Environmental Sustainability Efforts in Esports Organizations Toward Climate Action

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Abstract

As the global esports industry continues to grow, concerns regarding its environmental sustainability have garnered increasing attention. However, there is still an apparent lack of research on esports that intersect environmental sustainability, particularly to climate action. Our study aimed to gain a deeper understanding of efforts made by the esports stakeholders to achieve climate action. The findings reinforce the importance of existing United Nations' climate action framework for esports and highlight the potential for esports organizations to promote greater environmental responsibility.

Keywords: Esports, Climate action, Environmental sustainability, Digitalization

1. Introduction

Environmental sustainability is a significant challenge in the modern age, and this is true for gaming and esports as well (Abraham, 2022; Chang, 2019; Scholz & Nothelfer, 2022). Sustainable practices are now expected of all organizations and are widely regarded as responsible business conduct. Therefore, we also expect esports organizations to engage in sustainable and responsible actions (Kaillinen-Kuisma & Auvinen, 2022). Further, the survival and success of esports are largely determined by how effectively stakeholders address sustainability (Nyström et al., 2022).

Stakeholders like game developers, professional players/teams, and league organizers, play a central role in the survival and growth of esports ecosystem (Julkunen et al., 2021). However, the esports ecosystem remains obscure and disorganized involving a large number of various types of business operators (Wong & Meng-Lewis, 2023). Therefore, it is urgent to focus on a particular stakeholder within the ecosystems to examine their efforts in promoting environmental sustainability.

Esports and related activities can be significant sources of pollution, contributing to e-waste, energy consumption, CO2 emissions, and other environmental impacts (Abraham, 2022; Ross & Fisackerly, 2023). However, esports can also serve as a highly influential platform for disseminating knowledge and reinforcing vital messages about climate change (Hayday et al., 2022). This assertion directly relates to United Nations' Sustainable Development Goals (SDGs), particularly SDG#13 that emphasize climate action. Further, it relates to existing policy framework for sports in general that target climate action (UNFCCC, 2024). However, research at the intersection of esports and climate action remains very limited.

Scholarly literature on esports has traditionally focused on topics such as esports games themselves, competitive gaming, video gaming, and human-computer interaction (Chiu et al., 2021). However, due to the relatively brief history of academic research, studies have mainly examined esports physiological, motivational, informational, communicational, media, cognitive science, legal, sponsorship, and sociological perspectives (Julkunen et al., 2021). Thus, climate action in esports has received relatively little attention in academic studies. Nonetheless, recent research begun to recognize its importance of environmental sustainability, particularly in relation to climate change (Besombes, 2022; Scholz & Nothelfer, 2022).

In response, our study aims to better understanding the efforts made by esports stakeholders to achieve climate action (SDG#13). We seek to answer the following questions: 1) What actions have esports organizations taken to address climate change? And 2) How can these actions

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contribute to developing a climate action framework for esports organizations?

To answer the question, we employed a qualitative case method, examining seven esports organizations and substantiating our findings with two expert interviews. This approach contributes to the academic field of esports by exploring how these organizations can support climate action. Furthermore, the study increases awareness of environmental sustainability in esports among academia and stakeholders.

2. Esports

Although esports is still a relatively young phenomenon, it has gained increasing global attention (Allal-Chérif et al., 2024; Jeong & Youk, 2023). Esports is characterized by high heterogeneity and complexity (Scholz & Nothelfer, 2022). However, we view esports as a form of sport where the input and output of playing is facilitated by electronic systems through human-machine interaction (Rahman et al., 2023; Hamari & Sjöblom, 2017). Such electronic mediated environment enables players to play a sport or game as individuals or part of a team for competition (Scholz & Nothelfer, 2022). Esports includes leagues, competitive circuits, tournaments, and similar activities where individuals or teams compete in video games for entertainment, rewards, or money, with spectators either in-person or online (VGEE, 2021). Esports is an integral part of the video game industry and is often referred to interchangeably as competitive gaming, organized play, e-gaming, or pro gaming. Like traditional sports, the primary objective of esports games is to defeat opponents to achieve victory (Chiu et al., 2021). Consequently, esports is fundamentally characterized by three elements: human involvement, digital technology, and competitive gameplay.

