

## GREENING THE GAME WITH SUSTAINABLE PRACTICES IN SPORTS PERFORMANCE ANALYSIS

Prasanth V V<sup>1</sup>,

Nallavan G<sup>2</sup>,

<sup>1</sup>Research Scholar      <sup>2</sup>Associate Professor

Department of Sports Technology, Tamil Nadu Physical Education and Sports University,  
Melakottaiyur, Chennai, India.

### Abstract

One of the prominent concerns in the world of sports is sustainability. Sports bodies and professionals are taking a lot of actions to reduce environmental impact by promoting responsible practices. This study focuses on the world of analysis and its related practices that can be implemented to achieve our goals. An overview of the research's key findings and insights into the integration of greening the game within analysis is seen in this study. Analysis is one of the most important aspects of skill development and a team's or individual's success. Even though the equipment, tools, and methods that are used in this field may leave an ecological footprint, this study focuses on investigating the adoption of various practices in analysis, aiming to reduce the environmental impact during various stages of analysis, that is, data collection, analysis, and coaching feedback. Key areas of focus include the transition to digital data management, energy-efficient hardware utilization, and remote analysis technologies to mitigate the need for travel. Furthermore, this study discusses the importance of facilities and equipment to maintain our greening goals, promoting a more eco-conscious supply chain, and data security measures that align with environmental responsibility. It emphasizes the significance of data efficiency, encouraging practitioners to prioritize essential data collection while reducing energy consumption and storage requirements. This work brings to light the role of greening education and awareness in this field, empowering athletes, coaches, and analysts to contribute to environmental conservation in their practices. Ultimately, this study provides a comprehensive examination of the various greening practices that can be integrated into the analysis. By implementing these practices, sports bodies and professionals can contribute to a more sustainable and environmentally responsible approach in the sports industry, aligning their efforts with broader greening initiatives in this field.

**Keywords:** Sports sustainability; Sustainable sports; Sustainability practices in sports

### Introduction

Sports industries are not exempt from the global call for taking initiatives to maintain the SDGs (Sustainable Development Goals). Sports enthusiasts and professionals with sports bodies are also concerned about the implementation of environs protection by taking the necessary responsibilities and actions in implementing sustainable practices. As a part of the initiative in sports, which often conjures images of eco-friendly stadiums, energy-efficient transportation, and recycling programs, it is vital to extend this ethos to every facet of the sports industry, including the analysis of games.

Analysis plays an important role in the up skilling of athletes and the success of teams. By studying and dividing every aspect of an athlete's performance, from their movements on the field to their mental sharpness or acuity, analysis contributes in a particular way to the competitive edge.

However, we have a lot of ecological footprints that can't be ignored in this field. This study focuses on an important aspect of sports that is often overlooked in maintaining sustainability: implementing sustainable practices into analysis. The objective of the study is to adapt and enhance the processes of analysis to overcome the impact on the environs. The topic at hand is multi-faceted, encompassing a range of practices that are not only ecologically trustworthy but also economically reasonable and technologically creative. In recent trends, data plays a major role in sports, which makes the sport utilize a lot of equipment for maintaining the data.

In this digitalization process, we are also in need of creating practices to maintain sustainability, data security measures, and equipment like hardware devices that are energy-efficient in this field. This research also goes deeper into the importance of education and awareness. Athletes, coaches, and analysts need to understand the importance of sustainable goals in their routines and adapt their approaches accordingly. It is the responsibility of every athlete, coach, fan, and professional to take the necessary measures to maintain the fundamental principles in the sports community as well. By looking into these various aspects in terms of analysis, this study seeks to provide a detailed understanding of how sports often use SDGs to maintain the environs and nature for the next generation. Sports have the power to change and adapt to the sustainable practices in daily life of every person who is involved in sports, which is making our future more and more brighter, wealthier, and eco-friendly by conserving natural resources for the next generation.

### Literature Review

In this study, the first stage depends on the digitalization of data and managing it for future access for further usage. (Xiao et al. 2017) carried out a study with his team on sports digitalization. Also, through this digitalization work, it has been observed that the usage of paper is reduced and the data accessibility and efficiency of analysis are also increasing. (Dietrich, A. et al., 2011), the findings clearly picture the energy efficient equipment and its benefits for sports stadiums and arenas. And (Bruno Travassos et al.'s 2013) discuss the performance analysis advancements in terms of technology and how they are being used in an eco-friendly.

Also, the findings say that energy-efficient computers, servers, and software also play a major role in energy consumption during data analysis. Which creates a positive impact on the environs. (Trianti- Stourna et al., 1998) discuss energy conservation strategies for sports halls and swimming pools. From this, we are taking a few things and implementing them in the analysis part for energy conservation. (Blum, B. 2017), discussed how machine maintenance can be done remotely, which saves time and money. Also, by making use of remote analysis by sports professionals and organizations, emissions of carbon associated with travel are completely reduced. Also, it is economically advantageous and improves the work-life balance for analysts. As per the findings of (Barghchi, M et al., 2009), green buildings that are installed with energy-efficient lighting and heating and cooling systems are very helpful in reducing the carbon footprint during the analysis. (Abdourazakou, Y. 2016), discussed the management of innovation in the R&D of the equipment.

