured and decent manner. That is what a traditional sports association wants to do—it also wants to ensure we are healthier and good taxpayers. That is what an esports association also strives for […]. (Int_9; Esports Association) We co-founded ESBD, have a permanent seat on its board, and are trying to work together with the teams, both amateur and professional, to professionalize esports in Germany, to further strengthen it, and to establish guidelines. In other words, to create standards so that esports in Germany can continue to grow. (Int_7; Esports Event Organizer)	As is familiar from traditional sports, there is also a pyramid-like organization in esports: the basis, the foundation, is formed by the players, who deal with the esports titles individually, on gaming platforms and networks, often online, and enter into the active gameplay (eSport-Bund Deutschland e.V., 2018b) Based on similar traditional sports associations, WESA is an open and inclusive organization that will further professionalize esports by introducing elements of player representation, standardized regulations, and revenue shares for teams (World ESports Association, 2022) The eSport-Bund Deutschland (ESBD) has continuously promoted easier entry conditions for esport athletes and already succeeded in implementing short-term visas last year (eSport-Bund Deutschland e.V., 2020)
Manipulation - Counter existing cultural beliefs - Influencing social expectations using strategic instruments of public relations, e.g., lobbying or teaming up with already well-established organizations - Proactive promulgation of new destructive needs beneficial to the organization	[…] politics must develop an understanding […] of what esports is, the needs of those who practice it, the barriers, and the needs that politics must also address. (Int_9; Esports Association) Yes, and then they would have to start […] to become active. Sitting in the VIP area is, I think, quite lovely, but it does not help the community because you cannot get to know them, you cannot have controversial discussions. (Int_3; Esports Athlete) Moreover, WESA was then the first attempt to say: Hey, we are forming a community along with the teams and working together with the teams from now on, who will also have a veto in the [...] supervisory board or the committee. (Int_7; Esports Event Organizer)	The state government is asked to support and accompany the dialog between esports and traditional sports, including the recognition of esports as an eligible sport within the meaning of § 2 No. 1 of the statutes of the Landessportbund—while respecting the autonomy of the sport (Landtag von Sachsen-Anhalt, 2018) WESA will aim to incorporate more Teams and leagues, and will always work very closely with game publishers to include more games in the future (World ESports Association, 2022) YouTube will be the new streaming partner for Pro League Seasons 5 and 6 and will exclusively stream the English-language broadcast (World ESports Association, 2017)

refers mainly to associational work in an esports ecosystem dominated by game publishers. Legitimacy—a resource nearly always evident in the associations responsible for traditional sports—cannot be acquired by esports associations through simple imitation. Even if the associations orientate toward structures from traditional sports, this does not simultaneously mean an increase in legitimacy as a simple transfer is not practicable (Kelly et al., 2022). Thus, a rigid institutional isomorphism is not likely to be successful. Case-specific and the nuanced use of imitation, which reflect the particularities of esports, will likely generate superior outcomes (Sahlin and Wedlin, 2013).

Manipulation—A Fragile Bubble

Besides conformance, we identified manipulation as a strategy used by esports associations in the pursuit of legitimacy. Manipulation goes beyond pure conformity and environmental selection as organizations promulgate their distinctive needs and new approaches to operating cultural environments (Ashforth and Gibbs, 1990; Aldrich and Fiol, 1994). Our results show that the success of a manipulation strategy depends on the fundamental orientation of associations. In particular, ESBD uses the strategy to achieve its goals. While both associations build a network of profitable partnerships, only ESBD engages in political lobbying. The news items published underline this approach and, thus, highlight the associations' policy-oriented PR strategy to justify their requirements. Therefore, the proof of legitimacy is provided by constant demands on politicians since the associations must initiate consensual actions due to the various interest groups involved. Decision-makers, partners, and members are carefully selected and addressed. WESA is exceptional in this context as its monopolistic network was formed around specific game titles without the need for government support.

Partnerships and lobbying are inevitably accompanied increased dependence. According to our observations, most objectives can only be reached and implemented *by* or *through* governmental involvement. Even though politics is not integrated into WESA's approach, the association was critically dependent on the support of a single stakeholder, ESL.

The effectiveness of the manipulation approach to gain legitimacy is speculative. If the associations are not restricted in their objectives, nothing can be said against linking their work with their partners in politics and business. The dependencies raise concerns about the long-term sustainability of the cooperation. Because of a missed target achievement, even involved stakeholders might doubt the legitimacy of the respective associations. Conversely, this also means a loss of legitimacy for the association as "such proactive cultural manipulation is less controllable, less common, and, consequently, far less understood than either conformity or environment selection." (Suchman, 1995, p. 591). We would even argue that the activities pursued to implement the manipulation strategy are *fragile bubbles* that threaten to burst at the slightest setback.

Differentiation by Creating Stakeholder-Related Legitimacy

Organizations without legitimized activities are often viewed as unnecessary by their respective stakeholders (Meyer and Rowan, 1977). Therefore, the organization's legitimacy is closely linked to how stakeholders evaluate these activities and the added value they generate. Due to the diversity of esports with different games and genres, it is almost impossible to bundle all stakeholders in one overarching umbrella organization (Abanazir, 2018).

> "So, you definitely need some kind of USP. On the one hand, we have WESA, which concentrates on a single game title. That is one way. On the other side, we have ESBD focused on a certain regional USP. You must limit yourself because esports, in general, is so complex and big with all the publishers, games, and agents [...]. It is hardly feasible to provide an all-encompassing association." (Int_7; Esports Event Organizer).

According to our findings, associations have recognized the need for such differentiation and focus on unique goals and activities. In addition, their actions are targeted to specific stakeholders to develop their own unique (sales) propositions. We are convinced that this differentiated approach can be successful in practice. Given the fragmented esports landscape, associations in esports need to focus on selected sub-areas, genres, or disciplines. This focus creates an orderly environment for stakeholders in a disorderly novel phenomenon and generates stakeholder-related legitimacy, which is a fruitful approach, according to Kelly et al. (2022). These bodies "must implement their own governance strategies and seek to legitimize those strategies in the eyes of relevant stakeholders." (Kelly et al., 2022, p. 154). Despite serving different stakeholders, associations are also increasingly corporate to achieve common overarching goals,

as demonstrated by the call for uniform visa standards, the development of beneficial partnerships, or the linkages of ESBD to other associations at the international level. Therefore, our results also confirm the assumption of Peng et al. (2020, p. 11) as "although struggling with legitimacy issues, new esports governance alliances are following a trend of moving away from fragmentation to a network administration organization (NAO) model." Such a model offers the possibility to bundle common interests and enables a strategic approach in line with the overall network goals. The mentioned legitimacy problems have been highlighted in more detail in this study and the strategies used by associations to counter them. Although we cannot evaluate the intensity of cooperation, a tendency toward cooperation with as many other partners as possible to build up profitable networks is evident.

Due to their short existence, no statements can be made about the extent to which associations can establish themselves in the future as legitimate and recognized organizations while focusing on unique approaches. The degradation of WESA and its inactivity since 2020 indicates typical issues an association has to deal with in the emerging and dynamic field of esports: the dependency on (political) partners and stakeholders and, overall, a lack of publisher support for their activities. In addition, the question of the general need for associations in esports remains, accompanied by a lack of support from external stakeholders and the general public. Therefore, the associational work in esports is stuck in the middle, somewhere between publisher dominance on the one hand and the striving for independent structures on the other hand. Whether the assumed legitimation strategies of conformance and manipulation will be sufficient to solve these issues in the future can only be speculated at this point.

The pioneering work of associations has already initiated essential steps toward the future of esports. We can determine that the associations promote growth and raise awareness of their work. These actions try to create a certain level of order in a previously fragmented esports landscape with loose clans, confusing competitive structures, and a lack of responsibilities for target groups.

CONCLUSION AND IMPLICATIONS

Our study contributes to a better understanding of how (for-profit) leagues and self-proclaimed (non-profit) national governing bodies pursue legitimacy. In the context of limited academic discussion of governance in esports, our results generate preliminary but important managerial, policy, and theoretical implications.

Management Implications

Our findings have implications for management to help associations further consider and rethink their strategic direction. A simple transfer of governance structures from traditional sports to esports is unsuitable (Kelly et al., 2022). Associations need to be more selective and find unique and targeted approaches rather than strive for an esports' all-encompassing governance solution (Sahlin and Wedlin, 2013). Thus, the associations have the chance to fill niches that remain unoccupied

by publishers due to their profit-oriented focus. These blind spots (Peng et al., 2020) can be addressed with innovative approaches and individual target group-oriented solutions like new competitive structures (e.g., WESA) or a focus on amateur esports (e.g., ESBD). By filling the niches, associations reach individual stakeholders, creating stakeholder-driven legitimacy. The associations' work and orientation thus serve not only as a service for stakeholders but also for publishers, enabling them to focus on their core business, the distribution and marketing of their games. Associations need to accept publisher dominance. Their dominance is not challengeable. Instead, collaborative dialogue and exchange with publishers may establish a mutual understanding and enhance each other's legitimacy. The associations are operating in a highly competitive environment. Various stakeholders are striving for a position in this financially lucrative ecosystem. Esports associations must think more economically and entrepreneurially than associations in traditional sports. Focusing on specific stakeholders creates a space where publishers and other acting stakeholders can cooperate, benefit from each other, and coexist in a fragmented environment.

Policy Implications

The institutional development of esports is barely comparable to those of long-established traditional sports. The fragmented environment with different games, genres, and stakeholders and the regulating power of the publishers characterizes esports unique structure (Scholz, 2019). Esports associations operate in a highly profit-oriented environment in which they must constantly prove their raison d'être, especially their economic value to commercial organizations. In contrast to traditional sports, esports associations cannot rely on a taken-for-granted legitimacy (Croci and Forster, 2004). The legitimacy of esports associations must be earned. In this context, we consider esports to be a blueprint for many subsequent sports that are confronted with comparably fragmented and developing governance structures. Our insights and the observed narratives have therefore policy implications for emerging sports, such as boardsports (Strittmatter et al., 2019). Esports is a growing ecosystem with rapid developments during the last decades. Governing organizations did not develop to the same extent. Like other emerging sports, institutionalized rules and organizations must be established over time.

Theoretical Implications

Our research finally contributes to the organizational theory literature on associations in a profit-driven environment by identifying possible strategies these organizations use to pursue legitimacy. Suchman (1995) and Zimmerman and Zeitz (2002) propose four strategies: conformance, manipulation, selection, and creation. According to our findings and related to our case, conformance and manipulation are relevant strategies for esports associations to gain legitimacy. However, in the esports context, this legitimacy is often stakeholder-related and arises from focusing on individual stakeholder groups in a fragmented ecosystem where all-encompassing governance is not appropriate (Abanazir, 2018; Peng et al., 2020). More generally, the ongoing

legitimacy discussion on esports governance is actually caused by the representatives of the esports ecosystem themself due to a conceptual and cultural annexation of the sport concept. The term "esports" per se implies a connection to traditional sports and the associated structures although the basic meaning just refers to the competitive, sports-like mode how video games are played. The accompanying expectations regarding a need for regulation and the associated *commitment to institutionalization* are the inevitable result. In the esports industry, however, *partial legitimacy* prevails, unevenly distributed among the relevant actors and their associated interests and rights in the ecosystem. Following our policy implications, which apply to comparable governance challenges in many new and emerging sports (e.g., Strittmatter et al., 2019), we recommend considering this novel construct of a partial legitimacy in the field of organization sociology and specifically in institutional theory. We recognize this as a gap in the literature and a need to extend theories on legitimacy creation.

Limitations and Future Research

The present study provides valuable insights into legitimacy strategies esports associations pursue to ensure their survival and discusses associational work in a profit-driven business. However, several shortcomings must be pointed out, providing a basis for future research.

Despite nine interviews with esports stakeholders, it would be particularly desirable to include publishers in future research. It would be insightful to learn how publishers perceive associations. Hence, future research should examine the relationship between associations and publishers in more detail to uncover possible linkages. This supports the approach proposed in the management implications. A further limitation relates to the selected documents, representing a favorable perspective on the associations' work as we focused on primary documents published by the associations themselves. Accordingly, not all internal and external debates are depicted. The official statements only hint at the debates but limit us to a further interpretation. At the same time, this approach limits the number of fruitful documents to those published and approved by the associations. Nevertheless, the selected documents as primary sources provide valuable and meaningful insights into the two associations' actions which was the major purpose of this study.

This article focuses primarily on how associations use strategies to gain legitimacy in a first step. However, this is not sufficient for an organization to ensure its survival. In addition to gaining it, *maintaining* the achieved legitimacy and the ability to *repair* it in an unforeseen crisis are further challenges for organizations. For this purpose, different strategies are suggested in the literature (e.g., Suchman, 1995), which should be investigated. We moreover acknowledge that the legitimacy strategies are not always clearly distinguishable. In particular, conformance and creation are difficult to separate. Observed activities such as establishing uniform visa standards for esports athletes, and the foundation of leagues are possible creation approaches. In our interpretation, neither activity creates unique and new structures. Instead, they adapt structures

from traditional sports, although similar league formats have not previously existed in esports.