The requirement for human players distinguishes esports from competitions solely between machines or artificial intelligence, as esports involves at least two human players competing against each other. The digital aspect includes both hardware and software related to video games. Hardware elements like computers, consoles, and other electronic systems facilitate competing and training activities (Parshakov et al., 2020). Software elements are crucial for creating and running video games while digital platforms and head-mounted equipment are integral to augmented or virtual realities (Altimira et al., 2016).

Competitions are organized by officials for specific games and involve various activities. These include fixtures, designated tournament formats, rules, and the selection or registration of teams or players (VGEE, 2021). Esports competitions often take place within leagues and tournaments facilitating both individual and team play (Ludwig et al., 2020; Parshakov et al., 2020; Werder, 2022). This structured framework sets esports apart from casual video gaming, which is typically enjoyed as a recreational activity (VGEE, 2021).

Esports also requires specialized skills developed through professional training. For example, mastering the use of mouse and keyboard functions demands precise control of small muscle groups (Chiu et al., 2021). Additionally, esports games demand strong and consistent cognitive responses for decision-making and strategic planning (Cranmer et al., 2021; Hamari & Sjöblom, 2017). Consequently, esports players undergo continuous training to enhance their performance. In preparation for esports competitions, players engage in structured training activities such as boot camps or frequent practice matches, known as scrims (Werder, 2022; Crawford & Gosling, 2009).

To facilitate the aforementioned activities, esports organizations play a central role in the ecosystem by organizing leagues or tournaments and assembling players or teams. Similar to traditional sports, esports organizations also contribute to global warming and climate change, which is related to SDG#13.

3. Esports and climate action

Climate action aims to combat climate change and its negative impacts. In esports, climate action involves the responsible use of natural resources, sustainable technologies, and energy-efficient practices in video gaming and competitive events (Nyström et al., 2022; UNFCCC, 2024). While there are efforts to offset these impacts, it is important to consider that these measures may not fully mitigate the overall environmental harm. That is, esports has several negative impacts on environmental sustainability, which will be explored in detail below.

In esports, electricity is crucial for powering the facilities and the necessary hardware. Additionally, organizations need to run the venue and event, accommodate players, officials, and spectators that involve the extraction of water, raw materials, food, chemicals, and other natural resources. Such activities generate waste and recyclables from attendees, which must be appropriately disposed of to prevent further human-generated waste from impacting the environment (Ross & Fisackerly, 2023).

Concerning transportation, fuel is used to move people and materials to in-person esports events and venues, which is environmentally damaging as transportation is a major source of CO2 emissions. For example, spectators' travel contributes around 55% of

the total CO2 emissions, while athletes and teams account for around 24% (Collins et al., 2009; Dolf & Teehan, 2015).

Online video games generate and retain massive amounts of data through connectivity and data exchange for high-resolution streaming. Esports events are usually held in public assembly venues for in-person audiences while being streamed to online audience (Chaloner, 2020). In 2016, global online gaming traffic reached 915 petabytes per month, making it the world's fastest-growing data usage sub-segment (Patterson & Barratt, 2019). Additionally, the purchasing of games has shifted from physical copies to digital downloads, with digital sales in the U.S. increasing from 20% in 2009 to 79% in 2017 (Patterson & Barratt, 2019). This surge in data requires a significant amount of electricity to power servers (Gordon, 2020). As a result, massive data flow also generates several hundred tons of carbon emissions per year from each server farm. Furthermore, every video game needs to be developed for esports to exist (Ross & Fisackerly, 2023).

Several esports titles are constantly updated, with new content frequently distributed (Scholz, 2019). Additionally, games have a limited lifespan and cannot be guaranteed to remain in competitive settings indefinitely (Jalonen, 2019). Similarly, most electronic hardware devices last only five years on average, leading to rapidly increasing e-waste generation, from 50 million tons in 2019 to a projected 120 million tons by 2050 (Patterson & Barratt, 2019). Electronic waste represents one of the world's fastest-growing waste streams, with less than 20% being recycled globally. Further, producing and delivering these hardware devices also consumes significant natural resources (Abraham, 2022).