With this equipment, we should have longer lifespans, recyclable components, and energy-efficient designs. Also, they took some seriousness in examining the suppliers who are committed to sustainability in manufacturing. (Osborne, B. 2017) discusses the security threat to athlete data, saying that there is always a need for security, encryption, and storage to safeguard athlete data during the minimization of energy consumption. As per (Trianti-Stourna et al., 1998), energy conservation is an important thing that should be followed to save energy. Following this, it is insisted on the concept of collecting and analyzing important data for the usage of resources to conserve and streamline during analysis. (Dingle, G., & Mallen, C. 2020), they discussed the importance of education and awareness among the athletes, coaches, and analysts in this study. This will make them create daily routines and practices for maintaining the resources eco-friendly.

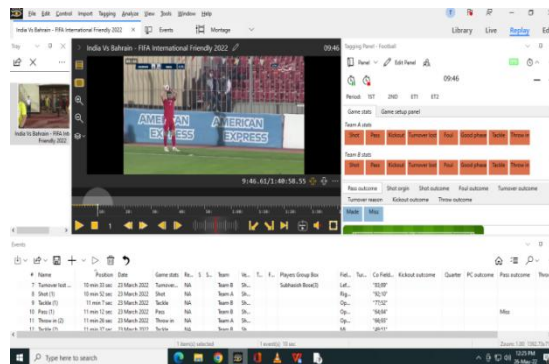
**Digitalization of Data and its Management:** Data is everywhere in sports, which is the key term that helps the player optimize and improve their performance in this modern world. Which includes various stages like the collection of data, analyzing, and storing vast amounts in the centralized system, which can be accessible for authorized persons like coaches, analysts, players, and other sports professionals who are part of sports bodies. (Xiao et al., 2017) However, previously we were using paper-based methods, which is very harmful to society, and through this modernization of digital data collection and manipulation, we are overcoming a lot of environmental impacts around us by reducing paper waste and lowering the carbon footprint. Also, this practice doesn't need any large physical storage space and streamlines data access and analysis.

### Usage of Energy-Efficient Hardware and Software

In the field of analysis, we require a high-performance computing environment, and software that consumes a lot of energy is also being optimized these days. So, the impact from this vertical is also reduced towards the atmosphere. (Dietrich, A. et al., 2011) & (Bruno Travassos et al.'s 2013) Implementation of energy-efficient hardware, like energy-efficient computers, servers, and data storage devices, reduces energy consumption and other associated greenhouse gas emissions. Also, using energy-efficient software and algorithms minimizes energy usage during the various phases of data analysis, which helps us promote greening practices in society.

**Figure 1: Completed analysis sheet for free kicks (Christopher, et al., 2006).**

**Figure 1:** shows the handwritten analysis sheet with the data, which is associated with the necessary details that are needed to find out the key event’s outcome (Christopher et al., 2006). Also, this is the completed analysis sheet of the soccer match, with the goals also updated in this image, which is shown below for reference purposes.



**Figure 2: Dartfish Video Analysis software’s tagging panel (V. V. Prasanth et al.,2022).**

**Figure 2** shows the computerized notational analysis system (V V, Prasanth & .G, Nallavan. 2022) which is done for the soccer match between India and Bahrain, a friendly match. This highlights one of the energy efficient systems that is used for analysis, which is user friendly and reduces paper usage.

**Reduction of Travel through Remote Analysis:** Most of the analysts who are working with the teams used to travel a lot to watch and analyze the match in person to provide feedback to the athletes, which created a carbon footprint during this activity. (Blum, B. 2017) Due to the practices of using remote analysis tools and video conferencing solutions, the need for travel has been reduced, resulting in the omission of carbon emissions in this part. On the other hand, this practice reduces travel costs and improves the work-life balance for the analyst. Also, the remote analysis helps the athletes get real-time feedback without the need for physical presence, which contributes to achieving the SDGs.

(Biao Ma, et al., 2020) also discussed remote training and its advancements with the help of artificial intelligence with GPS embedded suits to track their performance in real time, and we can provide feedback or insight to the players, coaches, and other stakeholders from a distance.

**Facilities for Analysis that are Sustainable:** The facilities that are used for player analysis are labs and offices, which should be resource-intensive in terms of energy and materials. (Trianti-Stourna et al., 1998) The energy-efficient lighting, HVAC systems, and eco-friendly building materials should be designed and operated to achieve SDG. (Barghchi, M et al., 2009) As an alternative, the facilities may be incorporated with natural lighting, efficient insulation, and sustainable landscaping to reduce their environmental impact. (Hassani, H., & Golizadeh, R. 2016) & (Stinnett, B., & Gibson, F. 2016) To be more responsible in maintaining the environs, integration of sustainable design and operation is needed.