In addition, the intercultural and international transferability of findings obtained in our study may be restricted. An association's legitimacy is likely to be country-dependent. Also crucial in this context is the general acceptance of esports in this respective environment. A recognition facilitates the associations' work and enables them to benefit from various resources from traditional sports (e.g., tax benefits or subsidies). Thus, the transferability of the results can only be guaranteed by extending the study to other countries.

As previously mentioned, the community has a historically shaped self-image in esports, as many statements confirm in our interviews. Donnelly (2013) argues that the democratization of sport by involving fans and players offers a variety of potential outcomes for the further development of a sport. Hence, the community's perception and attitude toward different governance models (with, e.g., a national, global, game- and/or team-based focus) require further examination, for instance, by larger-scale interview and survey methods or novel approaches for digitalized social environments, such as netnography.

Finally, we stress the complexity of esports. Our review of the literature has shown that complexity of the esports ecosystem has not been addressed adequately. Perhaps esports needs to be generalized and developed as a distinct research field to provide a holistic picture of the esports landscape. This includes associational structures, various game titles and genres, the different communities, the game publishers, and many other aspects and actors. We expect that academic interest in esports will continue to grow.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

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Scientific article 2: Exploring oppositionality and support of Counter-Strike redditors for the World ESports Association

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Exploring oppositionality and support of Counter-Strike redditors for the World ESports Association

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ABSTRACT

This study explores sentiments towards the World ESports Association (WESA) within a Counter-Strike Reddit community. Esports communities have not embraced the various self-proclaimed domestic and international esports governing organisations and are notoriously hostile to any organisation perceived as exploiting them. Our sentiment analysis was based on a review of 5359 comments (distributed across 29 threads and five subreddits) made by Counter-Strike Redditors. We retained 861 of these comments in our final data set. Provisional themes were revised until the main categories were finalised. The key finding was that negative sentiments outweigh positive sentiments. Counter-Strike Redditors criticised WESA for subsequent monopolisation and unnecessary interference in an otherwise functional system, corruption, a lack of transparency and power, and its opportunistic financial behaviour. More positively, WESA is credited with standardising rules and setting standards, enhancing player welfare and protection, growing esports, and offsetting publisher power and incompetence. Despite these sentiments, we propose that esports communities' influence on institutional considerations is likely to be limited. There is an ongoing tension between the initial understanding of gaming and its institutionalisation process. Acquiring player/fan acceptance is an ongoing challenge for these organisations.

Introduction

It is axiomatic that fans perceive their players and teams more favourably than they do the organisations (i.e. governing bodies) responsible for organising leagues and events. Significant failures in sports governance (e.g. corruption, misconduct, and fraud) have created a moral deficit and a consequential decline in the integrity of sports and their governing organisations (Brooks et al., 2013). In esports, while governance failures can create negative sentiments towards esports governing bodies, the more substantive issue is their existence and lack of legitimacy (Hamari & Sjöblom, 2017; Holden et al., 2017; Jenny et al., 2017). Previous studies indicate that 'while governance might be required, there is resistance from some within esport communities who appear to relish the lack of institutionalisation and structural boundaries' (Hayday et al., 2021, p. 150).

In this paper, we argue that the emergence of esports governing bodies and the sportification process are mutually reinforcing. The sportification of an activity can create pressure for establishing new governance structures and policies, while sport governance can expedite the process of sportification. There are many self-proclaimed domestic and international esports governing

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organisations (Scholz, 2019), some of which possess governance structures commensurate with traditional sports (Heidenreich et al., 2022). Problematically for these organisations, subcultural practices conflict with sportification. Esports' historical self-image reflects a creative dialogue between game publishers and players, a sense of belonging to a subcultural fringe group, and users identifying as *gamers* (Kirkpatrick, 2017). Esports consumers are 'notoriously hostile to organisations they perceive as seeking to exploit them' (Huettermann et al., 2020, p. 1). Heere (2018, p. 1) stated: 'As the sport industry itself is embracing e-sports as a sport, scholars should embrace e-sports as a manifestation of sportification and examine their negative and positive effect on our industry'.

Our study explores the positive and negative sentiments of a Counter-Strike community on Reddit (i.e. Counter-Strike Redditors) towards the World ESports Association (WESA). The study is important for several reasons. The esports community is an important stakeholder group (Ashton, 2019b; Xue et al., 2019). Esports fans determine the financial viability of all products and services (Peng et al., 2020). Yet 'critical conceptual explorations of esport communities are rare' (Hayday et al., 2021, p. 140). Positive perceptions of governing organisations are important because they imbue psychological, emotional, and financial investment by sports fans (Dalakas & Phillips Melancon, 2012; Supporters Direct Europe, 2012; Wagner Mainardes et al., 2012).

The remainder of this article is structured as follows. In the next section, we present the concepts relevant to the aim of the study. The third section describes the research methods and analytical procedures. The findings are shown in the fourth section of the article. The fifth section discusses the results and concludes with some thoughts on the study's limitations and delimitations, as well as suggestions for future research.

Background literature

Esports, alternative culture, and oppositionality

We begin by situating this study within the links between alternative leisure/sport, alternative cultures, and oppositionality (Spracklen, 2014). Non-traditional sports have been labelled 'extreme, alternative, lifestyle, whizz, action, panic, postmodern, post industrial and new sport' (Wheaton & Wheaton, 2004, p. 2). Alternative sports include windsurfing, snowboarding, BMX biking, extreme ironing, extreme skiing, ultimate frisbee, kitesurfing, in-line skating, parkour, whitewater kayaking, and adventure racing (Robinson, 2015). Esports is a counterculture or alternative to modern sports (Jonasson & Thiborg, 2010). Midol and Broyer (1995, p. 210) argued that within these activities:

> . . .the culture is extremely different from the official one promoted by sporting institutions. The whiz sport culture is championed by avant-garde groups that challenge the unconscious defences of the existing order through which [. . .] society has defined itself for the last two centuries. These groups have dared to practice transgressive behaviours and create new values.

Spracklen (2014) proposed that alternativism (i.e. the rejection of social normality through the pursuit of alternatives) is associated with oppositionality. Spracklen et al. (2013, p. 168) defined oppositionality as 'the way in which individuals, subcultures, counter-cultures and other counter-hegemonic movements reject the restrictions of instrumentality and express their refusal to conform as passive consumers'. Spracklen's (2014, p. 253) argument was that alternative leisure allows 'individuals find in the collective resistance of alternative leisure solace and communicative satisfaction'.

Esports enthusiasts share values, attitudes, beliefs, and interests (Xue et al., 2019). Esports has 'diverse communities and subcultures [. . .], established around social codes and practices, driven by identity and allegiance to certain titles' (Hayday et al., 2021, p. 150). Esports communities are therefore somewhat heterogenous given the different cultural characteristics (Elmezeny & Wimmer, 2018). Esporters 'co-exist on a virtual platform which is commonly referred to as a "community"' (Peng et al., 2020, p. 8) and use different media 'to augment gameplay, create

their individual gamer identities, and socialise about the games, events, and communities with which they associate' (Xue et al., 2019, p. 848). The gamer/esporter stereotype – an 'isolated, pale-skinned, white, teen boy in a dark basement single-mindedly mashing buttons' (Engelstätter & Ward, 2022, p. 1) – is slowly changing but remains pervasive, and perpetuates the negative elements associated with gaming (Stone, 2021).

Subcultures become 'accommodated and co-opted into the mainstream through a process of instrumental commodification' (Spracklen, 2014, p. 254). In the next section, we explore this through the lens of institutionalisation as a fundamental mechanism of the sportification process.

Institutionalisation of esports

Kwon et al. (2021) suggest that cultural changes can occur not just across society, but also within certain domains, affecting certain groups of individuals. One such domain that has undergone significant cultural change is gaming, which has shifted from a leisure activity for a small group of enthusiasts to competitive esports and a mainstream form of entertainment. This transformation reflected the incorporation of sporting conventions into esports' structure and practices, reflecting the concept of sportification (Heere, 2018). The aim of sportification is to make an activity more attractive to the audience while creating 'a fair, pleasurable, and safe environment for individuals to compete and cooperate, and compare their performances to each other, and future and past performances' (Heere, 2018, p. 23). Several activities have become sportified. For example, Dai et al. (2022) examined the sportification of international dance to become Chinese DanceSport. Švelch (2020) explored the transformation of 'Magic: The Gathering' from an analogue card game into an entertainment product. Skateboarding's sportification culminated in its inclusion in the 2020 Olympics (D'Orazio, 2021; Tjønndal et al., 2019).

Institutionalisation is a fundamental mechanism of the sportification process alongside standardisation and specialisation (Collinet et al., 2013). In the context of sportification, institutionalisation 'is synonymous with unified structures organised into a hierarchy and managing the practice from national to international levels (like federations)' (Collinet et al., 2013, p. 991). Traditional sports are governed by independent, non-profit sports organisations (Chappelet, 2010). These organisations 'arrange and manage various aspects of the delivery of sport at the community level, the elite level and everything in between' (Minikin et al., 2015, p. 435). The organisations emerge from a long-term process of institutionalisation (Jenny et al., 2017). To act as the sport's apex, the organisations must be perceived as legitimate (Croci & Forster, 2004).

Beginning in 2008 with the formation of the International eSports Federation (IeSF), a variety of self-proclaimed esports associations and federations emerged. Besides international organisations (e.g. IeSF), there are also continental (e.g. European Esports Federation (EEF)) and national associations (e.g. Korean e-Sports Association (KeSPA)). Despite all these approaches and the given publisher dominance, esports is still without an overall legitimised regulatory organisation (Hamari & Sjöblom, 2017; Holden et al., 2017; Jenny et al., 2017). However, by targeting stakeholder segments, these organisations seek to regulate the fragmented esports ecosystem and claim partial legitimacy in a profit-driven environment (Heidenreich et al., 2022).

Sentiments towards sport governing organisations

García and Welford (2015) consider that commercialisation and political developments have eroded the connection between supporters and the teams they support. According to Welford et al. (2015), 'supporters are dissatisfied with the current governance structures within the sport'. (p. 322). Martin (2007) stated that *new commercialism* – a shift towards a liberal market economy and thus towards profit maximisation – explains why football's historical position as a people's sport is increasingly obsolete. New commercialism has prompted some fans to engage in a call for

governance reforms, including formal recognition of supporters as stakeholders, as part of a 'governance turn' (García & Welford, 2015, p. 517).

Several studies have investigated negative sentiments towards sports governing organisations. García and Llopis-Goig (2021) collected opinions of football fans in six European countries (i.e. United Kingdom, Spain, Turkey, Poland, France, and Germany) towards European football governance. The results indicated high levels of fan mistrust of national governing bodies and their presidents, as well as football club owners. Hölzen and Meier (2019) conducted a sentiment analysis to explore Twitter users' responses to scandals within the Fédération Internationale de Football Association (FIFA). The study found little evidence that the corruption scandals had detrimental effects on FIFA's legitimacy among the Twitterati. Consequently, the study also expressed scepticism regarding the ability of football consumers to act as effective principals in football governance. Ma et al. (2022) surveyed the attitudes of 453 Chinese Super League (CSL) fans towards the CSL's governance. Whilst fans considered the CSL's 'market orientation as a counterbalance to governmental control' (p. 1), there was nonetheless aversion to ongoing commercialisation. Hallmann et al. (2020) studied the image fit between a sport and its German and international governing organisations. A key finding was that 'a sport's image is perceived more positive than the perceived image of its governing organisation' (p. 10).

Snowboarding and skateboarding consumers also resisted institutionalisation within their sportification processes. Whereas commercial equipment manufacturers once dominated the governance of both sports (Humphreys, 1997), sportification (and inclusion in the Olympics) disrupted the established competition and governance structures (Thorpe & Wheaton, 2011, 2016). Skateboarders and snowboarders were required to adapt to the hierarchical structures, rules, and regulations of a national federation, an international governing body, and the International Olympic Committee (IOC). Many community members rejected participation in such a formalised governance system, the discontent manifesting in competition boycotts. In both instances, a historically developed identity was challenged by the systems of organised sports (Strittmatter et al., 2018).

Esports has generally resisted the bureaucratisation, organisation, and structuring pervasive in traditional sports (Scholz, 2019; Witkowski, 2012). Hayday et al. (2021, p. 139) stated that '[s]uch resistance has contributed to a lack of consensus and clarity on industry regulation and precipitated calls to establish and enhance governance structures'. Therefore, it may be challenging for esports to align with and enforce expected governance practices. According to Abanazir (2018), it is almost impossible to establish an organisation covering esports with the multitude of games, publishers, and communities.

Research context

World Esports Association

Established in 2016, WESA is a subsidiary of ESL Gaming (ESL), a German-based esports event and production company. WESA did not consider itself a league, but rather an organiser of leagues. In doing so, WESA wanted to establish global benchmarks for standardising and regulating esports. WESA sought to be an 'open and inclusive organisation that will further professionalise esports by introducing elements of player representation, standardised regulations, and revenue sharing for teams' (World ESports Association, 2016). Despite these proclamations, WESA's scope was primarily limited to competitive Counter-Strike: Global Offensive (CS:GO).