Most of the hardware required for esports involves the mining and extraction of rare elements, minerals, and petroleum-based materials, especially plastics (Gordon, 2020). These materials are shipped globally, contributing to transportation emissions (Ross & Fisackerly, 2023). This cycle is exacerbated by the constant update loop, leading to the repeated sourcing, use, and disposal of potentially non-recyclable materials (Patterson & Barratt, 2019). Despite these negative environmental impacts, esports may also contribute significantly to climate action.

Esports has been identified as a cultural phenomenon to influence and mobilize climate action (Hayday et al., 2022). It helps to disseminate knowledge and shape behavior regarding climate change and other critical environmental challenges. For example, hundreds of millions of people worldwide watch esports on various platforms each week (Julkunen et al., 2021). Each month, over 100 million users watch esports on the popular video game streaming site like Twitch. Consequently, esports possesses significant innovative potential to leverage its vast user base in generating momentum for climate change awareness and discussions.

4. Research method

Based on a qualitative approach, this study uses document analysis and expert interviews as the primary data sources (Wynn & Williams, 2012). A case study method involves systematic collection and analysis of cases that reflect the given unit of analysis, rather than the conclusions if the original authors. In our study, the unit of analysis is the environmental sustainability efforts undertaken by esports organizations in relation to climate action (SDG#13). We use purposive and convenience sampling to identify and select relevant documents and interviewees.

We first identified and selected seven esports organizations from different countries to ensure geographical diversity, which enhances the depth and breadth of the findings. We collected all available materials from the websites of these organizations. Additionally, we used Google Search and Google Scholar to find further documents and published works related to these case organizations. Based on the content from these sources, we selected 44 documents/websites for analysis (a list of the is available upon request from the authors).

Next, we employed abductive reasoning to code and categorize the information from these documents based on activities related to the climate action framework (UNFCCC, 2024). We analyzed these categories to identify consistent and inconsistent patterns, which allowed us to systematically recognize emerging themes. We then examined relationships among those themes, trends, and differences across case organizations and their climate action efforts. To validate and enhance the findings from the document analysis, we conducted two expert interviews (Creswell & Poth, 2018). These interviews provided a deeper understanding of the esports teams' activities concerning climate action (UNFCCC, 2024).

We selected two experts from the case organizations identified during the document analysi, one individual holding positions of CEO/co-founder and another serving as Director of Innovation. An interview guide, developed based on the document analysis, was sent to the interviewees in advance to allow them time to prepare. The interviews, which lasted between 35 and 50 minutes were recorded and transcribed immediately for analysis. The collected interview data was then analyzed by using the same

approach as the document analysis. We compared these insights with the findings from the document analysis to identify correlations and differences.

5. Findings

The following section present our findings. First, a summary of climate activities by esports organizations based on document analysis. Second, a thematic understanding from expert interviews that support greater environmental responsibility.

5.1. Insights into cases: Document analysis

Team A, a Danish esports organization, operates from a two-story flagship store located within Denmark's prominent cultural institution, Tivoli. As tenants of Tivoli, they adhere to the institution's green energy policy, ensuring their energy consumption is fully covered by renewable sources. Additionally, Team A actively implements an energy-saving policy within their organization to further reduce their environmental footprint.

Team B, a Portuguese esports organization, collaborates with ZeroWasteLab, a non-profit dedicated to zero-waste solutions. They have developed an app to track real-time energy consumption of each team member based on their individual hardware usage during travel, training, competition, and online work. This data is converted into CO2 equivalent emissions and quantified in terms of trees needed for carbon capture. The team tracks emissions and offsets negative impact by investing in carbon-capture solutions endorsed by ZeroCertified, which promote regenerative practices.

