ENCOURAGING SUSTAINABLE BEHAVIOUR IN DUTCH FOOTBALL STADIUMS: PERSPECTIVE OF MANAGERS AND VISITORS

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PREFACE AND ACKNOWLEDGEMENT

Dear reader,

I hereby proudly present my Bachelor Thesis for the International Facility Management programme at Breda University of Applied Sciences.

This paper consists of research on how Dutch football stadiums can encourage environmentally sustainable behaviour of its visitors. My personal interest for football, and sustainability being an urgent matter in all building operations, including football stadiums, made me eager to do research in this field. During the process I learned that the social significance of football stadiums has the potential to send a message to a broad public. My aim is to use this message in an educative manner and with that contribute to a better future.

This research could not have been conducted without the help of my coach Ilse van Ipenburg. By always giving constructive feedback and right motivation, Ilse helped me very well during the process. I would also like to thank the participants of the interviews. Employees from NAC Breda and Sparta Rotterdam helped me very well with their perspective on the issue.

Job Klein Obbink

ABSTRACT

Creating building occupants awareness regarding sustainable behaviour has become a crucial instrument in reaching environmentally sustainable development goals (Barthelmes, Fabi, Corgnati, & Serra, 2018; Gonzallez-Ramalho, 2022) This accounts for all buildings, including football stadiums. Football reaches a broad public and has the capability to practice a social as well as an environmental impact on society. (Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma, 2017).

This bachelor thesis explores the potential of promoting sustainable behaviour among visitors of Dutch stadiums by examining the perspectives of stadium managers and visitors themselves. The research aims to identify correlations between these perspectives and draw conclusions that can contribute to the development of effective strategies for encouraging sustainable practices within football stadiums. The study adopts a mixed-methods approach, combining qualitative interviews with stadium managers and a quantitative questionnaire sent out to stadium visitors. Through the analysis of the collected data, several key findings have emerged. Firstly, both stadium managers and visitors highlight the importance of transparent communication regarding sustainability policies. The findings suggest that clear and accessible information about the sustainable initiatives undertaken by stadiums has the potential to influence visitor behaviour towards more sustainable practices. Secondly, both groups agree that individuals are more likely to embrace sustainable behaviour if they perceive personal benefits. Incentive-based programs, such as discounted ticket prices, are identified as effective motivators for visitors to change their behaviour. Furthermore, managers and visitors express a shared belief in using players as ambassadors to promote sustainable behaviour. The influential power of players can be harnessed to raise awareness and inspire visitors to adopt sustainable behaviour. Lastly, the implementation of hard cups with a deposit system is well-received by both managers and visitors to manage the waste stream more efficiently. This finding suggests that the introduction of sustainable alternatives to traditional single-use cups can contribute to waste reduction and support sustainable efforts within stadiums. In conclusion, the research findings show the mutual perspectives between stadium managers and visitors in terms of encouraging sustainable behaviour. The identified strategies: transparent communication, incentive-based programs, player engagement, and sustainable alternatives provide insights for stadium managers to promote sustainability within Dutch stadiums. By implementing these strategies, stadiums could foster a more environmentally conscious visitor base and contribute to a greener and more sustainable future for their own city and for the sports industry as a whole.

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1. INTRODUCTION:

1.1 BACKGROUND SIGNIFICANCE

For over forty years, it is known to mankind that we are exceeding the regenerative capacity (Wackernagel, et al., 2002). Sus what leads to new challenges at different levels. Corporations, new and current environmental legislation, product life cycle, waste management, energy consumption, and many stakeholders are all included in these new challenges. (Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma, 2017). Various industries have a significant environmental impact on society. Sport events in large scale stadiums are no exception to these developments.

Sports is, for the most part, an enjoyable experience that draws billions of people to games, events, televisions, bars and other venues to watch athletes. It is played by amateurs and upcoming proffesionals from a young age. However, this by many enjoyed activity comes with negative consequences. Sporting events generate an enormous amount of waste, from packaging, plates and bottles to food waste. Resources such as water and energy are used to power the games and keep the sports fields lush. When calculating impacts, carbon emissions from travel to and from events by all involved also play a role (Pfahl, 2013).

Creating building occupants awareness regarding sustainable behaviour plays a crucial part in reaching environmentally sustainable development goals (Barthelmes, Fabi, Corgnati, & Serra, 2018; Gonzallez-Ramalho, 2022). In the case of sport stadiums, visual, acoustic, thermal,
perspectives.

Sport events have the capability to practice a social as well as an environmental impact on society. (Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma, 2017). A football match is one of the examples of these important sport events. The stadiums these matches are held in fulfil a local, regional, national, and international role which can be called symbolic. The experiences that shelter in these stadiums are meaningful in various levels (Sfintes, 2020). Given the broad and cross-cultural popularity of sport on a professional level, social changes due to positive influences regarding pro-environment initiatives by important teams and stadium managers can be the potential (Kellison, Trendafilova, & McCullough, 2015). Due to sports being a powerful instrument for change, recycling programs, in-stadium signage, and create not only a reduction of waste at sporting events, but also educate visitors about ways to adopt a sustainable way of living at home (Sfintes, 2020).

Research has shown that sport can operate as an educational tool, especially for young participants. The development of competencies such as problem solving, setting goals and meeting deadlines during sport events is a result of
(Kellison, Trendafilova, & McCullough, 2015). Another example of the strong impact of sport is a study by Inoue & Kent (2012), they studied professional sports teams as influencers for pro-environmental behaviour. They concluded that pro-environmental behaviour by a

team, leads to an increase in pro-environmental behaviour Sfintes (2020, p. 173) also states that
informing and educating the surrounding community about sustainability, sustainable systems and measures, sustainable use as well as become a source of renewable energy for the community, thus becoming part of the community itself not only through its landmark
This indicates that sustainable football stadiums can fulfil an educative role as well as a contributing role towards environmental sustainability.

As mentioned above, the improvement of environmental sustainability is a world-wide concern in which sports facilities can play an important role. If we look at the average attendance of football matches in the Netherlands, we see that 17.700 people visit a football match in the highest domestic league, De Eredivisie, every week. This varies from 55.000 to 4.500 (Transfermarkt, 2022). Considering that, on average, more than 34 matches are played by 17 clubs annually, we can conclude that, on average, more than 10.832.400 visits to a football stadium take place (Transfermarkt, 2022). This means that per stadium, 604.577 visits take place annually. Abovementioned somewhat indicates the significance of understanding the social impact of a football stadium.

2. SCOPE

This thesis aims to find how football stadiums in the Netherlands can encourage environmentally sustainable behaviour of its visitors. In the research design, relatively smaller stadiums were taken into consideration due to the geographical location of the visitors. Bigger football clubs attract more fans and hence is the geographical location of these more expanded and audience harder to reach.