Counter-Strike

Counter-Strike is a team-based tactical first-person shooter (Ashton, 2019a). The game was initially developed and released by hobby programmers Minh Le and Jesse Cliffe as a modification of the

game *Half-Life* and was later commercially released in 2000 by Valve Corporation (Li, 2017; Scholz, 2019). The original 1999 version has been superseded by Counter-Strike: Condition Zero and Counter-Strike: Source (both released in 2004) and Counter-Strike: Global Offensive (released in 2012). The latter was awarded the 'Best Esports Game' at The Game Awards in 2015 (The Game Awards, 2021). The first major Counter-Strike tournament was hosted in 2001 at the Cyberathlete Professional League (Welch, 2006).

Method

This study takes an exploratory approach to answer this research question: '*What are the positive and negative sentiments of Counter-Strike Redditors towards WESA?*'. Sentiment analysis reveals people's opinions, evaluations, attitudes, and/or feelings and sentiments towards a specific topic, issue, or event (Ha et al., 2019). Positive statements represent support, whereas negative statements represent oppositionality.

A single case study is an ideal approach to investigating leisure-related phenomena. A single case study can offer 'insights and hypotheses that can be pursued in future studies' (MacCosham, 2017, p. 828), whilst providing a comprehensive exploration of the case's 'complexity, contexts, problems, and history' (Litawa, 2018, p. 3). Studying an individual case in its natural setting allows researchers to gain a deeper understanding of the phenomenon being investigated (McCormick, 1996). Elsewhere, there is recognition that single case studies are well-placed to provide an in-depth analysis of complex phenomena in real-life contexts (Flyvbjerg, 2006) and that single case studies, despite their relative simplicity, can generate new research opportunities and challenge existing assumptions and frameworks (Given, 2008).

WESA is an intriguing case for several reasons. Firstly, WESA was amongst the first associations dedicated to professional esports. The task of creating an umbrella organisation to regulate esports is challenging (Abanazir, 2018). Second, WESA implemented a novel approach to regulating a professional league. Thirdly, with a focus on Counter-Strike, WESA positioned itself within one of the most popular esports games, with a passionate and historically-evolved community of players and fans. Therefore, studying WESA as a game-related organisation offers valuable insights into the complexities of establishing a more organised and formalised environment for esports centred around a specific game. By focusing on a single association (WESA) and a specific community (Counter-Strike), we can gain a better understanding of the support and oppositionality towards emergent regulatory associations.

Data collection

Counter-Strike Redditors provided the data in our study. With the rise of online communities, social media platforms such as Reddit have become increasingly important for social science research (Amaya et al., 2021). Reddit is a publicly accessible website where users submit new posts and comments, creating tree-structured conversation threads. According to Melton et al. (2022), Reddit 'is an outstanding data source for textual analysis' (p. 1057). Its popularity among gamers (Massanari, 2017), makes it a valuable resource for researchers aiming to extract data for gaming-related studies. Following Jamnik and Lane (2017), the platform's vast size, diversity, and user-generated content offer a wealth of information for exploring topics related to gaming. The ability to analyse community-member sentiments on a large scale is one of the most significant advantages of Reddit as a data source (Hodges et al., 2022).

We collected Reddit data from July 2022 to October 2022 from different subreddits. Subreddits were identified by a keyword search for World ESports Association, WESA, and Counter-Strike, combined with regulation, governance, governance organisation and governing body. We screened 5359 comments within 29 threads divided into five subreddits. Table 1 provides an overview of the related subreddits (*n* = 5) and threads (*n* = 29) and the number of comments (overall and selected).

Table 1. Data source retrieved from Reddit.

Subreddit	Thread	Published Date	Last published comment	Overall comments	Selected Comments
r/Global Offensive	Solving the 'Governing Body' Problem	13-May-16	13-May-16	96	23
	Announcing the foundation of WESA – the World Esports Association	13-May-16	13-May-16	705	127
	Q&A with the founders of the World Esports Association	13-May-16	13-May-16	895	151
	World Esports Association (WESA) leaked, includes top teams and ESL	10-May-16	11-May-16	234	27
	World Esports Association Introduces Player Council	14-Sep-16	15-Sep-16	167	11
	Just How Profoundly Flawed Is the World's First Esports Association?	17-May-16	18-May-16	120	21
	WESA the effects it could have on CSGO and why you should care	15-May-16	17-May-16	125	45
	WESA and the Future of eSports	18-May-16	18-May-16	70	12
	WESA Players Council AMA	06-Oct-16	06-Oct-16	316	16
	Thorin's Thoughts – WESA So Vague	14-May-16	15-May-16	303	17
	[WESA EXPLAINED] What is WESA and why is it potentially very bad for the scene?	16-May-16	07-Juli-16	257	47
	In case you don't understand why your favourite orgs are 'supporting' WESA, here's a little ELI5.	16-May-16	17-May-16	20	4
	World ESports Association – New Association registered by ESL	10-May-16	11-May-16	203	38
	BBC publish an article concerning WESA and the ESL Pro League finals	14-May-16	15-May-16	6	3
	James Lampkin: 'Because of the way we built WESA, it doesn't allow for ESL to stomp around'	13-May-16	15-May-16	137	21
	WESA: ESL's Bully Pulpit	13-May-16	14-May-16	37	4
	WESA Reassures Esports World With Plans To Definitely Not Take Over World	13-May-16	14-May-16	96	7
	The Richard Lewis Show #6 WESA Special	15-May-16	15-May-16	117	12
	Nomad from HLTV speaks up about WESA	13-May-16	13-May-16	223	83
	FalleN: I can't be naive [about WESA]	14-May-16	16-May-16	156	16
	Reactions of pros/journalists to WESA announcement	13-May-16	14-May-16	192	29
	WESA.GG is registered under Turtle Entertainment, rather than WESA themselves. Turtle Entertainment is the owner of ESL. Red flags everywhere.	15-May-16	16-May-16	722	99
r/esports	Announcing the foundation of WESA – the World Esports Association	13-May-16	16-May-16	10	4
	World Esports Association (WESA) leaked, includes top teams and ESL	10-May-16	11-May-16	9	4
r/DotA2	World Esports Association has been launched, the WESA, the first esports 'union'	13-May-16	14-May-16	42	7
	World Esports Association (WESA) Founded	14-May-16	14-May-16	6	3
r/Games	WESA is a new FIFA-style governing body for esports	13-May-16	15-May-16	29	8
	Just How Profoundly Flawed Is the World's First Esports Association?	17-May-16	19-May-16	51	14
r/smashbros	Announcing the founding of WESA – the World Esports Association | What it has to to with #FreeLeffen	14-May-16	16-May-16	15	8
TOTAL				**5359**	**861**

In line with predetermined criteria, we selected 861 comments for further analysis. A comment was considered relevant if it provided a textual opinion, evaluation, attitude, feeling, or sentiment towards WESA. Therefore, non-WESA comments and non-textual expressions were excluded. Two research team members independently screened all relevant threads to identify relevant comments. Comments were transferred verbatim into an Excel sheet for subsequent analysis. Grammatical adjustments were not made to maintain the authenticity of the statements.

Data analysis

There are three approaches for sentiment analysis: manual coding (Burton, 2019), lexicon-based (Chang, 2019), and machine learning approaches using statistical models (Gong et al., 2021). Furthermore, there is also the ability to use more than one approach within a study (Wang & Sant, 2022). Despite being time-consuming and subjective, manual coding is still considered a reliable method of sentiment analysis (Roberts et al., 2018). Manual coding offers several advantages over lexicon-based and machine-learning approaches. These include greater reliability in detecting emotion, valence, and tonality (Saif et al., 2013), improved accuracy in coding (Canhoto & Padmanabhan, 2015), and better detection and interpretation of irony and sarcasm (Mostafa, 2013). Given these arguments and the relatively small dataset, we adopted a manual coding approach.

More specifically, we emulated Burton's (2019) applied manual coding approach. To aggregate sentiments towards a phenomenon, textual data were coded and classified as either positive (+1), neutral (0), or negative (−1) (Liu, 2012; Pang & Lee, 2008). Two research team members coded data individually, and their reliability was assessed by calculating Cohen's κ (Berry & Mielke, 1988). The calculated κ coefficient (κ = 0,87; 86,79%) indicated a strong agreement between both coders (Landis & Koch, 1977). Inconsistently coded comments were discussed by the research group afterwards. The qualitative data were evaluated and interpreted using quantitative frequency analyses. Upon completing the sentiment analysis, we applied a qualitative content analysis to explore sentiments from the linguistic material in more detail (Kuckartz, 2014).

Findings

We extracted 938 sentiments from the 861 comments. Note a single comment could contain several sentiments. The initial part of the analysis indicated that 77% ($n = 667$) of the overall comments ($n = 861$) were negative, 19% ($n = 160$) were neutral, and 4% ($n = 34$) were positive. Table 2 shows the category system and illustrative quotes.

The main theme *Disbenefits* contained the most frequently reported negative sentiments ($n = 372$). Comments emphasised the disruptive influence of WESA.

> 'Why do you assholes have to come and put your dirty hands in our game and communities? You're going to ruin the progress we have made. If you want to help, go away. I refuse to support you people and every team that took your bribes'. (The-Rez)

Within this theme, most of the negative sentiments refer to monopolisation ($n = 261$). Concerns of Counter-Strike Redditors revolve primarily around a restriction of competition. Competitors to WESA (e.g. other leagues, tournament organisers, and further established gaming platforms around the game) are systematically disadvantaged. Due to the lack of participation of top teams tied to WESA in other events, competition is thus restricted, slowed down, or even destroyed.

> 'The truth is that you guys want to take control of the scene to make more money and wanting to create a monopoly similar to what some sports already have, for example NFL. Trying to be the one to "govern" eSports not for ethical reasons but to try to become the sole organiser of big tournaments'. (deleted user)

At the same time, Counter-Strike Redditors mention the influence of ESL as a patron of WESA within this subtheme. The monopolisation and restriction of competitions lead to exclusivity: 'To me, this just sounds like ESL wants to bring teams closer to them and away from the others which fits to the "create a monopoly" mentality of the esl owners'. (painlessDawg). Links to the National Football League (NFL) reinforce establishing a natural monopoly around Counter-Strike: 'Seems like players shouldn't be taking their

Table 2. Themes, subthemes, and illustrative quotes.

Sentiment	Themes	Subthemes	Exemplary Comments
Negative	Disbenefits (n = 372)	Monopolization (n = 261)	'Welcome to Monopoly, the Counter-Strike/E-Sports edition!' (Sylvo99)
			'Wesa is blatantly looking to control the tournament market and gobble up top tier teams under their banner. It's fuckin disgusting'. (Vegas1717)
		System Interference (n = 64)	'For some odd reason I still don't believe this is the best for the game/gamers'. (deleted user)
			'I cant see a single shit in how this can be good for the community'. (deleted user)
		Corruption (n = 47)	'This whole thing just reeks of the corruption that everyone was afraid of when the news got leaked; you can smell the corporate bullshit on every response they give in this thread'. (Unnatural-Causes)
			'WESA seems to familiar with FIFA to be honest, which is also completely bullshit (corrupted) in my opinion. (fr4nticstar)'
	Poor Governance (n = 234)	Bias and Conflict of Interests (n = 124)	'I see this from very sceptical perspective, they will be biased since they have 2 board members who are also employees of ESL'. (timelyparadox)
			'WESA is made up of ESL and people who literally own specific teams. It's potential for a lot of bias, and conflict of interest'. (flappers87)
		Lack of Transparency (n = 110)	'I haven't read the dictionary for a while, have they changed the meaning of transparency?' (ragnarls)
			'Where is this transparency? I think its reasonable to provide a copy of your bylaws and other founding documents if you're claiming transparency starts now'. (c1cco)
	Pecuniary Interests (n = 80)		'It is just a shame that what they are doing seems not for the interest of esports, just their wallet and a way of ensuring they stay relevant in this era of multi-million dollar leagues'. (Requill)
			'It's still very early, but I'm glad we're talking about it it and realising that this is people trying to make buck on our game using shady methods'. (ruShmepls)
	No Benefits (n = 138)	Lack of Power (n = 80)	'ESL does not have the power to do something like this in the first place. It feels like they shot themselves in the foot, big time'. (jtalin)
			'I think we don't need this crap. Look how the scene and cs:go has grown without a governing body. Why do we need one now?' (deleted user)
			'Cs scene has lasted 16 years without it'. (Skidoosh123)
		Functioning Status Quo (n = 58)	'I expect some Valve blog this week. They're aware of this I assure you. Do not let these greedy corporate fucks get what they want'. (LeRohameaux)
Positive	Benefits (n = 114)	Uniform Rules and Standards (n = 38)	'I'd posit that csgo as an esport might need one in order to ensure that there is a standard at events which teams and event/league organisers can agree upon'. (clive_cs)
			'As a spectator, an added benefit might be something like us being able to enjoy a high quality World Cup of CSGO every 2 or 4 years or something'. (clive_cs)
		Player/Team Protection and Support (n = 35)	'It would actually go hand in hand with allowing players to have better working conditions in terms of the hours that they spend at events. (clive_cs)'
			'I suppose one potential positive is more reliable revenue for teams from leagues and tournaments could result in players receiving better salaries. . .' (MAMark1)
		Growth (n = 27)	'It is the next step to finally breaking the "hairy dude in his mom's basement" cliche. . . which I don't know about you, but I'm tired of that stereotype'. (EsportsUnlocked)
			'I think the formation of this kind of an organisation was both inevitable, and also necessary for the growth of the scene'. (Casus125)
		Offset Publisher Dominance (n = 14)	'I surely can't be the only one looking at current events and think why don't valve do more to make rules and such as clear as possible to everyone, like a handbook or something [. . .]'. (paddydasiper)
			'Yes, there needs to be a way for orgs, players and tournament organisers to push back against Valve when necessary'. (tolkienfanatic)

sweet ass time with creating a union. This wesa/esl is going to turn into an NFL'. (murderthumbz).