Team C, a US-based esports organization, launched its Go Green initiative in 2020, which includes several environmental campaigns. The initiative began with TreeQuest, where trees were planted for specific events during the team's LCS games, resulting in over 10,000 trees donated to the One Tree Planted organization. Following this, SeaQuest was implemented during the team's 2020 LCS Summer Split, with donations made to the Coral Reef Alliance to support coral reef conservation. The third phase, WorldQuest, involved tree planting and coral replenishment efforts during the 2020 League of Legends World Championship. In 2021, Team C expanded its environmental efforts by committing to produce eco-friendly clothing, ensuring that all future merchandise contains at least 25% recycled and sustainable materials. Furthermore, the organization began phasing out non-eco-friendly merchandise by the end of the year.

Team D, a UK-based esports organization, has established a dedicated internal environmental working group that meets regularly to address its carbon footprint and implement sustainability initiatives across all aspects of its operations. In collaboration with Planet Mark, a group of sustainability specialists, Team D is actively working toward achieving a net-zero carbon footprint. Planet Mark provides guidance and recommendations to help reduce carbon emissions, and Team D also supports Cool Earth in protecting endangered rainforests. Additionally, Team D is a founding member of the Gamers 4 The Planet Alliance, a sustainability movement within esports and gaming. They are also collaborating with ChopValue, a circular economy company, to develop the world's most sustainable carbon-negative gaming desks, contributing to offsetting the carbon footprint associated with esports.

Team E, a Finnish esports organization, initiated a partnership in 2022 with Vattenfall, Finland's most responsible electricity company for four consecutive years. Recognizing the significant electricity consumption of their professional players during gaming, Team E aims to promote responsible gaming by transitioning to fossil-free electricity. The partnership focuses on demonstrating the tangible positive effects of using fossil-free energy will emphasize the importance of selecting sustainable electricity sources. Vattenfall and Team E publish a monthly CO2 report for Team E players, detailing their gaming hours and resulting CO2 savings. Additionally, their joint goal is to raise awareness of fossil-free energy options through the Pelikeli campaign, which showcases solar, wind, and hydropower and discusses their advantages and disadvantages. Central to the campaign are three videos, each focusing on a different energy source, which are broadcasted on Team E's channels and those of its influencers. Team E also offers various types of ecological merchandise.

Team F, a Swedish esports organization, has partnered with WWF for the Earth Hour campaign since 2021. Earth Hour, organized by WWF, is a global initiative held annually on March 27th, encouraging people worldwide to switch off their electronic devices in support of nature and the planet. In collaboration with WWF, Team F participated in a global fundraising campaign from March 13 to March 28, 2021, organizing livestream events to raise funds and awareness for WWF's wildlife conservation and environmental sustainability projects. Furthermore, in 2021, Team F partnered with the digital electricity company Tibber to offset the energy consumption of gaming computers. Tibber offers renewable electricity at cost price through an app, prioritizing sustainability

over profit. In 2022, Team F also collaborated with the Swedish lifestyle brand A Good Company, launching a recycled water bottle to kickstart a sustainability-focused partnership. Moreover, Team F's partnership with Razer, a leading global lifestyle brand for gamers, provides their players with gaming gear such as mice, headsets, and keyboards. Razer is committed to environmental, social, and governance principles, aligning with the Hong Kong Stock Exchange's requirements and implementing various green initiatives across its operations.

Team G is a multi-regional esports organization with a commerce and apparel department focused on being more planet-friendly by continuously re-evaluating and optimizing their production process. They are committed to creating products with sustainability in mind, ensuring that every step of their production process is modified to reduce ecological footprint. This includes developing sustainable materials, treatments, and eco-friendly fabrics to minimize water and energy consumption per garment, and utilizing a dyeing process that is 100% non-toxic and natural. Additionally, Team G aims to increase their use of renewable methods and reduce material waste to contribute to a circular economy. For example, they launched an environmentally friendly apparel collection in 2022, prioritizing sustainability by minimizing waste and maximizing the use of eco-friendly treatments, fabrics, and high-quality materials.