Literature regarding environmentally sustainable solutions in football stadiums is reviewed and applied during the research. However, behavioural change and building user perspective are the central research topics.

3. LITERATURE REVIEW

In the scope of this review waste management, energy usage and carbon emissions in and around football stadiums will be taken into consideration. These three are most significant contributors to the ecological footprint of football stadiums and could therefore also contribute to a sustainable stadium design. (Costello, McGarvey, & Birisci, 2014; Pfahl, 2013; Hughes & Calautit, 2014; Papp-Vary & Farkas, 2022). Football stadiums have the ability to fulfill an inspiring and educative role (Kellison, Trendafilova, & McCullough, 2015). Therefore literature about behavioral change and the role of building design in this matter will be touched upon. Furthermore, literature review below will elaborate on elements which have a cognitive influence on user behaviour.

3.1 ENVIRONMENTALLY SUSTAINABLE STADIUM DESIGN.

3.1.1 WASTE MANAGEMENT

An increase in waste production is a world-wide concern in which various industries play a role. It has come to a point where solid waste production will increase up to 2.2 billion tons by 2025. (Kawai & Tasaki, 2015). Sports events are not excluded in this negative development. Sporting events generate an enormous amount of waste, from packaging, plates and bottles to food waste (Pfahl, 2013). After the production of carbon emissions due to travelling from and to the stadium, waste production is second highest contributor of the ecological footprint of football stadiums (Costello, McGarvey, & Birisci, 2014). In order to find solutions for this development, the Zero Waste International Alliance (ZWIA) was set up to establish standards to help the world to zero waste. The ZWIA defines zero waste as: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to (Zero Waste Definiton, 2018). Zero waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them (Zero Waste Definiton, 2018 p.1). Elsaid and Aghezzaf (2015) describe waste management as the management of all responsibilities, practices, procedures, processes and resources for establishing a system that manages waste and complies with environmental regulations.

Organizations translate their goal towards zero waste in managing the waste stream, rather than reducing the landfill disposal. It is accepted to say that a diversion in waste stream is more sustainably preferable than a diversion in landfill disposal (Costello, McGarvey, & Birisci, 2014). Managing the waste stream of sports facilities starts with inventorying its nature by intercepting and auditing the waste. The results of this audit will help with (1) forecasting the amount of generated waste during events, (2) identifying waste production that can be decreased by source reduction, e.g food waste, (3) identifying the lifecycle of waste resources and (4) recognising packaging that cannot be recycled or composted. (Costello, McGarvey, & Birisci, 2014) The latter can create managerial implications. By implementing

recyclable and compostable packaging, source material selection, employee training, public awareness and complexity of products are factors that need to be taken into consideration by facility managers (Hottle, Bilec, Brown, & Landis, 2015). More implications can occur during the management of waste reduction. For example, social components of waste management are complex. Convenience, perceived efficiency, consumer awareness, outreach and participation are factors that affect consumer behaviour towards waste management (Hottle, Bilec, Brown, & Landis, 2015). Another example of a challenge in waste management is elaborated in a case study by Daddi et. al. (2021) where the San Siro (Milan) stadium manager states that seperation bins at football stadium could be used as weapons during conflicts between fans. (Daddi, et al., 2021, p. 221) Secondly, bins might obstruct escape routes or light fire because of burning cigarettes.

Besides implications, research have shown that there are opportunities regarding waste management. Technological innovation has the potential to improve and modernize the implementation of waste management systems (Flethcer, St. Clair, & Sharmina, 2021). Examples of these technologies are AI, autonomous robots, Internet of Things (IoT), unmanned aerial drones, big data (Tanveer, et al., 2022). Other research concludes that designing for limited waste during the construction period of a building is a crucial step towards effective waste management. (Amaral, et al., 2020). Another approach to waste management in football stadiums is to encourage fans to reduce the amount of waste they generate, This can be achieved through various means, including providing reusable cups and bottles, encouraging fans to bring their own food and drink, and promoting recycling and composting (Casper, Pfahl, & McCullough, 2014).

3.1.2 BUILDING AND MAINTAINING A SUSTAINABLE STADIUM

The built environment and construction sector are active contributors of climate change. (Hughes & Calautit, 2014). Moreover, (Wergeland & Hognestad, 2021).
The generated waste varies to materials such as glass, wood, bricks, metal, and plastic (EU, 2022). Heating, Ventilation and Airconditioning systems (hereafter HVAC) have become a

energy is consumed by HVAC (Hughes & Calautit, 2014). Furthermore, built environment accounts for one sixth of the global freshwater usage, one quarter of wood harvest, and two fifth of material and energy flow (Hussin, Rahman, & Memon, 2013). Research tells us that energy reduction at sports facilities can start at the construction phase of these venues (Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma, 2017; Sfintes, 2020). There is a concept of sustainable built environment, which can be defined by the hand of two entities. On the one hand sustainable urban development, which refers to the efficient use of land and resources and on the other hand sustainable architecture, which refers to energy efficiency of buildings (Erten & Özfiliz, 2006).

Several studies elaborate on the usage of cost effective, yet sustainable materials in building design. Madurwar, Ralegaonkar, & Mandavgane, (2012) investigated the usage of agro waste for building materials. They conclude that using waste from agricultural practices such as sugarcane bagasse, rice husk, jute fibre, coconut husk and cotton stalk is a viable solution for cost effective sustainable building design. Staszek-Tomal (2020) - also contribute to cost reduction on the long term due to its low maintenance costs. However, the high costs of the materials itself cause implications for the usage on an industry scale. Moreover, given the scale of the buildings and safety priorities, the use of natural resources during the adoption of architectural and technical solutions in the construction phase might be difficult to consider (Sfintes, 2020).

Research regarding alternative solutions for energy production have been done. Mendez & Bicer (2020) researched the potential of wind energy for three stadiums in Qatar. Another example is mentioned by Sfintes (2020). He entails us about the Kaohsiung World Stadium in Taiwan, which uses photovoltaic panels to generate their energy. These panels not only produce enough energy to power the stadium, but they also produce 80% of the energy needed to provide the surrounding neighbourhood. Another example of progressive sustainable management is a research about the Forest Green Rovers (FGR) (Papp-Vary & Farkas, 2022). This English club uses a mechanic tool in its grounds that not only saves rainwater, but also recycles and reuses it for irrigation of the pitch. The roof of the New Lawn Stadium, the home ground of FGR, is covered with solar panels that cover 100% of energy usage of the stadium. Furthermore, the cutting of the grass is a robotized operation, and the remains of the cut grass are used for composting by surrounding farmers.

Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma (2017) divides the measures a stadium manager can take regarding energy usage in two different segments; passive and active measures. Passive measures are described as measures that are totally dependent on sustainable urban planning and architectural design. So, no technological or mechanical solutions are needed. Active measures are characterized by technological systems where mechanical solutions are required. Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma (2017) also elaborate on a Dynamic Management System in Sports Facilities (DM3S). DM3S is the basis for structuring sustainable management measures in six different segments (1) use of resources (2) environmental impacts (3) comfort of spaces (4) mobility (5) amenities/social connection (6) quality management of services.

3.1.3 CARBON EMISSIONS

The production of carbon emissions during sport events is significantly contributing to the ecological footprint of these events (Papp-Vary & Farkas, 2022; Pfahl, 2013). Earlier research shows that choice of transportation of visitors is negatively contributing to environmental sustainability (Collins, Jones, & Munday, 2008). Edwards et. al (2016) conducted a study of a collegiate sporting event in Arizona, where they concluded that visitor transportation from and to the stadium is the major contributor to carbon emissions of sporting events. Triantafyllidis & Davakos (2019) conducted research on produced carbon emissions related to

sporting events in the United States. Several factors were taken into account in order to visualize the produced carbon dioxide emissions by visitors of sport events. Firstly, the number of seats in a stadium were analyzed. Secondly, the mode of transportation and the milage driven to the stadium were considered. Supported by elaborative literature, the findings were as follows: an average of 15kg of CO2 emissions are produced by a sports event visitor in the United Stared on the day of the sports events with variations of 5kg to 80kg. (Tian, et al., 2019; Lankao, 2007; Tischer, 1979; Hidrue, Parsons, Kempton, & Gardner, 2011). In another research Grant (2014) elaborates on the negative environmental impact of sport stadiums in the United States.
due to their negative environmental impact. He indicates that not only carbon emissions produced during the day-to-day events should be taken into account. Grant states that pollution during the construction phase of a building, produced by construction vehicles, play a significant role in the negative environmental impact of stadiums. Grant (2014) explains that the effects of vehicular pollution are not only harmful for the environment, but can also be harmful for human health due to the emitted chemicals.

Research shows examples of measures taken to reduce carbon emissions by sporting events. Collins and colleagues (2008) elaborate on previous initiatives to reduce carbon emissions of big sporting events. Examples are the 2006 FIFA World Cup and the Melbourne Commonwealth Games in 2006, which were both characterised by producing as less carbon emissions as possible. In the case of the 2006 World Cup, the organization intended to compensate all produced green-house gas emissions by investing in climate neutral technology and renewable energy (Öko-institut, 2003). Grant (2014) explains about Federal and State -regulations regarding environmental impact of stadiums in the United States. He enlightens us about several acts, conducted by the US government or state authorities. Here, Grant refers to the Clean Air Act (CAA), Clean Water Act (CWA), National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). All these legislations aim to contribute to the reduction of the ecological footprints of stadiums. Another example is the case study about the Forest Green Rovers (FGR) by Papp-Vary & Varkas (2022). They explain about these unique English football clubs and the measures that were taken in order to be the first carbon-neutral football club. In terms of carbon neutral transport, the players of FGR travel in all electric vehicles and the club encourages its fans to do so as well by placing charging stations near the stadium. Moreover, vehicle sharing is encouraged. Furthermore, FGR offset the produced carbon emission by fan travel through compensation in the ticket price.

3.2 THE ROLE OF TE HUMAN ASSET

3.2.1 HOW TO REACH THE BUILDING OCCUPANTS

Abovementioned paragraphs indicate the opportunities of environmentally sustainable stadium design

Believe-Norm (VBN). However, in their book about the link between experiences and sustainable behaviour, Smit and Melissen (2019), introduce the attitude-behaviour gap, which describes the contrast between our attitude and values on the one hand and our actual behaviour on the other hand and therefore refutes the idea that behaviour can be explained by analysing attitudes and values of an individual. Hargreaves (2011) elaborates on further expanding literature about behaviour change and finds comparable models that align with the belief of VBN. He states that the central approach in conducting these models is relying on the assumption that decision making is undertaken by rational individuals. Hargreaves also

widely used in understanding behaviour change. We could say the VBN is aligned with

what others think of the behaviour and the perceived level of control of the behaviour. Bamberg (2003) confirms that if all cognitive components needed can be recognised, identified and modified, behavioural change can be accomplished in all areas of an (2005) reviewed the abovementioned theories and states that their practicality and predictive ability are not as reliable as expected due to increasing complexity and diminishing returns to the improvement of predictive capacity. Another refute

the social surrounding overrules the cognitive factors that influence decision making (Hargreaves, 2011).

3.2.2A UNDERSTANDING ENVIRONMENTAL BEHAVIOURAL CHANGE

increase of knowledge about environmental issues automatically leads to pro-environmental behaviour. However, these were soon to be proven wrong (Kollmuss & Agyeman, 2002). Theory of Planned Behaviour (1980) when elaborating on the more complex nature of behavioural change. They show us that this theory can be a tool to analyse pro-environmental behaviour by referring to a meta-analysis about pro-environmental behaviour, which was based theory, which found variables associated with pro-

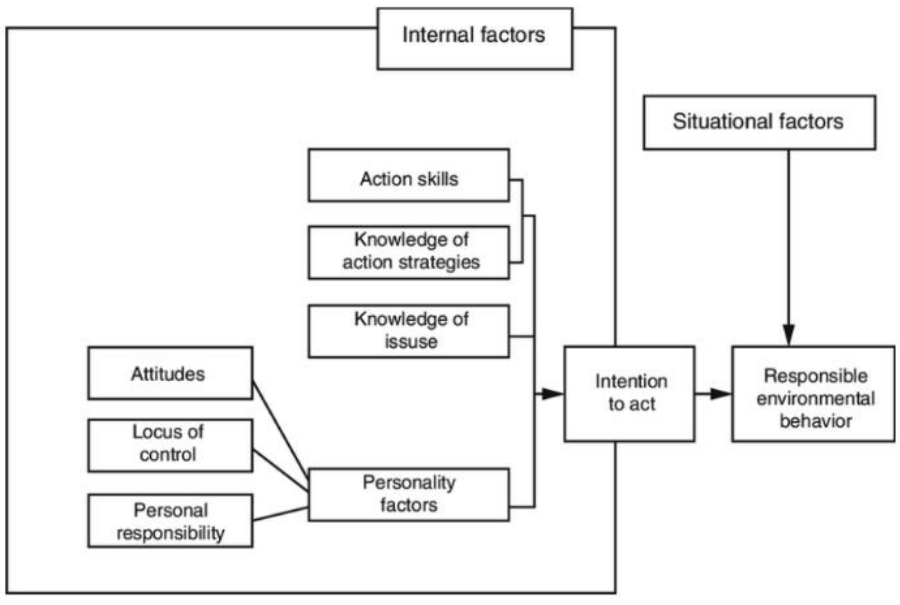

Figure 1: The model of environmental responsible behaviour. (Hines et. al, 1987)

pro-environmental behaviour sufficiently (Kollmuss & Agyeman, 2002). Kollmuss and Agyeman also review external factors influencing behaviour, rather than internal factors as explained by Hines et. al (1987). Examples mentioned are 1) institutional factors; pro-environmental behaviour can only take place if the right infrastructure is provided. 2) economic factors; vaguely described as factors that play a role in financial related decisions towards pro-environmental behaviour 3) social and cultural factors, if there is high cultural value towards a church, for example, and pro-environmental choices have to be made in order to preserve that church, people will always choose that option.