System Inference as a subtheme of disbenefits contains comments regarding the negative implications that WESA has on the community and esports in general and on teams and players in particular: 'A successful WESA will fuck players and fuck the community. IMO thats sad and disgusting [...]'. (gpaularoo)

Corruption is a disbenefit mentioned by community members. In this context, Counter-Strike Redditors draw comparisons to the Fédération Internationale de Football Association (FIFA) as the epitome of a corrupt organisation in traditional sports.

> 'Sounds like they googled FIFA and just took what they found and made an organization based on it. "let's see... corruption, low accountability, bad at regulating the sport they oversee. Sounds great, let's do that"'. (Explosion2)

Poor Governance as a main theme appears in terms of non-transparent structures and incomprehensible actions of WESA ($n = 234$). Counter-Strike Redditors assume a massive conflict of interest regarding internal structures. Thus, the community's confidence in the association is severely limited. A frequently criticised point is the connection and dependence of WESA to the ESL as its founder, which is reflected in the essential sentiment of Counter-Strike Redditors towards ESL as an untrustworthy organisation. Added to this is the resulting perceived lack of transparency in the organisation's structure. WESA and ESL are often perceived as units, thus being negatively assessed, reinforcing that top-level ESL officials are simultaneously board members of WESA. Most members see the organisation as an unbeneficial business-only model for esports.

> 'People comparing ESL (or WESA same shit) with FIFA, but there is one thing... FIFA owns Football, ESL doesn't, Valve owns the game so if they start doing shady shit Valve can just pull the plug and ESL cant host tournaments again'. (Elioss)

The main theme *Pecuniary Interests* ($n = 80$) combines statements regarding business interests: 'CS: GO now is all about milking money before the scenes death'. (trotolektor).

We identified *No Benefits* as a further main theme ($n = 138$). Statements are negatively related to a functioning status quo and a lack of power for esports. Counter-Strike Redditors question an association's role and fundamental purpose in a profit-driven environment with publishers on top. Limited room for manoeuvre due to publisher dominance results in a power deficit for the association.

> 'There are already too many well-funded outfits (including developers themselves) running tournaments with large followings for this to ever take hold of eSports the way FIFA has a grip on Association Football'. (TVPaulD)

Counter-Strike Redditors consider the publisher Valve Corporation (Valve) the overall governing institution: 'The governing body is Valve. End'. (84awkm, 2016). According to the statements, governance bodies have no right to exist next to the publishers. Some Counter-Strike Redditors call on Valve to intervene to stop WESA's actions: 'I hope Valve steps in and ends this quickly'. (Cubbling). Sentiments towards a functioning status quo support the publisher's rationale as the highest authority in esports. Furthermore, comments in this category mention the hostility of esports regarding institutionalisation and regulating structures: 'there was nothing wrong with the way it used to be. why would they fix something that isn't broken, except for filling their pockets?' (shadycharacter2).

Despite the predominantly negative sentiments towards WESA, Counter-Strike Redditors also see a positive in establishing an association for their game. The main category *Benefits* ($n = 114$) refers to the general development of esports and future possibilities due to the establishment of WESA. In this theme, Counter-Strike Redditors see opportunities to improve the prevailing conditions for players and teams and the entire competition-based organisation in professional Counter-Strike. On the one hand, it is about players pursuing their profession

under improved conditions. Minimum wages, transparent and uniform contract terms, and predictable tournament schedules for players and teams are cited to support WESA's work: 'Tournaments, teams, and players would be governed by a single body, guaranteeing things like no overlapping tournaments, minimum standards for player conditions, etc'. (meant2live218). A further subtheme contains positive sentiments regarding the benefits for the entire esports industry through WESA. As an entertainment segment worth million, esports must also be treated as such and deserves appropriate standards and uniform regulations – for all stakeholders involved, especially fans and players. Improved conditions are accompanied by growth at all levels. According to Counter-Strike Redditors, the association's work continues to help esports shed its niche image and become a socially recognised and overall legitimate sports activity in the long term.

> 'WESA will help propel esports to legitimacy. It is the next step to finally breaking the "hairy dude in his mom's basement" cliche... which I don't know about you, but I'm tired of that stereotype. Esports is a legitimate sport and should be treated as such'. (EsportsUnlocked)

Counter-Strike Redditors consider WESA to offset publisher dominance and cite their inability to run tournaments/leagues: '[...] valve have shown that they do not have the resources to properly manage the scene as it expands'. (paddydasniper).

Discussion

The purpose of this study was to examine the sentiments of Counter-Strike Redditors towards the World ESports Association. The findings show that the negative sentiments outweigh the positive ones. Hence, the study supports the argument that esports communities tend to resist institutionalisation and structural boundaries (Hayday et al., 2021) and show hostility towards institutions they perceive as exploiting them (Huettermann et al., 2020). This is also consistent with the literature suggesting that negative sentiments towards sports governance organisations outnumber positive sentiments (García & Llopis-Goig, 2021; Hallmann et al., 2020; Ma et al., 2022; Strittmatter et al., 2018; Thorpe & Wheaton, 2011, 2016).

As many other leisure activities, esports is in the midst of the sportification process (Heere, 2018). In some sportified leisure activities, the final step of this process was the inclusion in the Olympic Games. A three-stage process describes the institutionalisation of snowboarding (Strittmatter et al., 2018) which can be transferred to esports. The first stage describes gaming as a cultural industry. Communities are formed around a specific genre or game in a non-profit environment (Hayday et al., 2021; Kirkpatrick, 2017; Scholz, 2019; Witkowski & Manning, 2019). The second phase is dominated by commercialisation and professionalisation. Competitive gaming became relevant with broadband internet availability, enabling publishers to reach new audiences and leverage esports as a commercial product (Scholz, 2019). The third phase is the emergence of governing organisations as a logical consequence (Collinet et al., 2013). With this step, the institutionalisation of esports as an essential mechanism of its sportification process reached a critical crossroads. However, esports is somehow stuck in its own sportification process. Discussions to include esports in the canon of the Olympic Games already exist. No global governing body has yet been recognised by the IOC. According to our results, the existence of WESA as a governing body and exclusive league is highly questioned by the community.

The unique history of gaming and the community as an essential stakeholder must be considered to direct and support future associational work and ideas (Coates et al., 2010) and to counter and prevent institutional fragmentation (Strittmatter et al., 2018, p. 1). Actions and goals must be seen as valuable to secure legitimacy for an overall governance organisation (Croci & Forster, 2004). However, we note the short-lasting outcry within the Counter-Strike community. As shown in Table 1, the examined threads were published between May and

October 2016, and most comments were made within two to three days of the initial thread post. Beyond that, no further discussion appeared on Reddit. The community's oppositionality had likely no substantial impact on WESA. Research suggests that fan support is critical regarding governing organisations (Dalakas & Phillips Melancon, 2012; Supporters Direct Europe, 2012; Wagner Mainardes et al., 2012). Our results suggest that the perceived value of fan support for governing bodies may be exaggerated slightly. Hence, we agree with previous studies which question the ability of sports fans to act as effective principals for good governance (Hölzen & Meier, 2019).

Counter-Strike Redditors perceived WESA as a tool to promote ESL's monopolisation of the competitive scene of Counter-Strike. Within 861 analysed comments, ESL was mentioned 682 times. For many fans, there was no meaningful distinction between ESL and WESA. Other emergent esports governing organisations may not share this characteristic.

Spracklen (2014) referred to a collective resistance within alternative leisure. However, oppositionality towards WESA was not absolute. Some people perceived WESA would positively affect esports and make the highly fragmented landscape more coherent.

Several limitations need to be reported. First, lexicon-based or machine-learning sentiment analysis may be useful if these approaches generate large data sets. Second, Reddit does not provide sufficient user information due to its anonymity. Therefore, we cannot explicitly identify a comment's author and its role (e.g. amateur or professional player, fan, official, sponsor, etc.). Furthermore, we cannot identify whether these people had a legitimised interest in Counter-Strike. By focusing on WESA-related threads, we assume that we addressed people who are more likely to be related to Counter-Strike and are therefore more likely interested in talking about issues related to this game. Lastly, the dynamics of a discussion should be mentioned. Every comment, whether positive or negative, can have a significant impact on the overall sentiment and lead to herding.

Our decision to focus on WESA and Counter-Strike was purposeful because it enabled us to delineate clearly the boundaries of our study and generate valuable insights on this particular governance model and community. By conducting an in-depth analysis of a single case with a solid empirical basis, we were able to generate detailed findings and draw conclusions that can serve as a foundation for further research. While our study may generate preliminary insights into sentiments towards WESA, the inclusion of other governing organisations, games/titles, and social media platforms/communities in future research will provide a more comprehensive understanding of how people perceive esports governance. We also encourage more studies of oppositionality within sports and leisure contexts. Within esports, we encourage research that examines how fans perceive and reconcile how gaming companies also act as a publisher and *de facto* governing body for their respective games simultaneously. Within sports, we believe that examining fan hostility, brand hate, scepticism and oppositionality towards governing organisations may illuminate further our understanding of sport consumer behaviour.

Disclosure statement

Notes on contributors

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Data availability statement

The data that support the findings of this study are available from the corresponding author, [HH], upon reasonable request.

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Scientific article 3: Image, Trust, and Organizational Hybridity: An Experimental Study

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At the time of the dissertation's submission and evaluation, the study had been under review by Sport Management Review. Ultimately not being accepted for publication, it is currently revised for submission to another high-impact peer-reviewed journal. Thus, an extended abstract is provided.

After publication, the reference and link to the full text may be found on the website of the Department of Sport Governance and Event Management at the University of Bayreuth:

https://www.spowi2.uni-bayreuth.de/de/forschung/publikationen/index.php

Extended Abstract

Hybrid organizations operate beyond traditional boundaries, integrating diverse and potentially conflicting elements such as multiple organizational identities, governance modes, and institutional logics (Albert & Whetten, 1985; Gioia et al., 2000; Vakkuri et al., 2021). These organizations engage various stakeholders, pursue conflicting goals, and undertake divergent activities (Mair et al., 2015). While hybridity research often centres on internal perceptions (Jäger & Schröer, 2014), external stakeholder perceptions, particularly corporate image, are vital for competitive advantage (Simoes, 2005) and long-term success (Karaosmanoglu & Melewar, 2006). Corporate image significantly impacts an organization's reputation, employee satisfaction, product recognition, sales, and stakeholder relationships (Dowling, 1986; Fombrun & Shanley, 1990; Gray & Smeltzer, 1987; Kennedy, 1977). Moreover, a positive corporate image fosters greater trust in the organization (Flavián et al., 2005; Sekhon et al., 2016). However, there is limited understanding of how external customers perceive hybrid organizations' multiple identities, particularly regarding corporate image and trust.

To address this gap, two experimental studies were conducted on the video game publisher Riot Games. An online questionnaire was administered to 1,376 potential respondents via Reddit, Discord, and personal networks between October and December 2023, yielding 507 valid responses. Participants were randomly assigned to one of three scenarios depicting Riot Games as either a publisher (PUBLISHER), a governing authority (GOVBODY), or a socially responsible corporate entity (CSR).

Study 1 explored customer perceptions of corporate image across the three hybrid organizational identities. The CSR identity showed weak evidence of a negative impact on corporate image compared to PUBLISHER and GOVBODY, while no significant differences were found between PUBLISHER and GOVBODY. Regression analysis indicated that the antecedents expertise, integrity, shared values, and benevolence significantly and positively influenced corporate image perception, while communication was not a significant factor. Age negatively affected corporate image perception. Study 2 examined the effects of corporate image on cognitive trust and affective trust and how brand fan identity and esports fan identity confound this relationship. Findings show that corporate image significantly improved both trust types. However, the CSR identity negatively influenced cognitive trust but not affective trust, whereas PUBLISHER and GOVBODY identities showed no significant effects. Brand fan identity consistently enhanced both

cognitive and affective trust, while esports fan identity positively influenced affective but not cognitive trust.