5.2. Combined insights from different cases: Expert interviews and document analysis

5.2.1. Establishing partnerships for good. It is evident that most esports teams have formed partnerships with various entities. These collaborations enable them to leverage diverse expertise, resources, and capabilities to reduce climate impact. The climate action initiatives undertaken by these teams cover a broad spectrum of efforts aimed at reducing environmental impact, conserving natural resources, and promoting long-term ecological balance. Common types of collaborations, projects, and initiatives include renewable energy adoption, energy efficiency measures, waste reduction, conservation and restoration efforts, sustainable transportation solutions, green building practices, and awareness campaigns.

The selection of projects and partners for collaboration are typically based on their alignment with climate action goals. These initiatives are viewed as crucial for safeguarding the planet to ensure a sustainable future. Furthermore, insights from expert interviews underscore the importance of these projects and collaborations in achieving climate action. For example, an expert from Team E highlighted the rationale behind their choice of partners:

Our two primary partners, Kotipizza and Vattenfall, are exeptionally proactive in environmental sustainability. Vattenfall, recognized as Finland's most sustainable electricity company, and Kotipizza, acknowledged as Finland's most sustainable restaurant brand, integrate sustainability into every aspects of their operations.

5.2.2. Reducing waste and e-waste. The insights from document analysis and interviews highlight the importance of waste reduction. Human activities generate an enormous amount of waste, which increases annually. This waste includes various materials and by-products, and accumulation has severe environmental consequences, contributing to greenhouse gas emissions and global warming.

Reducing climate impact through waste reduction and recycling is a crucial aspect of modern environmental stewardship. It involves minimizing waste generation and reusing or recycling to reduce environmental impact and conserve resources. Achieving climate action through waste reduction and recycling addresses resource conservation, pollution reduction, and the promotion of a circular economy. Both experts also highlighted this fact as follows:

In our office, the amount of waste generated is minimal, with dining being the largest source. We use a lot of our partner Kotipizza's products, which come in fully recyclable pizza boxes that we then take to cardboard recycling. -Team E

At our facility, we have bins for different types of waste. Everyone is aware of this, and we all help ensure proper waste separation. -Team F

Most of the hardware required for gaming involves the mining and extraction of rare elements, minerals, and other materials, which negatively impacts the environment. Regarding the recycling of gaming-related materials, an expert from Team E, noted that their partnership with Jimm's supports the circular economy and helps conserves the natural environment:

We have an agreement with Jimm's that we use their equipment, and after a certain period, it is resold as used via them. This creates a circular economy model: we are the first users, and all our gaming equipment, will be resold via Jimm.

Additionally, an expert from Team F noted that this is a current focus for their organization, with ongoing discussions with their partners:

This is something that we are working on. We have already begun preliminary discussions and

planning with our partners about recycling gaming-related materials.

5.2.3. Reducing energy consumption. Document analysis reveals that some teams have taken actions to save energy and use renewable energy sources. Esports facilities require electricity for various operations, including maintaining temperatures, providing lighting, and powering gaming and workstation equipment. Due to the extensive use of professional gaming setups and other electronic devices, these facilities often have higher-than-average energy consumption within the video game industry. This involves investment in renewable energy sources like solar, wind, and geothermal power. However, as noted by the interviewed experts, some organizations have limited influence over procuring sustainable energy for their facilities.

Our rent includes the electricity supply, so we cannot influence how and where the electricity is sourced. Hence, our lessor is responsible for the facility's energy, and we have no control over it. -Team E

However, both experts recognized the importance of procuring sustainable energy for their facilities and have made efforts to explore alternative solutions. These efforts include collaborating with electricity companies that provide renewable energy options for staff and investigating ways to incorporate sustainable energy into their facilities.

