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Department of Mechanical and Industrial Engineering

ESTONIAN ACADEMY OF ARTS

Department of Design

MSc. Design & Technology Futures

Design for enhancing sports events' capacity to adopt more sustainable practices

Disain spordiürituse potentsiaali võimendamiseks jätkusuutlike tavade kasutuselevõtuks

MASTER THESIS

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THESIS TASK

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Thesis main objectives:

1. Understand the sustainability practises of sporting event management.
2. Explore existing approaches and identify possibilities for new solutions.
3. Propose a design concept to support a new approach to managing sustainability in sporting events.

Thesis tasks and time schedule:

No	Task description	Deadline
1.	Literature research and analysis	20.04.2023
2.	Design concept	15.05.2023
3.	Thesis finalisation	22.05.2023

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List of abbreviations and symbols

RE - Rally Estonia

ES- Environmental sustainability

EU - European Union

UN - United Nations

TBL - Triple Bottom Line

SOD - System Oriented Design

WRC - World Rally Championship

FIA - Fédération Internationale de l'Automobile

SDG - Sustainable Development Goals

ENM - Estonian National Museum

GHG - Green House Gas

SI - Sustainability Indicators

ABSTRACT

Climate change brought popularity to sustainability discussions. Organisations and individuals recognise the importance of integrating environmentally sustainable practices into our everyday lives to save our planet. While climate change is narrowly associated with the environment alone, it is important to acknowledge that its impacts are interconnected with economic and social sustainability as well. Despite various documentation with definitions and exemplifications on the topic, which are meant to guide towards establishing sustainable practices, in reality, they lead to controversial situations. The criticism around the topic questions the coherence of established definitions. In turn, actions taken in defence of sustainability are questioned for their appropriateness (Krauss, 2022).

People who are in charge of decision-making within sports organisations, managers, athletes, sponsors and other stakeholders are not environmentalists and rather represent a social and economic interest. Environmental enthusiasts who are eager to take steps towards sustainability are often left alone in their attempts to create a sustainability plan, along with a plethora of definitions and regulations. Lack of feedback on applied practices results in disregarded sustainability impact. The aim of the study was to find a possibility for a systematic approach that would simplify management for sustainability.

This research focused on the perception of environmental sustainability of sports organisers and management to find a possibility to intervene and create a framework that would help establish more efficient practices for sustainable performance of sports events. During the research, interviews with experts and industry managers were conducted alongside the observation, in particular at Rally Estonia 2022 event. The concept development process was built on top of various design methodologies and techniques proposed by the world's leading design agencies, including the co-design workshop with stakeholders.

The thesis proposes a concept of a sustainability portfolio which is meant to simplify the work of sustainability managers of the event. The concept is a digital platform that enables the planning, monitoring and structuring of collected data about sustainability performance. The platform should be seen as a tool meant to help event organisers

understand the scope of their capabilities by providing feedback and motivating them to implement more sustainable practices.

Keywords: sporting event, Rally Estonia, design-thinking, digitalisation, sustainability, environment, green event

1. INTRODUCTION

1.1 Introduction

Climate change is one of the main concerns of the 21st century. Without a natural and stable environment, humanity would not survive and nonetheless could enjoy sports. Although the biggest causes of ecological footprint might not be addressed to sporting events, we can not ignore the impact of the sports industry. The planet is in need of sustainable practices that will guarantee sustainable development so future generations do not have to pay our depths to nature. Talking about sustainability, humanity often refers to sustainable economic development while the importance of maintaining environmental, social and economic sustainability is neglected. The revolution towards a sustainable world will not happen overnight. We have to ask ourselves what can be done today that will take us one step closer towards the desired green future.

Representing the cultural side of society, a sporting event is also a business whose main product are emotions. The emotional product is one of the driving forces in the sports industry, as fans are willing to pay for tickets, merchandise, and experiences of the event that allow them to feel connected with the community. The sports industry recognises the value of emotions as a product, and as a result, invests in marketing and promotion of sports events and experiences. However, selling emotional experiences requires physical resources that leave an ecological impact. Intangible products cause tangible consequences.

The sustainability movement is not prevalent, but nonetheless is growing among sports events in Estonia. Rally Estonia (RE) has built their own environmental policy and has been awarded three stars environmental accreditation by the owner of the World Rally Championships organisation, FIA, recognising its aim towards environmentally sustainable practices. Despite the achievements, Rally Estonia is seeking new ways of improving its environmental sustainability practices. The management of RE was eager for collaboration, and therefore, RE served as the primary case study of the thesis.