Findings further indicate that Riot Games' publisher identity dominated consumer perceptions, with the CSR identity perceived as less credible, potentially harming corporate image and trust. Expertise, integrity, benevolence, and shared values were significant predictors of corporate image, whereas communication was not, suggesting that esports organizations should emphasize core attributes over overt communication strategies (Karaosmanoglu & Melewar, 2006; Simoes, 2005). Consistent with prior research (Flavián et al., 2005; Sekhon et al., 2016), corporate image significantly influenced trust, though the CSR identity negatively affected cognitive trust. Brand fan identity strongly enhanced both cognitive and affective trust, while esports fan identity primarily influenced affective trust, highlighting the emotional nature of competitive gaming. Limitations included platform-specific survey distribution, the potential biases introduced by using a real company, and the inability to fully explore data complexity, suggesting future research on diverse platforms, gaming habits, and broader hybrid organizational contexts.

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Scientific article 4: Energy Expenditure during eSports – A Case Report

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Energy Expenditure during eSports – A Case Report

Energieverbrauch bei der Ausübung von eSports – eine Fallstudie

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Summary

› **Problem:** The popularity of eSports has grown in recent years, although its characterization as a sport is controversial and there arise concerns about its health-promoting character. The aim of this case study was to show the effects of eSports on the cardiovascular system and on energy expenditure (EE) and to compare them with those occurring during dynamic exercise.

› **Methods:** A male amateur e-athlete (32 years, 184 cm, 60 kg) played a 30-minute video game during which heart rate (HR) and oxygen consumption ($\dot{V}O_2$) were monitored. On another day, 30min cycle ergometer exercise was performed where HR was adjusted to that of the eSports game by changing exercise intensity. Glucose concentration was determined in both tests.

› **Result:** HR increased from 85 bpm to 137 bpm and was almost identical in both tests. In contrast, $\dot{V}O_2$ and EE were about three times higher during cycling ($\dot{V}O_2$ ergometer: 0.72 L/min, eSports: 0.28 L/min; EE ergometer: 3.55 kcal/min, eSports: 1.38 kJ/min). Blood glucose slightly increased during eSports (+0.7 mmol/L) while it decreased during cycling (-2.2 mmol/L).

› **Conclusion:** During eSports, elevated HR is not related to EE as is the case during dynamic exercise. eSports, therefore, represents a pure mental stress response, which is supported by the opposite behavior of the glucose concentration in eSports compared to physical exercise.

Zusammenfassung

› **Problem:** Die Popularität des eSports hat in den letzten Jahren zugenommen, obwohl seine Charakterisierung als Sportart umstritten ist und Bedenken hinsichtlich seines gesundheitsfördernden Charakters aufkommen. Ziel dieser Fallstudie war es, die Auswirkungen des eSports auf das Herz-Kreislauf-System und den Energieverbrauch (energy expenditure, EE) aufzuzeigen und mit denen bei körperlicher Aktivität zu vergleichen.

› **Methodik:** Ein Amateur-E-Sportler (32 Jahre, 184 cm, 60 kg) spielte ein 30-minütiges Videospiel, während dessen Herzfrequenz (HF) und Sauerstoffverbrauch ($\dot{V}O_2$max) bestimmt wurden. An einem anderen Tag wurde ein 30-minütiger Radergometertest durchgeführt, bei welchem die HF durch Änderung der Trainingsintensität an die des eSports-Spiels angepasst wurde. Die Glukosekonzentration wurde in beiden Tests bestimmt.

› **Ergebnis:** Die Herzfrequenz stieg von 85 1/min auf 137 1/min und war bei beiden Tests nahezu identisch. Im Gegensatz dazu waren $\dot{V}O_2$ und EE beim Radfahren mehr als dreimal so hoch ($\dot{V}O_2$-Ergometer: 0.721 L/min, eSports: 0.28 L/min; EE-Ergometer: 3.55 kcal/min, eSports: 1.38 kJ/min). Der Blutzucker stieg während des eSports leicht an (+0.7 mmol/L), während er auf dem Radergometer sank (-2,2 mmol/L).

› **Schlussfolgerung:** Während des eSports geht eine erhöhte Herzfrequenz nicht mit einem gesteigerten Energieverbrauch einher, wie dies bei sportlicher Aktivität der Fall ist. eSports stellt daher eine rein mentale Stressreaktion dar, was durch das entgegengesetzte Verhalten der Glukosekonzentration beim eSport im Vergleich zu sportlicher Aktivität bekräftigt wird.

KEY WORDS: Oxygen Consumption, Cardiovascular System, Heart Rate, Video Game, Exercise Intensity

SCHLÜSSELWÖRTER: Sauerstoffverbrauch, kardiovaskuläres System, Herzfrequenz, Videospiel, Trainingsintensität

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Introduction

Whether the European soccer championships or the Olympic Games or other events in public sports – almost every traditional sport event is canceled or postponed for an unknown period of time due to the COVID-19 pandemic. Furthermore, private sporting activities were only possible to a limited extent before the first loosening of the restrictions came into force in early May 2020. Video gaming respectively electronic Sports (eSports) seemed to be a promising alternative for many people during this time. According to the telecommunications company Verizon, the US American market is experiencing an increase in gaming activity of up to 75% during peak gaming hours and there has also been a significant increase in streaming activities on Twitch (3).
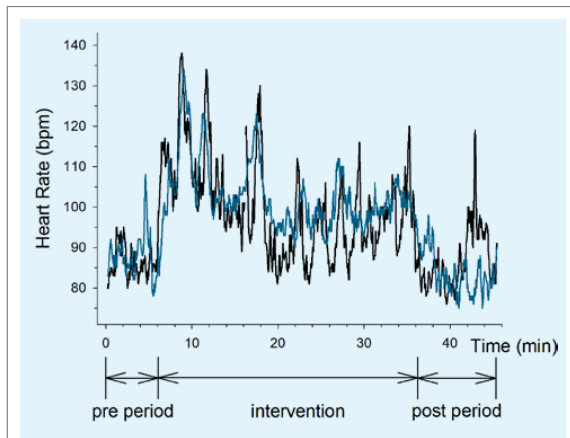
Figure 1

Heart rate during 30 min lasting units of eSports and cycle ergometer exercise. Blue=ergometer; black=eSports.
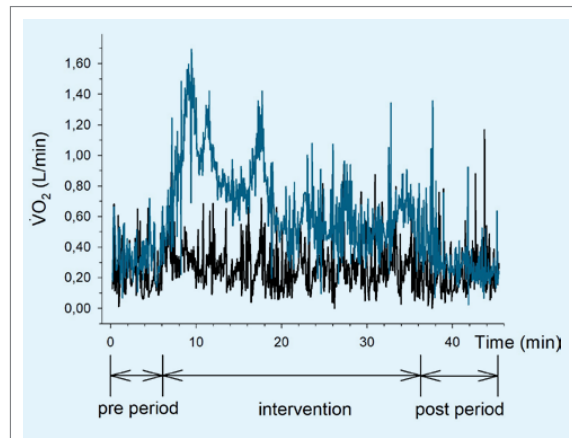

Figure 2

Oxygen consumption (VO$_2$) during 30 min lasting units of eSports and cycle ergometer exercise. Blue=ergometer; black=eSports.

Although controversial in its characterization as a sport (7, 13), eSports is gaining acceptance in the world of athletics as is proven by the rising amount of national and international eSports events organized for professional athletes which are attended by millions of spectators (6). Besides the professional athletes, in daily life millions of mostly young people (4) practice eSports for several hours a day playing sports simulations like FIFA or tactical first-person shooter games like Counter-Strike on their consoles or computers.

From the medical aspect, however, there arise more and more health concerns because of the sedentary nature of the sport and accompanying poor posture; eSports athletes are likely to have musculoskeletal injuries. Additionally, these athletes may have metabolic disturbances resulting from light-emitting diode computer monitors as well as mental health concerns regarding gaming addiction and social behavior disorders (15).

On the other hand, expert opinions assume that the stress-load of e-athletes can be compared with athletes in traditional sports. They achieve similar levels of cortisol as racing drivers and the heart rate of 160-180 bpm is equivalent to that of a marathon runner (8, 9). But whether the cardiovascular stress in eSports is associated with higher energy expenditure as it is the case during endurance training and might, therefore, be even associated with positive health effects, has to our knowledge not yet been described in the literature.

Therefore, the aim of this study was to compare the energy expenditure during an eSports game with that during an equivalent bout of exercise on a cycle ergometer in order to show whether eSports can be seen as physical strain or must be considered exclusively as mental stress. The study was planned in a cross-over design with >10 subjects. Because of the Corona-dependent restrictions, however, only one subject finished the complete test battery before the first lockdown. Because of its actual content, the results from this subject are presented here as a case study.

Methods

A male amateur e-athlete (32 years, 184 cm, 60 kg), who spends an average of 10 to 15 hours / week on eSports, was tested. All investigations were conducted in accordance with the ethical principles of the "Declaration of Helsinki" on Ethical Principles for Medical Research on Humans (14) and the test protocol
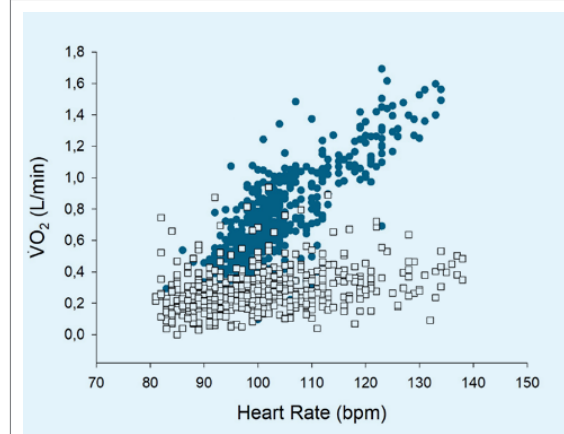

Figure 3

Relationship between Heart Rate and Oxygen consumption (VO$_2$) during 30 min lasting units of eSports (r=0.29) and cycle ergometer exercise (r=0.78). Blue=ergometer; black=eSports.

was approved by the local ethics committee of the University of Bayreuth. The test person received detailed written and oral information about the tests, including information about the content and procedure and about possible risks. He signed a declaration of consent and could terminate the study at any time without further explanations.

The design consisted of two tests. First, the subject performed a 30-minute game on Paladins Champions of the Realm, (Hi-Rez Studios, Alpharetta, Georgia, USA), an objective-based online-multiplayer first-person shooter on PlayStation 4 (Sony, Minato, Tokio, Japan). Heart rate (Polar H7, Polar Electro Oy, Kempele, Finnland) and spiroergometric parameters (breath-by-breath analysis, METALYZER® 3B, CORTEX Biophysik GmbH, Leipzig, Germany) were monitored continuously in sitting position 10min before, over the entire course of the game, and until 10min thereafter. For determination of lactate and glucose concentrations (BIOSEN S-Line Lab+, EKF-diagnostic GmbH, Barleben, Deutschland) blood samples were taken from a hyperemized earlobe before, every 10min during gaming as well as immediately and 10min after finishing. ❯

Table 1

Spirometric and metabolic data obtained during eSports and cycle ergometer exercise. VO$_2$=Oxygen consumption; RER=Respiratory exchange ratio; EE=Energy expenditure; V$_E$=Ventilation; Lac=Blood lactate concentration; Glu=Blood glucose concentration. Data are presented as the mean ± standard deviation (SD).

		PRE	PHASE I	PHASE II	PHASE III	POST
VO$_2$(L/min)	eSports	0.24 ± 0.16	0.30 ± 0.12	0.26 ± 0.14	0.28 ± 0.15	0.24 ± 0.17
	ergometer	0.35 ± 0.14	0.93 ± 0.28	0.66 ± 0.25	0.56 ± 0.11	0.33 ± 0.19
RER	eSports	0.88 ± 0.04	1.01 ± 0.10	0.85 ± 0.08	0.84 ± 0.04	0.80 ± 0.08
	ergometer	0.89 ± 0.03	0.94 ± 0.05	0.92 ± 0.04	0.88 ± 0.03	0.89 ± 0.03
EE (kcal/min)	eSports	1.18 ± 0.78	1.52 ± 0.61	1.26 ± 0.68	1.37 ± 0.73	1.15 ± 0.82
	ergometer	1.72 ± 0.69	4.63 ± 1.39	3.27 ± 1.24	2.74 ± 0.54	1.62 ± 0.93
V$_E$ (L/min)	eSports	9.8 ± 4.7	14.2 ± 4.1	10.9 ± 4.6	12.0 ± 4.2	9.3 ± 4.5
	ergometer	12.9 ± 3.9	26.1 ± 5.2	21.0 ± 5.6	18.5 ± 4.3	12.6 ± 5.2
Lac (mmol/L)	eSports	1.22	1.16	1.02	1.19	1.16
	ergometer	1.16	2.70	1.65	1.20	1.02
Glu (mmol/L)	eSports	5.1	5.1	5.7	5.8	5.7
	ergometer	5.5	4.4	4.1	3.3	3.7

In the second part performed on a separate day, the subject completed a test with aerobic load on a cycle ergometer (Lode Excalibur Sport, Lode B.V., Groningen, Netherlands) with the identical duration as the eSports unit. During the test, the load was manually adjusted continuously to the heart rate curve obtained before, during and after the eSports test. The spiroergometric parameters as well as the lactate and glucose concentrations were measured as described above.