Our cooperation with the electricity company Vattenfall allows individual players and personnel of the organization to have their electricity contracts with them. -Team E

Document analysis reaveals that climate action has been implemented through the adoption of specific technologies aiming to improve energy efficiency in facilities. This approach is crucial for reducing carbon emissions, mitigating climate change, and conserving natural resources. Teams commonly employ various energy monitoring systems to enhance efficiency. According to interviews, actions to lower energy consumption included installing LED lights, adjusting lighting, and incorporating dimmers and timers into lighting systems:

All of our office lighting is from LED lamps, which can be adjusted as needed. In esports, excessive lighting is often used, so we have considered this when designing our office lighting. -Team E

All of the lamps are equipped with dimming and automatically dim or turning off when people leave the rooms. -Team F

Implementing energy efficiency monitoring systems allows facilities to track energy usage in real-time. This data-driven approach enabled informed decision-making and continuous optimization of energy performance. his system helps identify and address the root causes of energy inefficiency effectively.

We have a meter that alerts people if electricity usage increases. For example, if five computers are left on, an alert is sent to individuals with access to the office, prompting them to investigate the issue. -Team F

Organizations might optimize heating in their facilitaties to reduce energy consumption and minimize the environmental impact of heating and cooling operations. Adjusting temperature settings is a key strategy for contributing to climate action by reducing energy use, conserving resources, and demonstrating corporate sustainability. However, as noted by an expert from Team E, not all teams can influence the heating or temperature settings of their facilities due to their tenant status.

The heating in our office is fixed, and we have limited ability to adjust it. We can make only minor adjustments.

5.2.4. Focusing on durability. The equipment and gear used in the organizational facilities and by personnel serve multiple purposes. Facilities typically include office furniture and essentials, electronics, and various other assets. Reducing climate impact through the procurement of reusable and environmentally sustainable work and gaming equipment is a growing trend driven by CR initiatives. This involves making conscious choices to minimize the environmental impact throughout lifecycle of these products. Key considerations include lifecycle assessments, eco-labels and certifications, material selection, durability, longevity, and supplier engagement.

Office furniture, including desks, sofas, tables, and chairs, plays a significant role in faclity's environmental impact. Archived data also underscores the importance of these initiatives. Both experts noted their consideration of climate action in relation to office furniture. As explained by the expert from Team F:

For our office furniture, we chose to invest in expensive, high-quality, and durable pieces from a small manufacturer. Every piece has been with us since we opened the office years ago. If any item gets damaged, we have it repaired.

Gaming equipment typically include items like gaming consoles, PCs, monitors, keyboards, mice, controllers, and headsets. Electronics play a significant role in esports, directly impacting a player's performance and overall experience. As outlined by the expert from Team E, this equipment is vital in esports, especially at in-person or LAN events

where player performance depends on it. They selected an electronics retailer that follows circular economy principles to promote sustainable and responsible consumption.

Regarding gaming equipment, we try to keep it up-to-date, to ensure optimal player performance. We receive new gaming equipment from our partner, and after one or two years of use, we return it to them. The returned equipment is then inspected, cleaned, and sold as used. -Team *E*

5.2.5. Focusing on sustainable merchandise. While the primary focus of esports organizations is performimg well in tournaments to secure cash prizes and sponsorship, merchandise sales represent an important revenue stream. However, the production of apparel and other merchandise significantly contributes to environmental harm. Document analysis and interviews revealed that this is a key area where esports teams can directly reduce their climate footprint by negotiatiating with equipment and apparel suppliers. This was emphasized in the expert interviews as well:

We have collaborated with Pure Waste, a Finnish textile recycling company, to produce part of our clothing collection from recycled fabrics. -Team E

The moment I joined the team, we stopped manufacturing in China and began producing in Portugal with smaller quantities… We have also looked at the whole supply chain, from cotton sourcing to final delivery, ensuring that every step is carefully monitored. -Team F

5.2.6. Reducing travelling. The need for frequent travel for tournaments and practices was an important factor that was not evident from the document analysis but emerged during the interviews. The fuel used for this transportation generates greenhouse emissions that negatively impact the environment. That is, transportation is regarded as one of the most harmful activities. Addressing climate action in travel and transportation involves minimizing the negative environmentl impacts of travel while maximizing positive contributions to conservation. Key strategies include transitioning, promoting public transportation, and carpooling, and encouraging sustainable travel practices within organizations through education and policy measures. As outlined by an expert from Team E:

Players travel primarily by train, and that is not possible, we have taken tournament trips in a big car that fits everyone. Some individual players might drive themselves if they have a different schedule, but otherwise, everyone either travels by train or carpools.