More recent research confirms that external as well as internal factors play a role in pro-environment decision-making. Czajkowski, Hanley, & Nyborg (2015) show how cost-based motives (external) and the desire to create a positive self and social image (internal) contribute in decision making regarding house-hold recycling in Poland. However, the results found by Czajkowski, Hanley & Nyborg (2015) show that external factors (institutional and financial in this case) play a more significant role in sustainable decision making than internal factors (attitude and values). Another confirmation of the relevance of external factor in pro-environment decision making is found by Chen et.al (2015). They found that external factors in travelling such operational management and vehicle facilities have 1,5x more influence on pro-environment travelling decisions than internal factors such as intention and habit.

Another mentionable model is reviewed by Lucas and colleagues (2008). They evaluate on external behavioural impulses on the hand of the Needs-Opportunities-Abilities (NOA) model by Charles Vlek (1998).

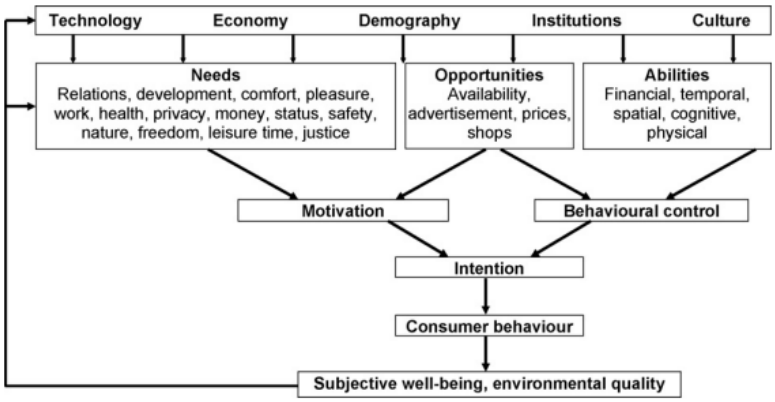

Figure 2 'The needs-opportunity-ability model of consumer behaviour', reproduced from Gatersleben and Vlek (1998). (Lucas, Brooks, Darnton, & Elster Jones, 2008)

The NOA model proposes that needs refer to an individual's desires or goals, which can range from basic physiological needs such as hunger and thirst, to more complex social or psychological needs such as the need for social interaction or self-esteem. Needs can also be influenced by cultural, social, and environmental factors. Opportunities refer to the resources, incentives, or situations that enable individuals to act on their needs. These can include physical, social, and economic opportunities, such as access to education, financial resources, or social support networks. Abilities refer to an individual's skills, knowledge, and capabilities to take advantage of available opportunities to satisfy their needs. Abilities can be influenced by a range of factors, including genetic predispositions, learning experiences, and environmental factors (Vlek, 1998)

The NOA model has been applied to a range of contexts, including environmental behaviour, health behaviour, and consumer behaviour. For example, in the context of environmental behaviour, the NOA model suggests that individuals are more likely to engage in environmentally friendly behaviours when they perceive that these behaviours satisfy their needs, are supported by available opportunities, and align with their abilities to act on those opportunities.

3.2.3 SOCIAL SUSTAINABILITY IN FOOTBALL

During the 1994 Olympic Games, close attention was paid to the construction of the sport facilities and their effects on the environment (Kellison, Trendafilova, & McCullough, 2015). This attitude could be seen as the first step towards sport as a platform for social change. After the 1994 Olympics, the International Olympic Committee adopted environmental sustainability as the third pillar of the Olympism (Kellison, Trendafilova, & McCullough, 2015). Additionally, the UN Environment programme established an initiative to promote environmental awareness through sport. The by the FIFA initiated efforts towards social developments could be seen as a contribution to not only environmental sustainable development, but also as social sustainable development. Social sustainability can be defined as a life-enhancing condition within communities, and a process within communities that can achieve that condition (McKenzie, 2004, p. 13). McKenzie elaborates on this condition on the hand of the following indicators;

- Equity of access to key services (Healthcare, education, housing, transport, and recreation.
- Following generations should not be disadvantaged by previous generations in terms of previous named services.
- A system of cross-cultural acceptance
- Political participation of citizens, not only during elections.
- A system of transmitting awareness of social sustainability between generations
- A sense of responsibility by the community to maintain these systems.
- A system where communities are able to identify its individual strengths and weaknesses.

Sport is a cross-cultural practice with a worldwide popularity (Kellison, Trendafilova, & McCullough, 2015)
symbolic. Sports can represent inclusivity, gender equality and acceptance amongst society. Research shows that sport stadiums can contribute to social change. (Kellison, Trendafilova, & McCullough, 2015; Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma, 2017; Sfintes, 2020). However, Iwuagwu et.al (2022) state that football fandom is becoming a venue for people to vent their rage and aggression which could result in

On the other hand, Iwuagwu et. al (2022) also elaborate the perception of football fandom by football fans themselves and conclude that fans gain a feeling of unifying, building social relationships and even economic welfare through betting. The participants of this research also indicate that the avenue in which football games are played plays a role in this sense of social cohesion. The crowd creates an

old and new friends especially those who share the same fan base (Iwuagwu, Ekoh, Ndubuisi Ngwu, & Akwasi, 2022, p. 6). Not only the atmosphere in football stadiums can improve mental health, another contributor to social sustainability in sport is an environmentally sustainable stadium design in which using low-energy materials, usage of prefabrication and end-of-life recycling should be central in order to improve human health. (Kucukvar, et al., 2021).

Sfintes (2020) conducted research on the contribution of a football stadium to the community. He looked at stadium as a source of energy for the community and with that advocating for sustainability. He describes the development of the usage of stadiums and what that means for the social perception of a stadium. He concludes that no matter how the stadiums were used, they were always places of social significance, and emotional release. In his research, Sfintes (2020) also analyses the legislation aspects of European football and concludes that a change of European game rules and norms and standards contributed to the alignment of the norms and values of society. A shift to inclusion, sustainability and diversity is visible. Which indicates that external factors can play a role in the way football events are perceived.
study is not the only one that considers external factors as a tool for perceptual change. The study conducted by Kellison & colleagues (2015) tells us that the Federation Internationale de Football Association (FIFA) and the International Olympic Committee (IOC) are involved in

more than

250 development-programs have started in more than 60 countries.