The spirometry data were obtained breath by breath and were calculated for every 5sec. Because the stress level varied during the game we analyzed the data for three intervals lasting 10min each. Because only one subject was tested no statistical analysis except a linear regression analysis for changes in heart rate vs. changes in oxygen consumption ($\dot{V}O_2$) were performed.

Results

The heart rate during the eSports unit increased from approx. 85 bpm to 137 bpm during the first 10 min interval and oscillated at elevated level during the whole time of gaming (Figure 1). During cycle ergometer exercise HR was adjusted to almost identical values and only slightly exceeded the eSports values at the end of exercise. In contrast, $\dot{V}O_2$ did not change during eSports, but was clearly elevated during ergometer exercise (+0.6 L/min during the first interval) (Figure 2). While $\dot{V}O_2$ was only slightly correlated to HR during eSports (r=0.29), there was a close relationship during ergometer exercise (r=0.78, p<0.001; Figure 3).

Energy expenditure was almost not affected by eSports, but was clearly increased during ergometer exercise (Table 1). During eSports, ventilation increased by approx. 50% and RER was elevated during the first interval. During ergometer exercise ventilation was doubled without effecting RER (Table 1).

Blood glucose concentration showed an opposite behavior, slightly increasing during eSports and decreasing during ergometer exercise. Lactate concentration was only slightly increased at the beginning of ergometer exercise (Table 1).

Discussion

The most important result was that eSports provoked a typical stress response as is demonstrated by increased heart rate which was hardly related to any change in energy expenditure as it occurs during physical exercise.

The increase in heart rate from 85 to 137 b/min during gaming was lower than reported for elite e-athletes who are characterized by up to 160-180 bpm during international competitions (9). To our knowledge, despite eSports is popular among millions of people worldwide there are no data available describing the cardiovascular reaction in leisure e-athletes. The increase in heart rate in this case study, however, corresponds to other stress situations like car driving (10), examinations (12), parachuting (2) or emotional stress situations (11) which can be exclusively referred to the activation of the sympathetic nervous system and may therefore be representative for eSports at low or intermediate performance level. The oscillation in heart rate also proves the heterogeneous demand of the prevailing game situations making it difficult to characterize a general cardiac reaction to eSports.

Adjusting the heart rate during the ergometer test can be judged as successful. There is no difference between the two tests during the first 10min interval; in the following two intervals the HR in the ergometer test is only slightly above that in eSports (Table 1).

During dynamic exercise, there exists a close relationship between the heart rate response and oxygen consumption (1) which is also present in this case study. During eSports, however, no noteworthy relationship exists indicating the absence of any remarkable metabolic demand. In a comparison of heart rate, metabolic and hormonal responses to maximal psycho-emotional stress during motor car racing and physical stress, i.e. cycle ergometer exercise, Schwaberger (10) found very similar results as we did in this case report. He reported a similar heart rate response under both conditions with a strong accompanying increase in $\dot{V}O_2$ only during physical exercise. The increase in catecholamine concentration was much more pronounced after psycho-emotional stress leading to higher plasma glucose and free fatty acid concentration. Also in our study, glucose concentration tended to increase during eSports hinting to elevated adrenaline effects on glycolysis.

To our knowledge there exists no data concerning the effects of eSports on metabolism and energy expenditure in the literature. Also this study just presents the results of a comparison of a relative short unit of eSports with moderate intensity and physical exercise in one single subject which, however, are in line with previous studies on psycho-emotional and physical stress.

In summary, it can be stated that the physiological processes during eSports differ clearly from those of dynamic exercise. The positive health effects associated with physical activity, i.e. elevated energy expenditure combined with an adequate cardiovascular response, could not be observed during eSports. Here, the increased heart rate is due to psychological stress without having the same metabolic effects as endurance exercise. eSports can therefore not be recommended as an adequate alternative to physical activities. Nevertheless, we are aware that eSports is not a homogeneous discipline and varies considerably concerning intensity and duration. Although not investigated here, eSports requires a level of neuromuscular performance (5), which is hardly demanded in any established sport. On the other hand, children and adolescents, in particular, often spend several hours a day playing eSports, so the effects of frequent stress situations on the cardiovascular system, on the metabolism and also on potentially harmful interactions between both should be examined more in detail. The present case report is therefore a suggestion and a request to investigate these relationships, which may be important for a large number of people. In doing so, we suggest studies considering the multidimensional character of eSports and the large number of game titles within different genres. ■

Conflict of Interest
The authors have no conflict of interest.

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Scientific article 5: Acute Effects of Esports on the Cardiovascular System and Energy Expenditure in Amateur Esports Players.

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Acute Effects of Esports on the Cardiovascular System and Energy Expenditure in Amateur Esports Players

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Introduction: Esports is practiced by millions of people worldwide every day. On a professional level, esports has been proven to have a high stress potential and is sometimes considered equivalent to traditional sporting activities. While traditional sports have health-promoting effects through muscle activity and increased energy expenditure, amateur esports could represent a purely sedentary activity, which would carry potentially harmful effects when practiced regularly. Therefore, this study aims to investigate the acute effects of esports on the cardiovascular system and energy expenditure in amateur esports players to show whether esports can be considered as physical strain or mental stress or whether amateur esports has to be seen as purely sedentary behavior.

Methods: Thirty male subjects participated in a 30-min gaming session, playing the soccer simulation game FIFA 20 or the tactical, first-person multiplayer shooter Counter-Strike: Global Offensive. Respiratory and cardiovascular parameters, as well as energy expenditure, blood glucose, lactate, and cortisol, were determined pre-, during, and post-gaming.

Results: There were no significant changes in oxygen uptake, carbon dioxide output, energy expenditure, stroke volume, or lactate levels. Heart rate, blood glucose and cortisol decreased through the intervention until reaching their minimum levels 10 min post-gaming (Cortisol$_{pre}$: 3.1 $\pm$ 2.9 ng/ml, Cortisol$_{post}$: 2.2 $\pm$ 2.3 ng/ml, $p < 0.01$; HR$_{min0.5}$: 82 $\pm$ 11 bpm, HR$_{post}$: 74 $\pm$ 13 bpm, $p < 0.01$).

Conclusion: A 30-min esports intervention does not positively affect energy expenditure or metabolism in amateur esports players. Therefore, it cannot provide the same health-promoting effects as traditional sports participation, but could in the long-term rather cause the same potentially health-damaging effects as purely sedentary behavior. However, it does not trigger a negative stress response in the players. Deliberate physical activity and exercise routines adapted to these demands should therefore be part of the daily life of amateur esports players.

Keywords: gaming, stress, sympathetic system, cortisol, heart rate, oxygen uptake

INTRODUCTION

Esports at different performance levels, defined as a competitive sport where gamers use their physical and mental abilities to compete in various games in a virtual, electronic environment (International Esports Federation, 2021), have grown tremendously in recent years. For example, the popular esports game League of Legends was played by an average of over 27 million people every day in 2018 (Newzoo, 2018). The total number of videogame players is significantly higher due to the variety of games and is further boosted by the restrictions on sports and activities during the COVID-19 pandemic (Goodwin, 2020). Since there are no hard differentiation criteria in the literature so far, for this study, we distinguish three performance levels of videogame players: On one side, professional esports players who have developed their game-specific physical and mental skills to the highest degree in order to establish themselves at the elite level of organized esports and often practice 8–12 h a day (Khromov et al., 2018). On the other side, casual gamers should be distinguished from esports players, as they do not require the prolonged development of skills in one game as well as competitive gaming (Reitman et al., 2020). However, casual gamers often also spend several hours a day playing various games (Khromov et al., 2018). As a third, intermediate performance level, we consider amateur players who focus on developing skills in a specific game and play this game in a competitive setting but have not reached a professional level (Jagnow, 2018; Khromov et al., 2019).

This trial will focus on amateur esports players since professional esports players represent only a small part of the total esports player population. For example, there were ∼202 million video gamers (all skill levels) in the U.S. in 2020 (Statista Research Department, 2021), of which 4,334 played professionally (Gough, 2021). Due to the lack of differentiation criteria, no solid numbers for amateur players can be given. However, due to the high numbers of video gamers in general and the fact that only a few of many aspiring amateur gamers make it to the professional level, it can be assumed that amateur players represent a correspondingly large cohort. Since this population group puts a high amount of time into competitive esports, the amateur sector is highly relevant from an epidemiological point of view. Overall, esports is steadily growing in importance and must therefore be viewed as a widespread social phenomenon with potential medical consequences.

Although esports is controversially discussed at the highest economic, political, and sports policy levels (Jenny et al., 2017; Ansgar and Jannika, 2018; Fiore et al., 2020), it is gaining acceptance in the world of athletics (Holden et al., 2017). However, today, the health-promoting aspect is mainly associated with traditional sports: systematic endurance training improves cardiovascular health, and regular muscle contractions during endurance or strength training release a large number of myokines, which have proven to be very positive in the prevention of many diseases of civilization (Wilmore, 2003; Chen et al., 2016). Whether these preventive effects are also caused by esports is questionable, as it is still unclear whether esports is a purely sedentary task or whether it

causes metabolic activity in the players. Following, we assume that esports is a purely sedentary activity if no change in energy expenditure (EE) of +14% is achieved. We base this assumption on the meta-analysis by Saeidifard et al. from 2018, who found a change in EE between purely sedentary and passive standing behavior of approximately +14% across 1,184 subjects (Saeidifard et al., 2018). This is supported by Amaro-Gahete et al. in 2019, who also measured a difference of approximately +14% between sitting and standing in $n = 15$ men (Amaro-Gahete et al., 2019).

Since the player often spends several hours a day in a primarily sedentary position and hardly any larger muscle groups are used, the potentially harmful effects of sedentary behavior in general could play a major role in the long-term. Greater time spent in a sedentary position is associated, for example, with higher all-cause mortality rates as well as increased risks for cardiovascular diseases and type 2 diabetes (Katzmarzyk et al., 2019; Saunders et al., 2020). In addition, a graded dose-response relationship between greater sedentary behavior and higher levels of different indicators of weight status, like body weight, body fat or adiposity, is assumed (Katzmarzyk et al., 2019; Saunders et al., 2020). Moreover, the harmful effects of sedentary behavior are more pronounced in physically inactive people (Katzmarzyk et al., 2019).

Applying the above findings to esports, there arise more and more health concerns because of the sedentary nature of esports and accompanying poor posture. It has already been observed that esports players are more likely to have musculoskeletal injuries like dysfunctions of the cervical and lumbar spine and the upper extremity (Zwibel et al., 2019); additionally, metabolic disturbances resulting from light-emitting diode computer monitors and mental health concerns regarding gaming addiction and social behavior disorders have been reported (Zwibel et al., 2019).

To this day, there are almost no data concerning metabolic changes caused by esports, and little research exists on cardiovascular stress. To answer the health impact question of esports, some studies regarding physiological stress in esports were carried out. These refer to either professional esports in a tournament situation or casual gaming (CG) (Staude-Müller et al., 2008; Lyons et al., 2011; Siervo et al., 2013, 2018; Rudolf et al., 2016; Behnke et al., 2019). In the competitive esports setting, significant increases in cardiac output ($\dot{Q}$) (Behnke et al., 2019) and heart rate (HR) (Chaput et al., 2011; Behnke et al., 2019) were measured. Since, in some cases, HR of up to 160–180 bpm were achieved and similar levels of cortisol as racing drivers were reached, there is a prevailing opinion that the stress load of professional esports players is comparable to traditional athletes (Rudolf et al., 2016; Schütz, 2016).

Looking at non-competitive CG, the data representing the stress reaction are inconsistent, showing slight increases, unchanged values or decreases for heart rate and unchanged or decreasing values for blood pressure and cortisol (Ballard and Wiest, 1996; Ballard et al., 2006; Arriaga et al., 2008; Barlett et al., 2008, 2009; Adachi and Willoughby, 2011; Siervo et al., 2013, 2018; Yeo et al., 2017). Overall, the available data tend to show that there are no or only minor stress reactions in

CG. A similar inconsistency was seen in metabolic parameters, where the existing studies on CG found no or only a slight increase in oxygen uptake ($\dot{V}O_2$) and EE (Lanningham-Foster et al., 2009; Lyons et al., 2011; Barry et al., 2016). At the same time, the respiration rate in the non-competitive setting decreased during the game (Staude-Müller et al., 2008). Thus, in CG, there appears to be no metabolic response and thereby no increase in EE. This would classify CG as purely sedentary behavior and CG could thus carry the possible long-term health risks of prolonged sedentary behavior. Overall, it turns out that an important distinction needs to be made between CG and professional esports, as physiological responses here are different and not transferable.