The aim of the thesis is to understand the practices of environmental sustainability in sporting event management, uncover the issues that arise along the implementation of environmental policy and, most importantly, propose a solution that will help create a framework towards more sustainable performance of a sporting event.

1.2 Defining the topic

Environmental sustainability on its own is a vast subject. For the purpose of narrowing it down, an occasion as a sporting event was chosen. Sport events make it possible to look at sustainability from a slender perspective, but at the same time keeping it wide enough for the various frameworks to be chosen for the further research and design possibilities. Moreover, local events bring a lot of international people, which means that achieved results can be shared globally and potentially be implemented in other sport events/countries. The positive, sustainable solution can also improve competitiveness between the different event organisers.

The research was conducted in Estonia. Being a European Union (EU) country, Estonia is committed to implementing the EU Green Deal 2030. The deal consists of policies that are meant to reduce the net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels (European Commission, 2022). There are several movements and developments that have already been done and are still carried out by the government and private organisations. Firstly, Tallinn, the capital of Estonia, is awarded the title of European Green Capital in 2023 (2022, May 23). Secondly, the second biggest city in Estonia, Tartu, will be a European Capital of Culture in 2024. For this matter, a separate environmental strategy and guide for organising environmentally sustainable events Tartu 2024 was developed and is already being implemented across southern Estonia (Tartu2024, 2022). Additionally, a multidisciplinary cooperation platform such as Green Tiger (in estonian Rohetiiger), whose purpose is to create a balanced economic model for Estonia and the world, was established (Rohetiiger, 2022). Green Tiger has partners across four strands: entrepreneurs, individuals, the public sector and the civic sector. All of the mentioned above serve as a groundwork that generates interest and knowledge and furthermore creates room for opportunities for development towards environmental sustainability.

1.3 Research Question Development

Sports events gather a lot of local and international people together in one location. A sudden flow of public into event circumstances puts pressure on the surrounding system. Many organisational aspects have to be thought through beforehand. Often sports events, such as marathons or rallies, are organised in public or even wild areas that lack

the necessary infrastructure for a sporting event. This adds complexity as the whole system has to be built from scratch at the location. Numerous artefacts have to be brought to locations, such as energy generators, water supplies, portable facilities etc. Production, transportation, and consumption of all of the above leave a footprint on the environment. Additionally, the public leaves a footprint on the environment by arriving at the locations by different means of transportation, generating waste, consuming food or by simply walking and parking cars on the grass.

European Capital of Culture ''Tartu 2024'' program released a special environmental strategy for event organisation. Applying this strategy to the sports events context organised in southern Estonia served as a starting point for the research with the question: **how to minimise the footprint of a sporting event?** The problem with this question came immediately into the surface, one must know the tangible value before trying to minimise it, and the numbers were not available.

Each event being complex and unique, however, stakeholders can be divided into two groups: the organisers, the ones who are responsible for organisation of the event and participants, and the ones who consume the proposed possibilities of the event in the role of athletes and competitors or spectators. An accompanying question arose: **who's responsibility is it to deal with the footprint?** Organisers represent the business interest in the event. For athletes and the public, it is either about achievements or entertainment. Here appears the interest and behaviour gap. A little further research showed that event organisers consider it to be their responsibility to strive toward environmental sustainability. On the other hand, the behaviour of the individuals is nonetheless important. Through the research, it appeared that even if the organiser provides all the necessary infrastructure, it does not guarantee the desirable green functioning of the system.

The research focuses on the perception of environmental sustainability term by sport event organisers and management. It is important to understand their definition of the wide spreaded term, what do they consider as problems and what kind of methods event organisers use to solve the identified issues. The initial problem appeared to be the vague perception of ES, lack of knowledge and the motivational gap. The beginning of the research formed the following question: **How can the efficiency of ES be increased in the decision-making process of the organisational phase of the event?** This served as the driving force for further research.

2. METHODOLOGY

2.1 Process Methodology

To break down the complex design process into smaller steps, the process was built up on the Double Diamond model proposed by the Design Council (2019). The model is divided into four stages. The first step is to discover. The initial research question is based on assumptions, however, to verify the existence of the problem we have to get to know the system from the inside. During this stage interviews and observations were conducted together with the literature review. This gives an insight into the viewpoint of users and stakeholders who are involved in the system, the initial problem gets expanded and opens an opportunity to reveal the dilemmas that were hidden before.