This review indicates the social and environmental impact of sport stadiums. Sport has an influential nature regarding social change. It has even come to a point where sport can be used as an instrument for environmental awareness and behavioural change. (Kellison, Trendafilova, & McCullough, 2015). Theories about behavioural change, which were used repetitively in more recent literature (Casper, Pfahl, & McCullough, 2014; Gonzallez-Ramalho, 2022; Barthelmes, Fabi, Corgnati, & Serra, 2018) indicate opportunities for modern-day sport venues to influence user behaviour. The gap found in the reviewed literature is considering factors that directly influence user behaviour in football stadiums regarding environmental sustainability. Furthermore, little literature was found concerning Dutch football stadiums and their

demographics, norms, values, and motivation. These are important assets in the framework of achieving behavioural change (Kollmuss & Agyeman, 2002; Vlek, 1998) Therefore research will be conducted on the hand of the following research questions:

***RQ:* How can Dutch football stadiums encourage visitor's environmentally sustainable behaviour?**

SQ 1: What is the stadium managers' perspective?

SQ 2: What is the stadium visitors' perspective?

SQ 3: What is the correlation between SQ 1 and SQ

4. METHODOLOGY.

4.1 RESEARCH DESIGN

This study started with desk-research, in the form of a literature review. Based on this review, a research gap was found. By using a mixed-methods research design, this study aims to explore how football stadiums can encourage sustainable behaviour of their supporters. The study first involved semi-structured interviews with 3 football stadium managers who were selected based on their experience and expertise in managing football stadiums. These interviews were taken with the aim to answer SQ 1. The interviews were recorded, transcribed, and analysed using colour coding to identify already existing managerial measures regarding the encouragement of sustainable behaviour and find possible threats and opportunities for developing new measures. The themes identified in the interviews were then used to inform the development of a questionnaire to address visitors. The questionnaire was designed in a subjective manner to find the visitor research question and SQ 1 and therefore answer SQ 2 & 3. The questionnaire was designed using a Likert scale and included both open-ended and closed-ended questions. Overall, this mixed-methods approach allowed for a comprehensive exploration of the factors that contribute to the encouragement of sustainable behaviour by football stadiums, using both qualitative (interview) and quantitative (questionnaire) data.

4.2 INTERVIEWS (SQ 1)

Who?	**When?**
NAC Breda	24th of March 2023
Sparta Rotterdam	11th of May 2023

The goal of the interviews was to determine the managerial view regarding the encouragement of sustainable behaviour of stadium visitors. Therefore, the interview questions were conducted based on the theory found in the literature review regarding environmental behavioural change. (Lucas, Brooks, Darnton, & Elster Jones, 2008; Czajkowski, Hanley, & Nyborg, 2015; Kollmuss & Agyeman, 2002).

4.3 QUESTIONNAIRE (SQ 2 & 3)

The questionnaire was set up based on the determined managerial view, obtained from the interviews, with the aim to find which managerial measures are possible factors to encourage environmentally sustainable behaviour. By using a four-point Likert scale, managerial measures were proposed to the respondent and hence percentual results were found and analysed. It was sent through social platforms such as WhatsApp and LinkedIn towards stadium visitors. The program used for the questionnaire is Google Forms. The questionnaire was sent out using non-probability sampling method. Non-probability sampling is a method that uses determined criteria such as the availability, geographical proximity, or expert knowledge of the individuals you want to research in order to answer a research question. When the population characteristics are either unknown or hard to individually determine, non-probability sampling is used. For example, visitors of a website where users do not have to create an account. (Nikkolopoulou, 2020). In this case, the individual characteristics of the target group, apart from them being stadium visitors, is hard to determine. Therefore, non-probability sampling is used. Non-probability sampling has multiple variations. The variation that applies best to this research is convenience sampling. Convenience sampling is a method mostly determined by convenience of the researcher. Factors such as geographical proximity, ease of access and existing contact with the population of interest could be of influence. (Nikkolopoulou, 2020). Another variation used in this research is snowball sampling. Snowball sampling entails the recruitment of new respondents, which are hard to reach, by existing respondents to make up the sample (Nikkolopoulou, 2020). In this research, the questionnaire was sent to a Whatsapp group chat which was not accessible by the researcher.

4.3.1 VALIDITY AND RELIABILITY

It is critical to take the instrument's validity and reliability into account while creating a questionnaire. While validity relates to the accuracy of the questionnaire in assessing what it is intended to evaluate, reliability refers to the consistency of the questionnaire's answers (Middleton, 2023). The questionnaire used for this research has 64 respondents. Taking into consideration that the target group is 17.700, which is the average attendance a of football stadium in the Netherlands (Transfermarkt, 2022), the confidence level is 95% and the margin of error is 5%, the ideal sample size would be 376 (Qualtrics, 2023). Therefore, we could say that the results of this questionnaire somewhat give us an idea of the perspective but cannot be considered valid. Furthermore, validity of the questionnaire can be questioned, since no evidence of being a stadium visitor was needed to fill in the questionnaire. Moreover, due to the length of this research being only five months, the questionnaire was sent out once. and reliability of the results of the questionnaire can be questioned.

4.4 LIMITATIONS

Due to little response towards interview requests done by the researcher and time span of this research being only six months, only two stadium managers were willing to take part of this study. The data gathered by these two interviews is used to conduct the questionnaire. Therefore, generalization of the data found is hard to determine.

Moreover, respondents of the questionnaire might have filled in socially desirable answers since most questions were close-ended using a four-point Likert-scale. A Likert scale is a rating scale used to measure opinions, attitudes, or behaviours. Likert scales are excellent for capturing respondents' levels of agreement or their thoughts towards the topic in a more nuanced manner since they give respondents a variety of viable answers. However, because of weariness, social desirability, a propensity for extreme response, or other demand features, Likert scales are vulnerable to response bias, in which respondents either agree or disagree with all of the assertions (Bhandari & Nikolopoulou, 2020).

This research aims to find the perspective and opinion of both managers and visitors of football stadiums through interviews and a questionnaire. Interviewees and respondents of the questionnaire might lack knowledge about the subject of sustainable development and behavioural change. Therefore, not all data gathered in the research about these subjects can be considered factual.

The interviews were conducted in the Dutch language and translated in English afterwards. A risk with data translation is loss of alteration, true meaning, and emphasis of what is said. Metaphors and sayings might not be possible to translate directly (McKenna, 2022).

The interviewers' previous experience in conducting interviews may have also affected reliability. Interviewing is a talent that is always evolving. The reliability of the information gathered may have been impacted because the interviewer for this study has never conducted interviews before.