In addition to general transportation, reducing specific transportation modes of travel, such as air travel, presents challenges for organizations. This is because they have limited control over transportation choices when participating in international LAN events, which are typically arranged by tournament organizers. An expert from Team E noted:

This is beyond our control. We have participated in foreign LAN events where tournament organizer covers the flight costs, and we have no influence over the choice of flights or airlines.

Moreover, Team F has reduced unnecessary travel at the organizational level, driven not only by financial reasons but also by a commitment to climate action. This is outlined as follows:

We have reduced travel at the organizational level by implementing a policy where three designated team members evaluate whether travel is necessary. This approach addresses both financial concerns and the carbon footprint associated with travel.

6. Discussion: Toward a climate action framework for esports

Our findings indicate that esports organizations have not only reduced their environmental footprint and conserved natural resources, but also achieved cost savings and enhaced long-term business resilience. Additionally, these insights offer foundational elements that could help in developing a climate action framework for esports (UNFCCC, 2024).

Tenet 1: Systematic efforts to promote climate leadership. Esports organizations often have limited control over the procurement of sustainable energy for their facilities due to their status as tenants. Nonetheless, some landlords, like those of Team A, have green energy policies that ensure the use of electricity from renewable sources, significantly reducing CO2 emissions. This not only helps to lower climate footprint of the facilities but also demonstrates leadership in sustainable business practices. Esports organizations are actively exploring alternative solutions, such as negotiating with landlords and partnering with sustainable electricity providers. These collaborations offer an opportunity to align economic growth with environmental stewardship, fostering a more sustainable and resilient energy future.

Tenet 2: Systematic efforts to reduce overall climate impact. Sports organizations, often constrained by their tanant status, have limited control over temperature settings within their facilities. However, minor adjustments can be made. Implementing energy-efficient cooling and heating solutions can significantly reduce energy

consumption, conserve resources, and lower the overall environmental impact of these operations. Utilizing various strategies helps mitigate financial and environmental costs, contributing to a more sustainable operational footprint (Quefelec, 2022).

The findings demonstrate that esports organizations have implemented specific technologies in their facilities, such as energy monitoring systems, LED lighting, dimmers, and timers. The use of energy monitoring systems has enabled these organizations to make informed decisions and continuously optimize their facilities' energy performance. Effective energy management systems help organizations manage their energy use sustainably, resulting in reduced costs and environmental impact (McLaughlin et al., 2015). The installation of LED lighting has significantly reduced energy consumption within these facilities. LED lighting is currently the most efficient method of illumination, offering high energy efficiency. Additionally, the longer lifespan of LED lighting has decreased waste generation, further reducing environmental impact within esports facilities.

Tenet 3: Promote responsible production and consumption. Esports organizations have prioritized the procurement of reusable and environmentally friendly work and gaming equipment, as well as merchandise and apparel from suppliers with sustainable practices. In terms of office furniture, these organizations have sourced both new and used items from companies committed to sustainable practices and circular economy. Regarding merchandise and apparel, esports organizations collaborated with suppliers and manufacturers who adhere to the principles of the circular economy, resulting in more environmentally friendly products (Ogunmakinde et al., 2021).

By adopting responsible procurement processes, esports organizations can reduce their climate impact while creating healthier and more environmentally friendly work environments. Further, these organizations have also reduced both waste and e-waste utilizing recyclable products within their facilities. Reducing the use of specific materials, particularly single-use plastics, is a critical aspect of modern business operations. By eliminating single-use plastics, esports organizations contribute to promoting responsible consumption and enhancing environmental well-being. Sustainable procurement not only improves corporate environmental performance but also supports broader ecological sustainability (Etse et al., 2023).