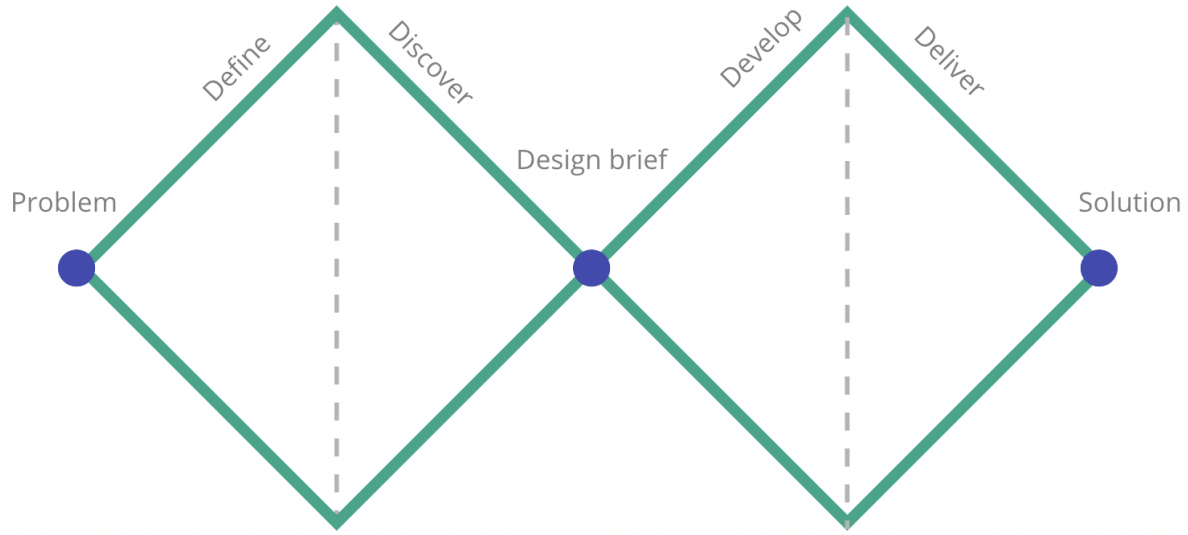

Figure 1. Double Diamond Model. Made by the author

The second step is to define. At this step, all gathered information is analysed in order to define the challenges in a different way. This process is accompanied by the mapping method (SOD, 2012). System Oriented Design (SOD) defines mapping as a visual thinking tool that helps you to investigate relations between seemingly separate things and gain a holistic view of the system.

By the end of this step, a brief for a potential further design is established. The design abduction reasoning pattern proposed by Kees Dorst (2019) was used to generate the brief. The only thing we know in the abduction design is the desired result that we aim for. The challenge for this reasoning is to figure out the new elements that have to be created without knowing how they will lead to the desired outcome. Figure 2 illustrates

that the process that starts backwards, from the only known equation, the desired value, thenmoves towards proposing a new *how* – this process is called framing. The design process is never limited to one frame. Furthermore, the Double Diamond model is not a linear process. Hence, from this point, the process can continue into the development stage and later come back to the reframing until the most suitable way is found.

Figure 2. Design Abduction. Made by the author

The development step implies the exploration of potential solutions through co-design workshops and more interviews. The solution is prototyped and tested and the process is repeated if needed. the concept design was introduced to potential users which provided insights about adding or removing a few functionalities of the final solution. The process of the current thesis does not lead to the creation of the real product, therefore finalising the thesis is considered as the deliverable result.

2.2 Research Methods

Qualitative research in the form of phenomenological research was conducted to collect the necessary information. The main research methods that provided the most valuable information were interviews and observation. Different sources of available materials were studied during the research, such as academic papers, articles and books. The materials covered the topic of environmental sustainability, as well as design expertise, methodologies and practices.

Additionally, for the research purpose and data collection, various archival discussions with experts in the form of audio-recorded podcasts and seminars were studied. In cooperation with the Green Tiger Club (Rohetiigri klubi) and the Von Krahl Academy have organised a series of discussions on the sustainability topic ''One Step'' (''Üks Samm''), which consisted of three parts. Other discussions took place during the Opinion Festival (Arvamusfestival) in Paide, August 11-12th, most of them were also moderated by the Green Tiger.

To add the diversity of attained information and gain insights into the pre-organisational processes of the event, the author participated in the training programs on

environmental sustainability meant for event organisers. One such training program was part of the international URBACT cooperation project "Food Corridors", which was conducted in Estonia by Tartumaa Arendusselts. The goal of the training was to help event organisers create their own green plan to set achievable green goals and metrics for their event. A training program was conducted by the Green Team of Rally Estonia for green volunteers, the team, the author, was also a part of. The goal of the training was to introduce the environmental policy to green volunteers, explain their role and assign tasks. Additionally, the author listened to the presentation on sustainability and managing food waste at big events that was presented to the Rally Estonia team by other stakeholders. The goal is to share experience and knowledge on the matter. These various trainings gave an overview of processes behind the scenes and information exchange in the preparation stages of the event.