5. DATA ANALYSIS AND RESULTS

5.1 DESK RESEARCH

This research started with desk research in the form of a literature review. The most important results found in this review for answering the research question are structured below. This overview is meant to categorize the most important findings, which makes it more convenient to make comparisons with the results of the interviews and questionnaire in the discussion of this study.

TABLE 1: DESK RESEARCH FINDINGS STRUCTURED

1. Sustainable stadium design	2. The role of the human asset
Football stadiums contribute to waste generation with packaging, plates, bottles, and food waste. (Pfahl, 2013)	Raising building user awareness has become a crucial element in reaching environmental sustainability goals (Barthelmes, Fabi, Corgnati, & Serra, 2018; Gonzallez-Ramalho, 2022).
Convenience, perceived efficiency, consumer awareness, outreach and participation are factors that affect consumer behaviour towards waste management (Hottle, Bilec, Brown, & Landis, 2015)	perspective, Casper and colleagues (2014) conclude that recycling programs, in- promotions contribute to educating spectators how to adopt sustainable measures at home.
Technological innovation has the potential to improve and modernize the implementation of waste management systems (Fletcher, St. Clair, & Sharmina, 2021)	Visual, acoustic, thermal, and tactile design behaviour and perspectives. (Lucas, Brooks, Darnton, & Elster Jones, 2008)
Designing for limited waste during the construction period of a building is a crucial step towards effective waste management. (Amaral, et al., 2020).	As Casper, Pfahl and McCullough (2014) concluded, behavioural change can be explained by analysing values and perceptions that might lead to actions,

	summarized as the Value-Believe-Norm (VBN).
Another approach to waste management in football stadiums is to encourage fans to reduce the amount of waste they generate (Casper, Pfahl, & McCullough, 2014).	Behaviour can not necessarily be explained by analysing norms and values of an individual (Smit & Melissen, 2019).
Organizations translate their goal towards zero waste in managing the waste stream, rather than reducing the landfill disposal. It is accepted to say that a diversion in waste stream is more sustainably preferable than a diversion in landfill disposal (Costello, McGarvey, & Birisci, 2014).	Bamberg (2003) confirms that if all cognitive components needed can be recognised, identified and modified, behavioural change can be accomplished in
Built environment accounts for one sixth of the global freshwater usage, one quarter of wood harvest, and two fifth of material and energy flow (Hussin, Rahman, & Memon, 2013)	Sometimes, the social surrounding overrules the cognitive factors that influence decision making (Hargreaves, 2011).
Mendez & Bicer (2020) researched the potential of wind energy for three stadiums in Qatar	According to the theory of environmental responsible behaviour by Hines and colleagues (1987), internal factors, which lead to the intention to act, and situational factors are the main contributors for environmental responsible behaviour.
The Kaohsiung World Stadium in Taiwan uses photovoltaic panels to generate their energy. These panels not only produce enough energy to power the stadium, but they also produce 80% of the energy needed to provide the surrounding neighbourhood (Sfintes, 2020).	Kollmuss and Agyeman (2002) state that external factors should also be taken into consideration. They mention institutional, economic, social, and cultural factors.
Lucas, Duarte Pinheiro, & de la Cruz Del Rio-Roma (2017) divides the measures a stadium manager can take regarding energy usage in two different segments; passive and active measures. Passive measures are described as measures that are totally dependent on sustainable urban planning and architectural design. So, no technological or mechanical solutions are needed. Active measures are characterized by technological systems where mechanical solutions are required.	Czajkowski, Hanley, & Nyborg (2015) show how cost-based motives (external) and the desire create a positive self and social image (internal) contribute in decision making regarding house-hold recycling in Poland. However, the results found by Czajkowski, Hanley & Nyborg (2015) show that external factors (institutional and financial in this case) play a more significant role in sustainable decision making than internal factors (attitude and values).
Edwards et. al (2016) conducted a study of a collegiate sporting event in Arizona, where they concluded that visitor transportation from and to the stadium is the major	Another confirmation of the relevance of external factor in pro-environment decision making is found by Chen et.al (2015). They found that external factors in travelling such

contributor to carbon emissions of sporting events.	operational management and vehicle facilities have 1,5x more influence on pro-environment travelling decisions than internal factors such as intention and habit.
In terms of carbon neutral transport, the players of a football club in England travel in all electric vehicles and the club encourages its fans to do so as well by placing charging stations near the stadium. Moreover, vehicle sharing is encouraged. Furthermore, the club offsets the produced carbon emission by fan travel through compensation in the ticket price (Papp-Vary & Farkas, 2022).	The NOA model suggests that individuals are more likely to engage in environmentally friendly behaviours when they perceive that these behaviours satisfy their needs, are supported by available opportunities, and align with their abilities to act on those opportunities. (Vlek, 1998)
	Iwuagwu et. al (2022) also elaborate the perception of football fandom by football fans themselves and conclude that fans gain a feeling of unifying, building social relationships and even economic welfare through betting.
	Sport has an influential nature regarding social change. It has even come to a point where sport can be used as an instrument for environmental awareness and behavioural change. (Kellison, Trendafilova, & McCullough, 2015)

5.2 INTERVIEWS

The data gathered from the interview will contribute to answering SQ 1. The researcher wanted to find what managerial measures and policies are already taken regarding sustainable solutions in the stadium and the encouragement of sustainable behaviour of the visitors. Secondly, possible challenges for the encouragement of sustainable behaviour were identified. At last, possible opportunities for the encouragement of sustainable behaviour were identified.

5.2.1 EXISTING MEASURES AND POLICIES

Both Sparta Rotterdam and NAC Breda are progressive in their sustainability policies. Both have LED-lights all around the premises and both stadiums are expanding their bicycle parking facilities. Differences found are most importantly the public transport facilities around the stadiums and management of the waterflow. The city of Breda offers bus rides from the central station to the stadium and fans from villages outside Breda came up with an initiative to pay for a local bus that drives around three villages. The Sparta Stadium, on the other hand, is reachable for all Rotterdam by tram, bus, and train. Furthermore, the Sparta

stadium has a circular water system for watering the pitch. Their unique drainage system gives them the opportunity to store water from the sky under the ground and use it to rain their pitch. Another important aspect is the fact that the KNVB (Royal Dutch Football Federation) is obliging Dutch stadiums to create a starting-point measurement for waste production and carbon emissions. In this measurement, the clubs need to consider transport of the fans towards the stadium, the transport of the players and staff during away matches, the food that is offered for employees and the management of the energy flow in the stadium. According to the NAC manager, the development of these factors will be measured annually, with the purpose of contributing towards the sustainable development goals of 2030, set by the Dutch government.