As previously described, there already exist studies on stress and metabolic responses in CG and, to some extent, professional esports settings. These studies, however, segmented gamers into a binary distinction between professional players and casual gamers. The intermediate performance level of amateur esports players has thus far not been considered, and so there is almost no research on how and to what extent amateur esports affect metabolism and EE and whether this is coupled with the stress responses. The only available study linking metabolic and stress data in amateur esports demonstrated that the stress response is decoupled from the metabolic response as HR was markedly increased while EE did not change (Haupt et al., 2021). However, this case study has weak explanatory power, and further research is urgently required. Furthermore, the barely studied segment of amateur esports players plays a major role from a health perspective due to the high number of players, especially young players, and needs to be investigated (Khromov et al., 2018; Hedlund, 2021).

This study aims to investigate the acute effects of esports on the cardiovascular system and EE in amateur esports players to show whether amateur esports has to be seen as purely sedentary behavior, possibly accompanied by potentially harmful effects on health in the long term, or whether esports can be considered physical strain or mental stress. To test this hypothesis, we focus our study on the two esports titles "Counter-Strike: Global Offensive" and "FIFA 20."

MATERIALS AND METHODS

All investigations were conducted in accordance with the "Declaration of Helsinki" on Ethical Principles for Medical Research on Humans (World Medical Association, 2013), and the test protocol was approved by the local ethics committee of the University of Bayreuth. All subjects provided written informed consent, which included the aim and possible risks of the study, and they could terminate the study at any time without further explanations.

Test Subjects

Thirty healthy male amateur esports players (age 23.1 ± 3.0 years), who spend an average of 12.3 h per week on esports, were tested. The subjects were recruited through a mailing to the students and employees of the University of Bayreuth and through the esports team of the University of Bayreuth. In total,

TABLE 1 | Characteristics of the subjects.

	Overall ($n = 30$)	CS:GO ($n = 13$)	FIFA ($n = 17$)
Age [years]	23.1 ± 3.0	24.1 ± 3.4	22.3 ± 2.4
Height [cm]	180.4 ± 8.6	181.4 ± 9.5	179.7 ± 8.0
Body mass [kg]	78.5 ± 13.3	82.4 ± 17.0	75.5 ± 9.1
Body fat [kg]	15.2 ± 7.8[#]	19.2 ± 9.2	12.1 ± 4.8
Body fat [%]	18.7 ± 7.2[##]	22.5 ± 7.8	15.8 ± 5.2
Visceral fat [cm^2]	62.4 ± 36.5[##]	82.0 ± 41.2	47.4 ± 24.1
LBM [kg]	63.3 ± 8.4	63.2 ± 10.5	63.4 ± 6.9
Esports [h/week]	12.3 ± 4.5[##]	14.6 ± 5.9	10.5 ± 1.4
Sporting activity [h/week]	4.5 ± 3.0	3.5 ± 3.6	5.1 ± 2.3

Values are mean ± SD; LBM, lean body mass; visceral fat [cm^2] expressed as cross-sectional area; significance of differences between groups: [#]$p < 0.05$, [##]$p < 0.01$.

approximately $n = 16.000$ people were reached directly. A power analysis according to Hopkins (Hopkins, 2020) was performed, which led to a minimum population size of $n = 17$. According to Saeidifard et al. (2018) and Amaro-Gahete et al. (2019), the difference in energy expenditure between sitting and standing is around 14%, which is why we calculated the smallest change in energy expenditure required to exclude a purely sedentary activity with +14%. We assumed a typical error of 13.6% based on past studies we have conducted on resting metabolic rate. The number of participants of $n = 30$ is, therefore, sufficient to prove our hypothesis.

The main inclusion criteria were playing the required game (Counter-Strike: Global Offensive or FIFA 20) for at least 10 h per week with interruptions of <1 month in the last year prior to study participation. The study team set this prerequisite to ensure participants were amateur players with a minimum gaming experience and routine level. Additional inclusion criteria required participants to be in good health, of male gender and between 18 and 40 years of age. Exclusion criteria were regular smoking or medical contraindications for participation in the study. In addition, no coffee, alcohol, or performance-enhancing supplements were to be consumed and no sport was to be practiced on the day of the trial. **Table 1** provides the anthropometric and (e)sports activity data for all subjects.

Study Design

The study was held at the sports medicine laboratory of the University of Bayreuth (Institute of Sports Science). It consisted of one gaming session, split into the pre-gaming, gaming, and post-gaming stage. The pre- and post-gaming phases lasted 10 min, the gaming session at least 30 min and consisted either of Counter-Strike: Global Offensive (CS:GO) or FIFA 20 (FIFA). CS:GO (Valve, Bellevue, US) is a tactical, first-person multiplayer shooter and was played either on the subject's personal device or an ASUS ZenBook UX434F (ASUSTeK COMPUTER INC., Taipei, Taiwan). The soccer simulation video game FIFA 20 (Electronic Arts, Redwood City, US) was performed on PlayStation 4 (Sony, Minato, Tokyo, Japan). Initially on the measuring day, an anthropometric measurement of body

composition was performed using bioelectrical impedance analysis (BIA, In-Body 720, Biospace Co. Ltd., Seoul, South Korea), for which the participants were instructed to fast for at least 3 h before they arrived at the laboratory, and esports and sporting activity in hours per week were surveyed *via* a written questionnaire. Pre-, during, and post-gaming respiratory parameters, EE, cardiovascular parameters, as well as blood and hormonal parameters, were determined.

Respiratory Parameters

Respiratory parameters [oxygen uptake ($\dot{V}O_2$), carbon dioxide output ($\dot{V}CO_2$), respiratory exchange ratio (RER) and ventilation (VE)] were monitored continuously (METALYZER® 3B, CORTEX Biophysik GmbH, Leipzig, Germany) in sitting position starting 10 min before, over the entire course of the game, and until 10 min thereafter. The spirometry data were obtained breath-by-breath and were analyzed for every 5 s. Data were calculated as 5-min intervals and as 0.5-, 1-, and 2-min intervals after the start of the gaming session. When referring to these data, index entries, therefore, contain either "pre," the minutes in the game (e.g., RER_{min2}), "post" or the number of minutes after the end of the game (e.g., RER_{min+10}). EE was calculated by converting the measured RER values to their caloric equivalent and multiplying this by the corresponding $\dot{V}O_2$ values.
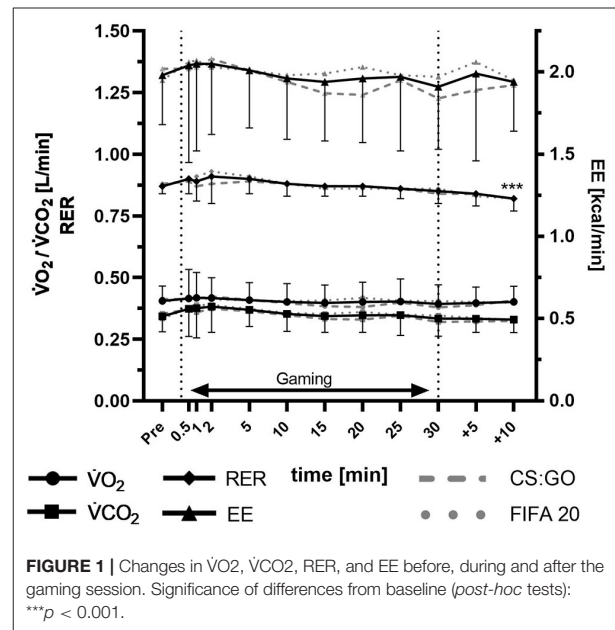
Cardiovascular Parameters

Cardiovascular parameters [heart rate (HR), cardiac output ($\dot{Q}$) and stroke volume (SV)] were monitored (PhysioFlow Enduro, Manatec Biomedical, Paris, France) continuously in a sitting position starting 10 min before, over the entire course of the game, and until 10 min thereafter. The cardiovascular data were obtained and analyzed simultaneously to the respiratory parameters due to the connected measurement system (MetaSoft® Studio, CORTEX Biophysik GmbH, Leipzig, Germany).

Saliva and Blood Analytical Procedures

A saliva sample was taken 15 min before and 15 min after the gaming session to determine the cortisol level (Cort). For this purpose, a cotton roll was soaked with saliva in the mouth for 1–2 min (Salivette® Cortisol, SARSTEDT AG & Co., Nümbrecht, Germany). The saliva was then isolated by centrifugation and analyzed using an enzyme-linked immunosorbent assay. Pre-gaming, 5, 10, 20, and 30 min into the gaming phase, as well as 10 min post-gaming capillary blood samples were taken from an hyperemized earlobe. These were used to determine lactate and blood glucose concentrations (BIOSEN S-Line Lab+, EKF-diagnostic GmbH, Barleben, Germany).

Statistics

All statistical calculations were performed using Graphpad Prism 8.0 (GraphPad Software, US). Data are presented as the mean ± standard deviation (SD). Data were tested for normal distribution *via* Kolmogorov-Smirnov test. All parameters except cortisol were normally distributed. Possible changes over time were checked by an analysis of variance for repeated measurements

FIGURE 1 | Changes in $\dot{V}O2$, $\dot{V}CO2$, RER, and EE before, during and after the gaming session. Significance of differences from baseline (*post-hoc* tests): ***$p < 0.001$.

(one-way ANOVA) with *post-hoc* tests (Bonferroni *post-hoc* test). Differences between groups at identical time points were calculated using unpaired *t*-tests. The significance of differences in Cortisol levels pre- and post-gaming was analyzed with a non-parametric Wilcoxon matched-pairs signed rank test. The significance level was set at $p < 0.05$.

RESULTS

Anthropometric Parameters and (e)Sports Habits

CS:GO and FIFA players differed significantly in absolute and relative body fat, visceral fat, and hours of esports activity per week. No significant differences were found in age, height, body mass, lean body mass, and hours of sporting activity per week between CS:GO and FIFA players (**Table 1**).

Respiratory Parameters and Energy Expenditure

Figure 1 shows the course in $\dot{V}O_2$, $\dot{V}CO_2$, RER, and EE before, during, and after the gaming session. $\dot{V}O_2$ and $\dot{V}CO_2$ remained constant over all three phases. Mean $\dot{V}O_2$ during the gaming session was 0.40 ± 0.06 L/min ($\dot{V}O_{2,pre}$: 0.40 ± 0.07 L/min; $\dot{V}O_{2,post}$: 0.40 ± 0.06 L/min). The RER showed a significant time effect ($p < 0.001$) with significant lower values in the post-phase (RER_{pre}: 0.87 ± 0.03, RER_{min+10}: 0.82 ± 0.05, $p_{pre;post} < 0.001$). In the calculated EE, no significant changes occurred (EE_{pre}: 1.98 ± 0.30 kcal/min; EE_{Gaming}: 1.99 ± 0.43 kcal/min; EE_{post}: 1.96 ± 0.43 kcal/min). Additionally, there were no significant differences in $\dot{V}O_2$, $\dot{V}CO_2$, RER, and EE between CS:GO and FIFA players.

Cardiovascular Parameters

As shown in **Table 2**, HR and $\dot{Q}$ showed a significant time effect ($p < 0.001$) and decreased significantly toward the end of the game and the post-phase in relation to $HR_{min0.5}$ and $\dot{Q}_{min0.5}$. In stroke volume, no significant changes occurred. Between CS:GO and FIFA players, no significant differences in HR, $\dot{Q}$, and SV were detected.

Blood and Hormonal Parameters

Blood glucose showed a significant time effect ($p < 0.05$) with significantly lower values in the post-phase, while lactate remained constant over all three phases (**Table 3**). Cortisol levels decreased significantly from pre- to post-phase. No significant differences in blood glucose, lactate, and cortisol of CS:GO and FIFA players were found.

DISCUSSION

The present study aims to investigate the extent to which EE and the cardiovascular system are acutely affected in amateur esports players during a 30 min lasting esports unit. The central finding of this study is that a 30 min esports intervention at the amateur level does not affect metabolism and thus EE. Likewise, no stress response is induced in the players. Since very little data exists for amateur players, our results are compared with professional players and casual gamers to enable a relative classification of these performance classes.

Stress Response

Looking at other sports like chess, which are mentally but not physically demanding, studies found an increased sympathetic activation for professional and amateur players (Troubat et al., 2009; Fuentes-García et al., 2019). Competitive, performance-oriented esports shows very similar tendencies: Looking at professional esports players in a tournament situation, there is an increase in HR and trends toward a heightened $\dot{Q}$, which implies a high sympathetic activation (Behnke et al., 2019). For example, Rudolf et al. found a slight increase in HR from 102 to 108 bpm, comparing pre to during the tournament situation. This slight increase, as well as the high HR at baseline, are likely caused by the tournament situation and not by the esports activity itself since, in the same players, a relatively low HR (80 bpm) during training of the identical game could be measured (Rudolf et al., 2016). The stress reaction during esports tournaments is partially reinforced at the hormonal level by the significantly elevated cortisol concentrations found in some studies (Schütz, 2016; Schmidt et al., 2020). However, it was not detected in other trials measuring consistent cortisol levels during competitive esports (Oxford et al., 2010; Chaput et al., 2011; Rudolf et al., 2016; Gray et al., 2018). On the other hand, non-competitive casual gaming (CG) was contrary to these results, as no changes in cardiac activity and no hormonal stress indicators could be detected as a reaction to 15–60 min of gaming (Ballard et al., 2006; Arriaga et al., 2008; Staude-Müller et al., 2008; Siervo et al., 2013, 2018).