3. CONTEXT

3.1 Choosing Rally Estonia as a Case Study

Rally Estonia (RE) was chosen as the main case study due to pleasantly aligned factors. Firstly, Rally Estonia is a very large international sporting event. It also organises World Rally Championship (WRC) competitions that are governed by Fédération Internationale de l'Automobile (FIA). The race trials are taking place in several different locations across southern Estonia at the same time, which makes it an extremely complex and diverse event for organisation and research. Secondly, Rally Estonia founded a Green Team whose objective is to develop a green strategy. Green Team has a few years of experience in implementing environmental policy. Rally Estonia has already built up some data throughout the years that are available for research. Furthermore, the team, represented by Tiiu Niglas, Head of Environmental Strategy in 2022, were very helpful and extremely enthusiastic about cooperation with the author.

Last but not least, what makes RE even more interesting is that it is an automobile oriented sport event. One of the main concerns of environmental policy is the pollution caused by transportation, including cars. This creates a sort of paradox. On the one hand, we have accusations that cars and transportation cause 25% of the EU's total greenhouse gas emissions (European Commission, 2020) and on the other hand a massive sporting event that is dedicated to cars and rally, but nonetheless is working its way out to become more environmentally sustainable.

Most of the data used in the problem identification and design process is based on the Rally Estonia case study. The information gained from research of other events, such as Tartu Marathon and IronMan Tallinn, acts as reinforced material.

3.2 Environmental sustainability in a sporting event

3.2.1 Climate change and why is it important?

By examining past climate changes, it is clear that changes in CO_2 concentration and temperature are related (Ministry of the Environment, 2022). According to the Estonian Ministry of Environment, most scientists share the opinion that humans have a significantly greater role in today's unprecedented rapid climate change than any natural cause. The main reason for the changes is the emission of exhaust gases into the atmosphere, mostly due to human activities, such as fossil fuel consumption,

deforestation, overproduction and much more. In addition to CO2, which is the gas that absorbs and radiates heat, methane (CH4), nitrous oxide (N2O) and fluorinated gases (F-gases) also have a significant impact. All gases that cause climate change are called greenhouse gases. The effect of greenhouse gases on the atmosphere is called the greenhouse effect.

Climate change usually is defined as the increase in the average temperature of the atmosphere (Ministry of the Environment, 2022). Global warming will have harmful consequences to humans and nature. Some consequences that will affect European countries and Estonia are: The risk of flooding in coastal areas, the rise of global sea levels also causes more frequent and stronger storms. More frequent and longer drought periods. Desserts also spread to southern Europe. The rate of forest growth accelerates in the northern region and slows down in the south, also the risk of forest fires increases. Transformation of the ecosystem, some species and habitats are being destroyed. The declining potential of fishing. All of the above is accompanied by food shortages and rising food prices. Property Damage increases due to extreme weather conditions. The current complication is that changes are happening faster than the environment can adapt to. All of that irrevocably affects humanity as a whole and the comfort of each individual. Hence actions have to be taken towards a more sustainable existence.

For a successful move towards sustainability, society will require significant investments, research and innovation, new ways of producing and consuming, and changes in the way we work, use transport and live together (European Commission, 2022). The EU is addressing this by aligning action in areas such as energy, environment, mobility and transportation, regional policy and the low-carbon economy, sustainable finance, industrial policy, trade and sustainable development, international cooperation and development, research and innovation on climate change.

Environmental sustainability is defined as responsible interaction with the environment to avoid depletion or degradation of natural resources and allow for long-term environmental quality. The definition for sustainable development as it is understood today was formulated by the United Nations Brundtland Report (1987), also known as "Our Common Future". The United Nations have developed the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDG) with 232 unique Indicators. (Figure 3). Seven of these focus directly on environmental issues. The European Union is committed to implementing SDG into their policies and encourages EU countries to do the same. Even though definitions and merits are

formulated and provided they they cause a turmoil and have gained plentiful of criticism that will be discussed in further chapters.