5.2.2 POSSIBLE CHALLENGES FOR THE IMPLEMENTATION OF NEW MEASURES AND POLICIES

Despite all the progressive sustainability policies facilitated by the stadium, one very important asset seems not to cooperate with these developments. NAC as well as Sparta both state that the fans are not coming to the stadium with the idea of changing their behaviour. They travel to the stadium to watch a game of football, and nothing else. They might come by public transport or bicycle, but this choice of alternative transport is not aimed to reduce carbon emission. It is aimed to be able to drink a beer during the game. And if that beer is finished, the empty cup will be thrown on the ground if there is no bin close by. Another challenge in the case of NAC Breda is the fact that all new measures and policies taken are not meant to create consciousness amongst the visitors. Both clubs also state that financial factors play a role in the implementation of new policies. However, Sparta seems to be more able to overcome financial challenges. Another challenge repeatedly mentioned by Sparta is the fact that football matches can be considered a mass event that take place 20-25 times a year. This means that 20-25 times a year, an average of 11.000 people visit a building in a time span of approximately two hours. These people leave the premises at the same time, which causes the waste flow to be hard to monitor and manage. Another mutually agreed challenge between the clubs is the fact that a visible change of behaviour will take time to notice. Sparta compared it with the non-smoking policy. For two years it is prohibited to smoke in the stadium, and still smokers are spotted in the crowd.

5.2.3 POSSIBLE OPPORTUNITIES FOR THE IMPLEMENTATION OF NEW MEASURES AND POLICIES

Both clubs gave insights about the possible opportunities for the implementation of new measures and policies regarding the issue. Both clubs also acknowledge the social significance and impact of the sport and state that it can be used as a tool to send a message. Several differences were found, but overall, a clear correlation between the answers can be determined. One of the mutual findings was the potential of using hard cups with a deposit when serving drinks. Both clubs agree that this will reduce the amount of waste produced. Another overarching topic in both interviews is the communication towards the supporters. NAC thinks that by promoting sustainable behaviour of the club towards the fans will encourage sustainable behaviour. Sparta agrees and adds to that that the power of repeating the message will be one of the most important contributors towards a shift in behaviour. By

hosting fan-meetings, Sparta hopes to reach the supporter even more. Sparta is also planning on creating a visual where all measures and policies regarding sustainability are monitored and this will be shown to the fans repeatedly. In other words, both clubs think that by showing the right example, the supporter will feel a certain pressure to follow the example. Both clubs also agree that using the players as a propaganda tool might be useful to reach the supporters. An opportunity found in the interview with Sparta is the positive outcome of the non-smoking campaign. Despite some exceptions, the director of the club notices a big difference in the attitude towards smoking in the stands. By discouraging communication through signage, ticketing and videowalls, the club managed to reduce smoking significantly. An opportunity suggested by NAC is the fact that the supporter should benefit from changing their behaviour.

5.3 QUESTIONNAIRE

The questionnaire was sent out to stadium visitors in the Netherlands varying from frequent visitors (20+ visits annually) to occasional visitors (1-5 visits annually). The questionnaire received 62 responses. Due to little responses, percentages are rounded to zero numbers behind the comma.

5.3.1 THE CURRENT SITUATION IN THE STADIUMS.

When asked about considering sustainable behaviour during stadium visit, over 50% of the respondents stated that they are not considering sustainable choices such as alternative transport or separating waste during the match. 35% states to be neutral, which leave 15% of the visitors being conscious of their sustainable behaviour. When asked to describe factors in the stadium that might encourage sustainable behaviour, 45% of respondents say these are not present. 8% of the respondents acknowledge the presence of these factors but describe these factors as a matter of convenience. For example:
factor that might contribute. The dominant contributors in the discouragement of sustainable behaviour are the plastic cups and the bad visibility of trash bins. 77% of respondents state that the bins are badly visible, 54% of respondents state that plastic cups are a contributor in the discouragement of sustainable behaviour, when asked in an open question. On the other hand, 94% concludes that the stadium is easy to access via public transport.

5.3.2 WHAT DO THE VISITORS THINK OF THE SUGGESTED POLICIES?

Noticeable difference of responses is seen when asked about the suggested policies of the managers. Firstly, 72% of respondents support the implementation of hard cups and is willing to pay a deposit. Secondly, 76% of respondents state that they are willing to change behaviour if the club communicates about their sustainability policy. 64% agrees that they will follow the good example set by players. On the other hand, only 21% thinks their club is promoting sustainable behaviour. Furthermore, 88% of respondents state that they are willing to shift towards more sustainably desirable behaviour if they benefit from it in the form of a discount on their tickets.

6. DISCUSSION

6.1 SQ 1: WHAT IS THE STADIUM MANAGER'S PERSPECTIVE?

Both stadium managers confirm that raising building user awareness is a crucial element towards reaching sustainable development goals, as is also stated in previous research (Barthelmes, Fabi, Corgnati, & Serra, 2018; Gonzallez-Ramalho, 2022). Several possible contributors in raising building user awareness are found during the interview.

Firstly, according to the managers, communication towards the supporters will be the main contributor in creating awareness and consciousness of sustainable behaviour. This can be done through fan-meetings, signage, ticketing and videowalls. When referring to the reviewed literature, this finding is perfectly in line with the conclusion made by Casper and colleagues (2014) where t contribute to the adoption of sustainable behaviour of sport event visitors. The positive attitude towards promotion through visual and tactile elements also aligns with the findings done by Lucas et. al (2008). They state that visual, thermal, acoustic, and tactile elements in buildings contribute towards behavioural change.

Another element found is the positive attitude towards the introduction of reusable hard cups to reduce the waste production. One of the clubs is currently in contact with a Belgian company that sells reusable cups with a personalized chip in it. This confirms that technological innovation has the potential to improve and modernize the implementation of waste management systems (Fletcher, St. Clair, & Sharmina, 2021)

The primary challenges perceived in the adoption of the new policies are, firstly, the repetition of the events hosted in the stadiums. Sparta states that 20-25 times a year, 11.000 people attend a football match in their stadium. Previous research explained that it is accepted to say that a diversion in waste stream is more sustainably preferable than a diversion in landfill disposal (Costello, McGarvey, & Birisci, 2014). So, monitoring the waste stream is an important step towards good waste management. The repetition of the events hosted in the stadium makes monitoring the waste stream a tough task, according to the Sparta Stadium manager.

Secondly, in the case of NAC Breda, sustainable decisions are not intended to create consciousness amongst the fans. According to Kollmuss and Agyeman (2002), social and cultural factors can play a role in sustainable decision making of an individual. So, if there is high cultural value towards a church, for example, and pro-environmental choices must be made in order to preserve that church, people will always choose that option. According to the NAC Breda manager, the cultural value of the stadium for its visitors can be considered high. So, encouraging the visitors by giving the right example might be an encouragement for sustainable behaviour.

NAC Breda also states that the fans are easier willing to change their behaviour if they benefit from it. This might be in line with the NOA-model by Charles Vlek (1998). The NOA model suggests that individuals are more likely to engage in environmentally friendly behaviours when they perceive that these behaviours satisfy their needs.