These findings lead to the expectation that sympathetic activation as an increase in HR, $\dot{Q}$, SV, and cortisol could also occur in amateur esports, although to a lesser extent than in

TABLE 2 | Heart rate, cardiac output, and stroke volume pre, during and post the gaming session.

Time [min]		Pre	0.5	1	2	5	10	15	20	25	30	+5	+10
HR [bpm]	Overall	79 ± 10	82 ± 11	81 ± 13	81 ± 12	80 ± 11	78++ ± 10	77++ ± 10	77++ ± 11	78 ± 11	77+ ± 10	76+ ± 11	74++ ± 13
	CS:GO	82 ± 7	84 ± 6	80+ ± 8	81 ± 8	82 ± 7	80 ± 7	79 ± 7	79 ± 7	82 ± 9	80 ± 7	79 ± 8	74 ± 16
	FIFA	77 ± 12	81 ± 14	82 ± 16	80 ± 14	78 ± 13	77 ± 13	76+ ± 13	76 ± 13	75 ± 12	75 ± 12	74 ± 12	73 ± 11*
SV [ml]	Overall	95.0 ± 16.4	93.9 ± 20.3	93.2 ± 19.1	96.0 ± 17.5	93.4 ± 16.0	93.7 ± 16.9	95.2 ± 14.1	92.0 ± 19.6	93.7 ± 18.3	92.3 ± 17.8	95.6 ± 16.2	91.3 ± 17.7
	CS:GO	93.9 ± 20.5	91.5 ± 25.7	90.6 ± 24.8	96.0 ± 21.7	91.6 ± 19.1	93.0 ± 19.8	96.4 ± 13.9	90.0 ± 25.4	92.2 ± 22.3	90.5 ± 21.6	97.8 ± 18.4	88.3 ± 20.5
	FIFA	96.0 ± 2.8	95.6 ± 15.7	95.3 ± 13.5	96.0 ± 14.0	94.8 ± 13.5	94.3 ± 14.8	94.2 ± 14.6	93.6 ± 14.0	94.9 ± 14.9	93.7 ± 14.5	94.0 ± 14.7	93.6 ± 15.5
$\dot{Q}$ [L/min]	Overall	7.4 ± 1.2	7.9 ± 1.8	7.7 ± 1.8	7.8 ± 1.6	7.5 ± 1.4	7.4 ± 1.3	7.4 ± 1.1	7.1+ ± 1.4	7.3 ± 1.2	7.1++ ± 1.3	7.2 ± 1.1	6.8+ ± 1.2
	CS:GO	7.6 ± 1.4	8.0 ± 2.2	7.5 ± 2.0	8.2 ± 1.7	7.8 ± 1.5	7.6 ± 1.4	7.8 ± 0.7	7.3 ± 1.7	7.6 ± 1.2	7.2 ± 1.5	7.7 ± 0.9	6.9 ± 1.3
	FIFA	7.3 ± 1.0	7.79 ± 1.5	7.8 ± 1.7	7.6 ± 1.7	7.4 ± 1.3	7.2++ ± 1.3	7.2+ ± 1.3	7.0 ± 1.2	7.1 ± 1.1	7.0 ± 1.1	6.9 ± 1.2	6.8 ± 1.2

*Values are mean ± SD. HR, heart rate; $\dot{Q}$, cardiac output; SV, stroke volume. Significance of differences from $t = 0.5$: +p < 0.05, ++p < 0.01. Significance of differences from baseline: *p < 0.05.*

TABLE 3 | Lactate, glucose, and saliva cortisol pre, during and post the gaming session.

Time [min]		Pre	5	10	20	30	+10
Lactate [mmol/L]	Overall	0.9 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2
	CS:GO	0.9 ± 0.2	0.8 ± 0.2	0.9 ± 0.2	0.9 ± 0.2	0.8 ± 0.2	0.9 ± 0.2
	FIFA	0.9 ± 0.3	0.9 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.3
Glucose [mmol/L]	Overall	5.3 ± 0.8	5.1 ± 0.7	5.1 ± 0.6	5.0 ± 0.7	5.0 ± 0.6	4.9 ± 0.7*
	CS:GO	5.3 ± 0.7	5.1 ± 0.5	5.0 ± 0.5	5.0 ± 0.5	5.0 ± 0.5	4.9 ± 0.5
	FIFA	5.2 ± 1.0	5.1 ± 0.8	5.1 ± 0.7	5.0 ± 0.8	5.1 ± 0.7	4.9 ± 0.8
Cortisol [ng/ml]	Overall	3.1 ± 2.9	–	–	–	–	2.2 ± 2.3**
	CS:GO	3.6 ± 3.1	–	–	–	–	2.6 ± 2.2
	FIFA	2.6 ± 2.6	–	–	–	–	1.8 ± 2.3**

Values are mean $\pm$ SD. Significance of differences from baseline: *$p < 0.05$, **$p < 0.01$.

professional esports. This assumption is also supported by the case study of Haupt et al., in which a mental but no metabolic stress response was triggered in an amateur esports player (Haupt et al., 2021).

In the present study, during the course of the game and just after the end of the game, HR and $\dot{Q}$ decreased. This suggests that the playing itself did not trigger a stress reaction. At the hormonal level, this assumption is strengthened by the significant decrease in the cortisol level. A rising cortisol level is often used as an indicator for mental stress situations, as it is needed to mobilize glucose for the skeletal musculature to prepare the body for fight-or-flight reactions (Tozman et al., 2017), which does not happen in this study. Similarly, in other competitive, sedentary situations, such as professional chess, no or only small increases in cortisol levels have been found (Tozman et al., 2017; Mendoza et al., 2020). Although the circadian rhythm could have contributed to this, the observed cortisol reduction was significantly more pronounced than what would typically occur during this period in the absence of external influences (Bailey and Heitkemper, 2001).

In physically stressful situations, blood glucose is needed to provide energy for any potential fight-or-flight reactions. During such increased metabolic demands, the release and breakdown of glucose balance each other out, resulting in approximately constant blood glucose levels (Bamberger et al., 1996). In mentally stressful situations, on the other hand, glucose concentration increases due to the elevated glycogenolysis while glucose consumption remains constant. Therefore, the significant decrease in blood glucose values from pre-gaming to 10 min after the end of the game suggests that there is no stress situation caused by playing. The lactate values, which did not change, align with our assumptions because lactate concentration is known to increase during severe stress situations (Hermann et al., 2019).

Overall, when comparing our data to data in the literature, amateur esports should be distinguished in its acute stress-related, physiological effects from professional esports with enormous sympathetic arousal, in which the players find themselves in a highly competitive as well as pressuring situation and are strongly mentally challenged as well as subject to high performance pressure. Therefore, amateur esports can be better compared with the low sympathetic activities in CG.

Metabolism and Energy Expenditure

In studies on other cognitively oriented sports such as chess, no increased metabolic response could be observed in the professional and amateur levels. However, studies have found an increased stress response in chess players of different performance levels despite the unchanged metabolic response (Troubat et al., 2009; Fuentes-García et al., 2019). At the moment, there is no literature data in the competitive esports area for comparison, but in the CG sector, the same tendencies can be observed in the metabolic reaction, as shown in this study. In chess as well as in CG players, there were no or only minimal increases in respiration rate, $\dot{V}O_2$ and EE (Staude-Müller et al., 2008; Lanningham-Foster et al., 2009; Lyons et al., 2011; Barry et al., 2016). As the only study to date that investigated metabolism and EE in esports, the case study by Haupt et al. likewise did not detect an increase in metabolic response or EE. However, a major stress situation occurred during the gaming session (Haupt et al., 2021). At the metabolic level, these findings are supported by this study, as metabolism, expressed by the parameters $\dot{V}O_2$, $\dot{V}CO_2$, and RER, as well as the EE, showed no acute change due to the 30-min esports intervention.

Overall, the present study's findings suggest that in amateur esports, no acute changes in metabolism or EE occur, while HR and $\dot{Q}$ slightly decrease. Consequently, the lower HR and $\dot{Q}$ seem not to be coupled to the metabolic reactions, as it is mentally but not physically induced.

Games Comparison

Performing esports at an amateur level, players of both games in this study have shown identical physiological responses. However, it is necessary to explicitly distinguish this from the professional area since skill level as well as competition situation could play a major role here and make game-specific investigations necessary.

However, there were differences between the two player groups in body composition and the amount of time spent playing per week. The CS:GO players had a higher body fat percentage than the FIFA players and spent more time playing their respective games per week. Since lean body mass and the exercise activity of both groups did not differ, this could indicate that more gaming hours per week lead to less activity in everyday

life. This is supported by a study by DiFrancisco-Donoghue et al. (2020), demonstrating that collegiate esports players are significantly less active than non-esports players and have a higher body fat percentage. However, it is equally conceivable that FIFA as a sports simulation generally attracts players with an already more active lifestyle. All in all, additional research is necessary to make generally applicable statements.

Practical Implications

The consequence of this would be that esports cannot provide the same health-promoting functions as traditional sports or presumably do not have any health-promoting effects in general. Due to the lack of any form of physical strain, neither the energy metabolism nor the cardiovascular health can be increased, nor can muscles be built, nor can disease-preventing myokines be released (Wilmore, 2003; Chen et al., 2016). Presumably, esports is a form of purely sedentary behavior, which could be associated with potentially harmful effects, such as higher risks for cardiovascular diseases, type 2 diabetes and increased all-cause mortality rates (Katzmarzyk et al., 2019; Saunders et al., 2020). In order to counteract these possible negative health consequences, deliberate physical activity and exercise routines adapted to these demands should be part of the daily life of amateur esports players. Considering the recommendations of the ACSM's guidelines for exercise testing and prescription 2021, adults should perform 150 min of moderate-intensity aerobic physical activity per week for improved health promotion and disease prevention (American College of Sports Medicine, 2021). However, since esports does not constitute aerobic physical activity, these recommendations cannot be fulfilled by esports and additional physical activity is needed to meet these requirements.

Limitations

Although the power analysis requirements were met, the number of participants was nonetheless limited to $n = 30$, making it difficult to provide generalized conclusions. Additionally, the playing time of 30 min was relatively short and thus may only offer a brief insight into, but not a general overview of the gaming situation. With longer game durations more in line with the daily life of professional or amateur players in esports, prolonged exposure to esports could have different effects on metabolism and stress responses and therefore needs to be investigated. Moreover, only acute effects and not long-term effects were investigated by this study. Furthermore, only two games, CS:GO and FIFA, were examined. The results for other games could differ from those of this study and need to be examined individually. Also, the individual game experience of the players was only partially controlled and may have differed between participants. To determine cardiovascular responses, respectively, sympathetic activity more precisely, blood pressure measurements would have been of the highest interest. However, since conventional blood pressure measurements would have disturbed the game's flow, they were not used in this study.

The regular use of caffeinated or alcoholic products, dietary supplements, or pharmacological agents as well as preliminary fatigue or hydration status were not controlled, which could, to some extent, influence the study outcomes. However, this would probably influence all three measurement phases and keep the changes over the course of the measurement largely unaffected. In addition, changes in emotional state before, during and after the 30-min gaming session were not measured and could have influenced the course of the heart rate.

Additionally, only the weekly sporting activity was surveyed via a questionnaire. In order to be able to know the daily physical activity, it would have been necessary to measure the physical activity using an activity tracker. Moreover, it is unclear to what extent these results can be transferred to female amateur players. Further research on gender differences in the psychophysiological response to esports is needed.

CONCLUSION

It can be concluded that esports does not have a stimulating effect on EE in amateur players. On the other hand, there is no acute negative stress reaction. However, if several hours a day are regularly spent playing video games or esports, this may lead to the gamer's considerably reduced everyday activity, on the long-term increasing the risk for development of chronic diseases. This tendency is concerning but has not yet been sufficiently investigated and therefore requires further studies to determine the effects of esports on health. It is nevertheless advisable for conscious physical activity and well-adapted exercise routines to be part of the daily routine of amateur esports athletes.

Furthermore, a clear distinction must be drawn between esports professionals and amateurs since professionals are under higher stress influences due to the given tournament or competition situation. Moreover, there could be differences between the physiological responses to different games in the professional area, which has not been investigated yet. Overall, the lack of data is still evident and requires further physiological investigations not only in professional, but, from an epidemiological point of view even more important, also in amateur esports players.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of the University of Bayreuth. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RZ, SH, HH, and WS were involved in the conception and design of the study, approved the final version of the manuscript, and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. RZ

and SH were involved in the acquisition of data. RZ and WS were involved in the analysis, interpretation of the data, and the drafting of the manuscript. SH and HH were involved in the critical revision of the manuscript. All authors contributed to the study. All authors contributed to the article and approved the submitted version.

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