Figure 3. The 17 Sustainable Development Goals, www.theglobalacademy.ac

3.2.2 Rally Estonia's Environmental Strategy

Rally Estonia has developed an environmental strategy with clearly stated goals and directions for action. The purpose of the strategy is to define long and short-term development trends to maintain the good condition of the natural environment. Rally Estonia's slogan is "flat out to green future". The environmental strategy of RE focuses on three main goals Climate change and carbon emissions, waste management, water protection and biodiversity (Rally Estonia, 2022). RE is the case study of this thesis, so their perceivement of environmental strategy will be opened up in more detail for an overview.

All of the following information is cited from Strategic goals 2020-2030 of RE: (Rally Estonia, 2022)

Carbon emission reduction and compensation of air quality by 2050.
By 2050, Estonia aims to reduce greenhouse gas emissions in the transport sector by 60 per cent compared to the 1990 level. The specific sub-goal is to reduce the so-called share of conventional fuel cars by 2030 and eliminate them completely by 2050. FIA set a strategic goal in 2021 to prepare plans to reduce carbon emissions by 20% in 2025 and 50% in 2030. In 2021, to start compensating emissions through compensation in selected projects; In 2027, start investing in carbon sequestration technology and sustainable fuels by 2030 to achieve zero carbon emission status.

1.2 Energy consumption

The goal is to monitor energy consumption and increase energy saving by minimising the use of electricity in the venue. Also, to maximise the use of permanent electrical connections and use the most environmentally friendly technology for portable energy generators.

1. ***Waste reduction***

   Primarily, it is important to significantly reduce waste generation by developing waste sorting, recovery and recycling in order to reduce the amount of disposed waste to a minimum. It is also important to reduce the hazardousness and the content of hazardous substances in waste. Some objectives in numbers:

   • Increase the share of household waste collected by type in the total household waste collected by at least 10% at each event (annually)

   • Reduce the amount of waste by 5% per year, reaching a 30%-50% reduction from the 2020 level by 2030 (taking into account the number of event participants)

2. ***Sustainable use of natural resources (protection of groundwater and surface water), preservation of landscapes and natural diversity***

   The goal is to monitor the amount of water and wastewater used, reducing the use if possible and adequately handling the wastewater. Some proposed actions:

   • All of the wastewater generated at the event is directed to the general sewer.

   • Temporary toilets in the Service Park and spectator area.

   • Proper washing of racing cars - the water is cleaned mechanically before the rainwater drainage, and detergents are not used.

RE submits the corresponding requirements and recommendations regarding environmental policy to cooperation partners.

The first measurements of environmental impact were carried out in 2020. However, 2020 was the year when the pandemic due to Covid-19 started, so the event was not carried out to its fullest potential. Accordingly, the data gained in 2020/2021 serves as a source and base level to assign objectives and measures.

Environmental objectives for 2022 were:

- ***Switch to renewable energy -*** *Achieve at least 50% of Renewable energy at HQ and Service Park in contract with ENM - using Renewable energy and Solarstone's Green Mobile Energy technical solutions during the rally.*
- ***Improve transportation efficiency*** *by reducing transport carbon emissions by 5% per year during 4 years compared to 2021 (using hybrid or electric cars as*

most of the organisational vehicles, improve the travel efficiency of Rally Estonia organisation and partners). Improve travel policy by using IT development.

- *Embed **sustainability criteria** into procurement decisions and strength management commitment / controls by implementing fully comprehensive guidelines.*
- *By **developing a monitoring methodology** define the scope of impact monitoring and strength management commitment and controls by implementing fully comprehensive guidelines.*
- *Increase internal and external **knowledge and environmental competence** in cooperation with partners and using platform Rohetiiger (Green Tiger).*
- *Apply for the **3-star FIA Environmental Accreditation***
- ***Improve waste management** at the event by optimizing the collection system and increasing the number of separate sorting bins. Expand environmental information and knowledge to spectators and teams by the help of volunteers.*
- *Draw up **an Annual Environmental Sustainability report** collecting information for all objectives in 2022 and prepare improving areas for the next event by the Board.*

End of citation.

Rally Estonia and environmental accreditation

The following activities were carried out in 2022 during the RE that lead to the recognition of diligence towards environmental sustainability by the authorities:

- In order to reduce carbon dioxide emissions, the organisers of Rally Estonia use as many hybrid or electric cars as possible thanks to the contribution and cooperation of their official car partner, Toyota Baltic.
- The software developed by the Rally Estonia IT team since 2019 nevertheless gives a significant impact. More precise digital planning has made it possible to reduce trips from North to South Estonia and reduce the use of paper to a minimum.
- Throughout the whole event, renewable energy was used at the Estonian National Museum, where the office was located.
- As a result of the collection of old electronic equipment organised together with Ringy and the contribution of major supporter Cronimet, the WRC Rally Estonia 2022 winners' trophies were made of recycled metals.
- The Rally Estonia team together with RMK and other partners, went to plant trees in order to completely neutralise the carbon footprint created by the organisation

and execution of the event. While 4,000 new trees were planted in 2020, at the beginning of September 2021, 8,000 saplings were planted to compensate for the carbon emissions generated during this year's World Cup stage.