**Equipment and Supply Chain with Eco-Consciousness:** The equipment that is used during the analysis, including cameras, sensors, and computing devices, could also have an impact on the environment. The supply chain for the above devices can also contribute to the challenges of achieving the SDG. (Khosravian Champiri, Y., 2021) & (McCullough, B. P., 2021) Adapting eco-friendly equipment also involves the selection of longer lifespans, recyclable parts, and energy-efficient designs. Also, sports bodies and analysts can work with the manufacturers and suppliers who are giving importance to SDG in the production and distribution of equipment and software to create a more sustainable supply chain.

**Data Safety with a Sustainability Focus:** An important aspect of analysis is ensuring data privacy and security. When it comes to the SDG, it should align with the principles of the SDG to maintain the atmosphere in a natural manner without polluting it. The practices involved in this are securing data, energy-efficient data encryption, and storage solutions. (Osborne, B. 2017) Using these practices, we can protect sensitive athlete data while also minimizing energy consumption and waste in data management. Balancing data security with the SDGs is an important part of this field of analysis.

**Optimized Data Management:** Optimization data collection and management is a practice that involves the process of collecting the required data alone instead of collecting unwanted data, which is not at all useful during analysis and also occupies a lot of memory space with the storage devices. Which may also consume energy while storing unwanted data. All of this should be done as a practice while collecting and maintaining the data for future use in analysis or for any other purpose.

**Sustainable Awareness and Training:** This is one of the important part that the stakeholders like athletes, coaches, and analysts should be educated, and awareness initiatives for maintaining SDG goals must be followed. Also, the active involvement of all the stakeholders in the analysis is required to maintain the SDGs all around the world, as already followed in Spain. (Campillo-Sánchez, J., 2021). By involving them in the education and awareness initiatives, we can create an understanding of the impact of their work on the environment and provide alternatives for overcoming the issues that are caused. (Graham, J., Trendafilova, S., & Ziakas, V. 2020) and (Dingle, G., & Mallen, C. 2020) & (Dingle, Greg et al., 2017) Education and awareness initiatives aim to inform and engage athletes, coaches, and analysts in adopting sustainable practices. This approach can empower key stakeholders to embrace sustainability in their daily routines and contribute to broader environmental conservation efforts.

**Results and Discussion:** The implementation of SDG and its practices in the field of analysis represents a vital aspect of the broader movement within the sports industry. This study has discussed various practices and initiatives that can be adopted to make this field more responsible by making it eco-friendly and encouraging responsible stakeholders to adopt efficient practices. (Escher, et al., 2020) The practices that are followed in this field cover a wide range of strategies and initiatives from the beginning to the end of every activity, like the usage of energy-efficient cameras, sensors, and computing devices; data transmission and data management with energy-efficient hardware and software algorithms; reduced travel-related emissions; and all other cost saving practices.

Further, it also includes practices and initiatives like the creation of sustainable facilities for analysis, the adoption of eco-conscious equipment and supply chain practices, sustainable data security measures, data efficiency and prioritization, and the education and awareness of athletes, coaches, and analysts. Each of these practices contributes to reducing the environmental footprint and promoting sustainability in the field of analysis.

**Conclusion and Future Work:** Since we have already taken some responsibility and implemented a few practices for adopting the SDG in our field, from this point on, we have a lot of opportunities for further development in this field (Lindsey, 2017). The future of the SDG and its practices in this field lies in innovation, education, and collaboration: 1. Technological advancements should be energy-efficient and we should keep this in mind while designing hardware and software energy savings products to be used in analysis.

2. We need to collaborate with suppliers and manufacturers to create a eco-friendly equipment and components for usage. 3. Data security should be strictly followed along with the SDG goals while looking into athlete's data, which should also minimize energy consumption and waste generation.

4. Increases in designing and operating facilities with SDG will have more renewable energy sources and advanced green building materials, which will be standard, and will also reduce carbon emissions. 5. (Hognestad HK, 2022) & (Graham, 2018) Community wise education and awareness programs will promote the practices among stakeholders like athletes, coaches, and analysts to implement them in their daily routines. 6. Creating partnerships between researchers, sports bodies, and technology companies can contribute more to creating innovation in this field for the main SDGs. 7. Our aspirational goal is to achieve carbon neutrality in this field. To measure the carbon neutrality in our field, we should implement offsetting measures through reforestation or make investments in renewable energy, which can contribute more to our environmental conservation and its future. As a conclusion, the pursuit of SDG practices in this field is a journey that requires commitment, innovation, and collaboration. By following all the above mentioned 7 guidelines in a continuous manner, we can contribute to a more eco-friendly field as a whole.

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