6.2 SQ2: WHAT IS THE STADIUM VISITOR'S PERSPECTIVE?

The stadium visitors are willing to change their behaviour if the club is transparent regarding their sustainability policy. This is also in line with previous research. When looking at the Model of Environmental Responsible Behaviour (Hines, 1987), knowledge of the issue, knowledge of action strategies and personal responsibility are all contributors to an By being transparent about the issue and the action strategies, the stadiums could create a sense personal responsibility and therefore encourage environmentally responsible behaviour.

Furthermore, the visitors support the implementation of hard cups and are willing to pay a deposit. This could be supported by literature as well. Individuals might adapt a certain behaviour to create a positive self-image (Czajkowski, Hanley, & Nyborg, 2015). But it is hard to determine that a positive self-image is the implementation of hard cups with a deposit since no explanation of this attitude is given during the research.

Moreover, by introducing a discount on ticket prices, visitors are keen to change their behaviour. The latter confirms that external factors such as economic wellbeing could play a role in decision making, as earlier described by Kollmuss and Agyeman (2002). However, it is hard to determine whether the effect of this discount will have results on the long-term, since visitors might forget about the discount or take it for granted.

Visitors also state that using the players of the team they support as an example for sustainable behaviour might influence their sustainable decision making. This might also be in line with Kollmuss and Agyeman (2002) that cultural value towards the subject is an important contributor in behavioural change.

It is important to keep in mind that all abovementioned perspectives could have been socially desirable answering during the research. All results contribute to a positive self-image and are not in line with the current behaviour of the target group.

6.3 SQ3: WHAT IS THE CORRELATION BETWEEN SQ1 AND SQ2?

When referring to the root of the problem, both managers and visitors agree that the attitude of the visitors towards sustainable behaviour plays an important role. Managers agree that visitors visit a stadium for entertainment purposes only. Where more than half of the visitors state that they are not considering sustainable decision making when visiting a stadium. According to literature, convenience, perceived efficiency, consumer awareness, outreach and participation are factors that affect consumer behaviour towards sustainable behaviour (Hottle, Bilec, Brown, & Landis, 2015).

Another correlation the fact that when an individual benefits from changing their behaviour, by receiving a discount, for example, they are more willing to change their behaviour. This aligns with the theory in several ways. Firstly, the fact that financial factors might play a role in sustainable decision making correlates with (2002) theory about the importance of external factors rather than internal factors in decision making. The NOA model (Vlek, 1998) suggests that individuals are more likely to engage in environmentally friendly behaviour when they perceive that this behaviour satisfies their needs.
needs can be translated to a discount on ticket pricing, the NOA model also might also align with this issue.

The third correlation found is the importance of the stadium managers being transparent about their sustainability policy towards the supporters. NAC and Sparta agree that by giving the right example, the supporters might follow that example. Supporters say that they are more willing to change behaviour if the club sets the right example and is transparent in their communication. Managers as well as visitors agree that using the players as propaganda could be a useful tool for the encouragement of sustainable behaviour. This perfectly aligns with statements done in previous research. Kellison and colleagues (2015) state that sport has an influential nature regarding social change. It has even come to a point where sport can be used as an instrument for environmental awareness and behavioural change.

The last correlation is the attitude towards the implementation of hard cups with a deposit. Managers agree that it might help in the reduction of waste production, and visitors are willing to pay a deposit for the hard cup. Previous research explained that it is accepted to say that a diversion in waste stream is more sustainably preferable than a diversion in landfill disposal (Costello, McGarvey, & Birisci, 2014). So, monitoring the waste stream is an important step towards good waste management and with that set the right example for visitors.

7. CONCLUSION

7.1 HOW CAN DUTCH FOOTBALL STADIUMS ENCOURAGE SUSTAINABLE BEHAVIOUR OF ITS VISITORS?

Based on the research conducted on the correlation between the perspectives of stadium managers and stadium visitors, several key findings have emerged regarding the encouragement of sustainable behaviour within Dutch stadiums. Both managers and visitors agree on the significance of transparent communication regarding sustainability policies, recognizing its potential to influence and encourage sustainable behaviour among visitors. This implies that clear and accessible information about the sustainability initiatives undertaken by stadiums might effectively shape visitor behaviour towards more sustainable practices.

Another notable finding is the shared belief among managers and visitors that individuals are more likely to adopt sustainable behaviour if they perceive personal benefits. For instance, offering incentives such as discounted ticket prices or other rewards can serve as effective motivators for visitors to change their behaviour. This suggests that implementing incentive-based programs or initiatives could be a successful strategy for fostering sustainable practices within stadiums.

Furthermore, the research indicates a mutual agreement between managers and visitors regarding the utilization of players as ambassadors to promote sustainable behaviour. Leveraging the influence and popularity of players can be a powerful tool in raising awareness and inspiring visitors to embrace sustainable practices. By using players as a propaganda tool, stadiums could effectively communicate the importance of sustainability and motivate visitors to adopt eco-friendly behaviours.

Additionally, both managers and visitors have a positive attitude towards the implementation of hard cups with a deposit system as a means to manage the waste stream more efficiently. This finding suggests that the introduction of practical and sustainable alternatives to traditional single-use cups, such as reusable cups with a refundable deposit, can be a viable strategy for reducing waste and promoting sustainability within Dutch stadiums.

In conclusion, the research somewhat demonstrates an alignment between the perspectives of stadium managers and visitors regarding the promotion of sustainable behaviour within Dutch stadiums. Transparent communication, incentive-based programs, player engagement, and the

adoption of more sustainable alternatives all emerge as possible effective strategies for encouraging visitors to embrace sustainable practices. These findings somewhat indicate how Dutch stadiums could have the potential to create a more environmentally conscious and responsible visitor base, contributing to a greener and more sustainable future for the sports industry as a whole. However, further research is needed to implement concrete findings regarding the subject. The findings if this paper could be included in an interview with more stadium managers in the form of a group conversation. In this way, several perspectives can be determined at once and the research can gain more natural insights about the attitude of the participants. Also, more research can be conducted amongst the stadium visitors. By sending out the questionnaire again, reliability can be improved by determining the consistency of responses. By asking demographics of respondents of the questionnaire, further research can determine to which specific stadium each response relates. This will enhance the accuracy of the instrument in measuring what it is intended to measure. In the questionnaire, researchers could include a Max-Diff analysis. Max-Diff (otherwise known as Best-Worst) quite simply involves respondents This results in obtaining a relative ranking for each option (Daly, 2018). If the options in this questionnaire are the findings in this paper, combined with possible new findings obtained from the group conversations, a ranking can be made between all the suggested findings, which could make it easier to implement suitable measures and policies and answer the question how Dutch football stadiums can encourage sustainable behaviour of its visitors.

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