Esports organizations utilize the use of public transportation and carpooling when traveling to in-person events. Public transportation significantly reduces greenhouse gas emissions, which are harmful to the environment (Hodges, 2010), while carpooling helps to lower both energy consumption and emissions (Shaheen et al., 2018). Additionally, these organizations have taken steps to minimize travel overall, further contributing their environmental sustainability.

Tenet 4: Create partnership to promote greater environmental responsibility. Esports organizations can form collaborations with manufacturers, suppliers, distributors, retailers, and organizations from different industries that are committed to climate action. These partnerships bring together diverse perspectives, fostering creativity and innovative to environmental challenges. By sharing responsibilities and liabilities organizations can minimize individual exposure and enhance project resilience, thereby promoting environmental responsibility (Ramanathan et al., 2020). Overall, the collaborations and partnerships formed by esports organizations are crucial for advancing climate action, harnessing collective actions, and promoting inclusive and equitable solutions to complex environmental challenges.

Tenet 5: Advocate for climate friendly institutional change. Esports organizations can drive institutional change within the gaming industry by adopting climate friendly mindset. Stakeholders of esports have potential to shape the competitive landscape and significalntlly influence gaming culture and communities. Although social responsibility agendas are still in the earlys stages of integration into esports business models (Hayday et al., 2022), it is evident that esport managers are becoming increasingly involved with climate action. This engagement allows managers to interact directly with the institutional environment, fostering advocacy for sustainable practices (Subbady, 2013).

Additionally, esports has substantial potential to increase awareness of climate action among a global audience. With millions of followers worldwide and a growing audience, esports organizations have a unique opportunity for advocacy for climate action to engage followers through conversations and communication. This engagement raises awareness and empowers people to make informed decisions and adopt sustainable habits in their everyday life. By incorporating environmental themes into their activities, esports organizations can drive significant change and contribute to a sustainable future. However, it is apparent that esports do have a harmful impact on the natural environment (Ross and Fisackerly,2023). The operation of esports relies on natural resources, emphasizing the need to incorporate sustainable practices within the industry to mitigate its negative impacts. While it is not possible to eliminate

all environmental effects, efforts should be made to minimize them as much as possible.

7. Conclusions

The intersection of esports and climate action is notably underexplored in academic literature (Besombes, 2022; Scholz & Nothelfer, 2022). In response, our study provides critical insights into how esports organizations are addressing climate action. Despite the inherent climate impacts of esports, our study reveals esports organizations' innovative climate action solutions. Moreover, esports offer a unique opportunities to promote environmental awareness and activism to a global audience. Our study thus provides valuable perspectives on the emergence of eco-conscious practices within this rapidly growing industry and offers practical insights for esports organizations and other stakeholders in the esports ecosystem. Additionally, it offers lessons for other industries to enhance their climate action efforts and reduce their environmental impact. However, while significant progress has been made, it is important to acknowledge that the journey toward achieving SDG#13 within the esports industry is ongoing.

In conclusion, our study underscores the transformative potential of integrating climate action efforts within esports organizations. We highlight five tenets toward developing a climate action framework for esports— (1) systematic efforts to promote climate leadership, (2) systematic efforts to reduce overall climate impact, (3) promotion of responsible production and consumption, (4) creation of partnerships to enhance environmental responsibility, and (5) advocacy for climate friendly institutional change. As the industry evolves, new climate challenges may arise. Esports organizations must remain proactive, adaptable, and committed to advance climate action tenets across their operations. By embracing these principles, organizations can not only reduce their environmental footprint but also inspire positive changes globally. We argue that climate action should be a fundamental aspects of the esports industry's future growth and success as it continues to evolve.

This study has several limitations that should be considered when interpreting the findings. Firstly, the collected documents may reflect a more positive image of organizations' climate change activities than what is actually implemented, a phenomenon known as greenwashing. Secondly, there may be response bias in the interviews, as interviewees might present the situation in a more favorable light than it truly is. Consequently, we cannot confirm the practical implementation of these actions based on the current data alone. Follow-up studies are necessary to accurately assess how these activities are implemented in practice.

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