These are some of the noteworthy actions performed on the way to becoming a more environmentally sustainable event. By all means this is not everything that was carried out by the team of RE. However, this gives an overview of the process of implementation of environmental policy, how environmental sustainability is perceived by the event organisers and administration and officials, and in which direction they are moving.

Green Team

Development and implementation of the environmental strategy have been assigned to the Green Team of RE. During the event, green volunteers are invited to become a part of the Green Team to communicate the ES policy to the public, monitor and report the performance of ES.

The team creates a plan for action in accordance with ES policy during the organisational stage. After the event, information about the performance is gathered and analysed. Information mostly consists of tangible merits that are interconnected with the bookkeeping reports, e.g. type and amount of fuel used during the event. Gathered data is converted into desirable merits and calculated through available tools online (such as www.gowebtool.com and www.ecoscore.be). Achieved results are used for evaluation of necessary offsetting and analysis for future performance.

According to Rally Estonia, they use a model designed by the Estonian Ministry of Environment to determine the monitoring of the influence areas, which provides a framework for calculating the greenhouse gas (GHG) emissions. Furthermore, RE involves RMK’s (State Forest Management Centre) climate change specialist in the calculation process.

Establishing a Green Team is a great starting point, however, environmental sustainability should be integrated throughout the whole organisation and management of the sport event, instead of being assigned to one specific person or department. McCullough and Kellison (2017) point out that environmental sustainability being streamlined across various departments increases the efficiency of organisation functioning and opens up a possibility to design more comprehensive and efficent programs that are deeply integrated into the organisation process. Which as a side result also boosts returns on investment and returns on organisational objectives. Possibilities

for integration of a smooth layer of environmental sustainability across the organisation should be considered and explored, so environmental sustainability is not seen as a burden of just one department.

3.2.3 FIA Environmental Framework

The International Automobile Federation FIA awarded Rally Estonia the highest level of sustainability, with the 3-star FIA Environmental Accreditation (2022). In 2021 the event was awarded only two stars.

According to FIA the accreditation system helps stakeholders to measure and improve their environmental performance in accordance with ISO 14001 (Environmental management systems) and ISO 14064 (greenhouse gases) standarts. The FIA designs a specific accreditation roadmap for each member joining the programme, covering key environmental impact areas, as well as Clubs' principal business activities. The program consists of a three-level sustainability accreditation framework for the organisation of competitions, on the basis of which the environmental activities of the event are evaluated (FIA, 2020).

The first level means that the organiser meets the requirement sufficient to host national championships. The third level is generally attributed to competitions that belong to the World Series and host large factory teams.

Figure 4. FIA Environmental Accreditation www.fia.com

FIA's environmental framework consists of 17 guidlines that serve as a benchmark criteria for accreditation system (FIA, 2020). These are:

1. Clear commitment and leadership to Environmental Management among organisation and managment of the event.
2. Clearly defined and established Environmental Objectives and Targets.
3. Carrying out Communication, Training and Consultation on Environmental Issues.
4. Demonstrate a Compliance with Environmental Regulatory Requirements.
5. Measuring and Monitoring the environmental performance.
6. Processes for Internal Auditing, corrective and preventive actions and documentation and Record Keeping are established.
7. Key Environmental Aspects/Impacts are Identified and Managed.
8. Energy use
9. Water consumption
10. Waste Management
11. Identifying and managing the ssues related to Ground and Water Pollution.
12. Supply Chain / Procurement of Materials and Services
13. Transport
14. Biodiversity and Heritage
15. Noise
16. Air Quality
17. Carbon Emissions

As stated by FIA, the benefits of environmental accreditation ensures that you implement a best practice management of environmental impacts and will represent at term a reduction in costs as well as compliance and reputational risks (FIA, 2020). While guidelines clearly focus on environmental sustainability, the benefits are acknowledged throughout the economic and societal pillars of sustainability. However the communication of the last remains indefinite.

Benchmarks for three-star accreditation guidelines mostly require demonstration of commitment; established definition and development of environmental policy; clear understanding of the objectives and their scope; records of the environmental management system; and communication of environmental impacts in a form of trainings among employees and regular reporting to stakeholders, throughout all the 17 guidelines. The benchmarks emphasise that information on environmental impacts from activities should be reviewed and updated regularly. Furthermore, specific high risk event situations, for example such as increased risk of ground pollution at the river-crossing,

should be identified and implement a relevant reporting regime. Whilst the scope of requirements is wide and requires a dynamic approach, FIA does not seem to provide a tool or a framework for managing the scope.

Currently environmental policies of FIA stakeholders, including Rally Estonia are available on the website in the form of Portable Document Format (.pdf) for downloads. Reports are accordingly presented in the Excel sheets, pdf documents or illustrative slide presentations. While information being easily available, it requires a deep exploration in the plethora of documentations in order to find required figures. Available documents and information remain rigid and do not contribute to flexibility of regular updates but instead add the complexity of operating the information. Due to vast documentations in different forms certain contents might be overlooked. Requirements for fulfilment of the guidlines are dynamic and complex, so should be the information management and handling. There is room for development of a systematic and holistic approach to handling and communicating the information among the stakeholders and possibly leaving room for generation of new knowledge.

4. RESEARCH

4.1 Interviews and discussions

Several interviews with experts and representatives were conducted during the research phase. The interviews were guided by a set of prepared questions in advance. However, interviews often grew into a form of dialogues and discussions. Experts in the area with a deep knowledge of the topic were eager to share information on matters that the author was not even aware of enough to ask. Occasionally, some valuable data collection happened as informal or spontaneous conversations during and between the observation process.

The interviewees were chosen because of their daily interaction with environmental sustainability and their experience working on the solutions. One part of the interviewees were direct organisers of the sporting event: Oliver Kivimäe, Project Manager of Tartu Marathon Club; Tiiu Niglas, Head of Environmental Strategy of Rally Estonia; Ena Poltimäe, Environmental officer of Rally Estonia; Santiago Peña Gómez, Sustainability Manager at WRC and Rallycross Promoter GmbH; Aire Veskimäe, Operation Manager of IRONMAN Tallinn; Moonika Einaste, Tourism Manager of SA Elva Kultuur ja Sport, Elva Liikumis ja Spordifestival (English: Elva Moving and Sports Festival). All of the interviewees with the represented sport event have a different level of experience with the environmental topic. For example, Elva Sports Festival took place for the first time in 2022, while Rally Estonia has three years of experience in calculating its ecological footprint. This gave a diverse overview of the event organisation process in the context of environmental sustainability and organisators' insights on the problem space. Also, an interview with Katre Kahre, Sustainability Manager and Partner of Jolos and an active member of Green Tiger (Estonian: Rohetiiger) was conducted. Jolos is an agency that primarily organises corporate events. This added a variety of insights from the perspective of a non-sport event organiser. Another part of the interviewees were service and solution providers in the context of environmental sustainability: Katarina Papp, the author of RingKarp and Gertu Kaunismaa, responsible for Marketing & Events at Ringo. Both companies, RingKarp and Ringo services, are oriented to eliminate package waste and put reusable dishes into use, especially at public events. It was important to gain insights from their perspective on the problem space as service providers.

The interviews provided the crucial and most valuable information that was analysed and later used to identify the problem space.

4.2 Observations

Rally Estonia 2022 took place between 14th-17th July. The Green Team of Rally Estonia granted the author access to the event for research purposes.

The first part of the observation was conducted on 15th July 2022, during the second day of the event at the Service Park of Rally Estonia. The Service Park is a site where each rally team has its service stations situated with access to the energy source, car wash, toilets, canteens and other necessary facilities. The service park was located behind the building of the Estonian National Museum (short ENM) in the area that previously served as an airfield, and the building itself served as an office area for the whole Rally Estonia organising team. Completed research at the Service Park gave an overview of the organisation process, function and workflow of the Green Team, participants' behaviour in the form of rally Teams and little insights into the public's behaviour as well.

The second part of the observation was conducted on 17th July during one of the race trials at Leigo Farm race track alongside the visit with the Green Tiger members.

The purpose of the visit of Green Tiger to the event was to share the experience and knowledge of the implementation of environmental policy. Part of the event's energy at Leigo was produced by solar energy, therefore the visit also included a presentation by SolarStone and their solar technology. Moreover, the whole area of race trials was full of temporarily organised infrastructure in the wild, between forest and fields. It included public parking, organisation and restriction of public movements, portable tribunes and lounges, catering, toilets etc. This gave an overview of the organisation process of the event in the area where everything has to be planned in advance, brought in and built up from scratch.

It is important to note that the author did not have an overview of the entire management of Rally Estonia. The insights were gained only from the perspective of the Green Team and within the framework of environmental policy.

4.3 The anatomy of sport event

The rally event consists of three main stages: organisational, lasts throughout the year and enters the active phase a few months before the competitions; event stage, while the competitions last 3-4 days, the intense work for the management lasts around two weeks; Post-event stage, summarising and analysing stage. The figure 5 gives an

overview of the complexity of environmental tracking within the sporting event through the main environmental nodes that require the consumption of resources. The main nodes are transportation, energy & water consumption, and waste management. However, each node in turn can be broken down and looked through the same nodes in more detail. The attempt to manage the performance of each node in an environmentally sustainable way is puzzling and requires deeper research from the managers to understand.

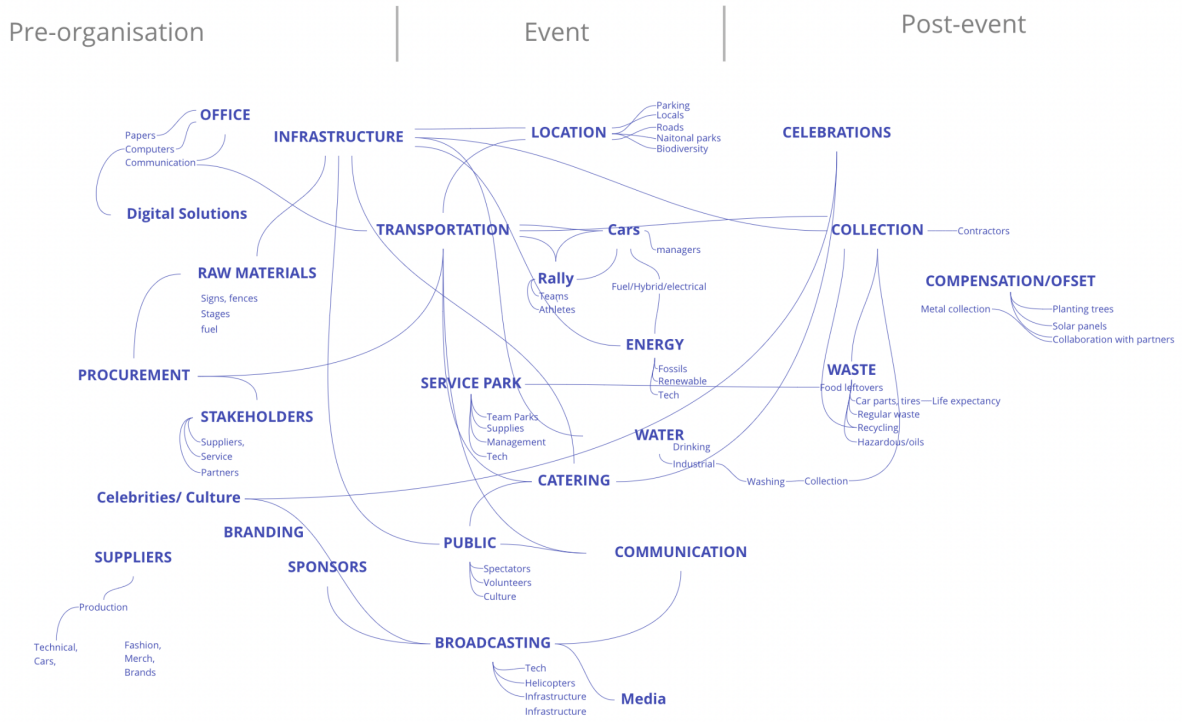

Figure 5. Resource consumption nodes. Made by the author

The environmental policy of Rally Estonia is built on top of the requirements for FIA's environmental accreditation. RE team is free to build it in the way they see it being most relevant to their event, as long as the outcome fulfills the requirements. FIA's policy is in turn based on ISO standards and SDG goals. After the policy and goals are established and an action plan is carried out during the event the caused ecological impact is calculated and reported. In 2022, the amount of km covered by the management team was brought down with the help of IT soluiton, hence the amount of emitted GHG was also lower. (The author was kindly presented with the draft report of 2022, but due to the fact that it is not being officially released yet the numbers remain confidential at the moment of writing the thesis). The report is composed through the perspective of an environmental sustainability lens, the impact of the same actions on economic or social sustainability are not taken into account. The report proposes the feedback on the

performance. However, the feedback lacks meaning on the overall system. In figure 6, the solid arrows illustrate the flow of environmental policy, while dashed arrows indicate the delay. The previous map, figure 5, is the zoom-in into the ''consumption'' area, indicated by a big circle in figure 6.

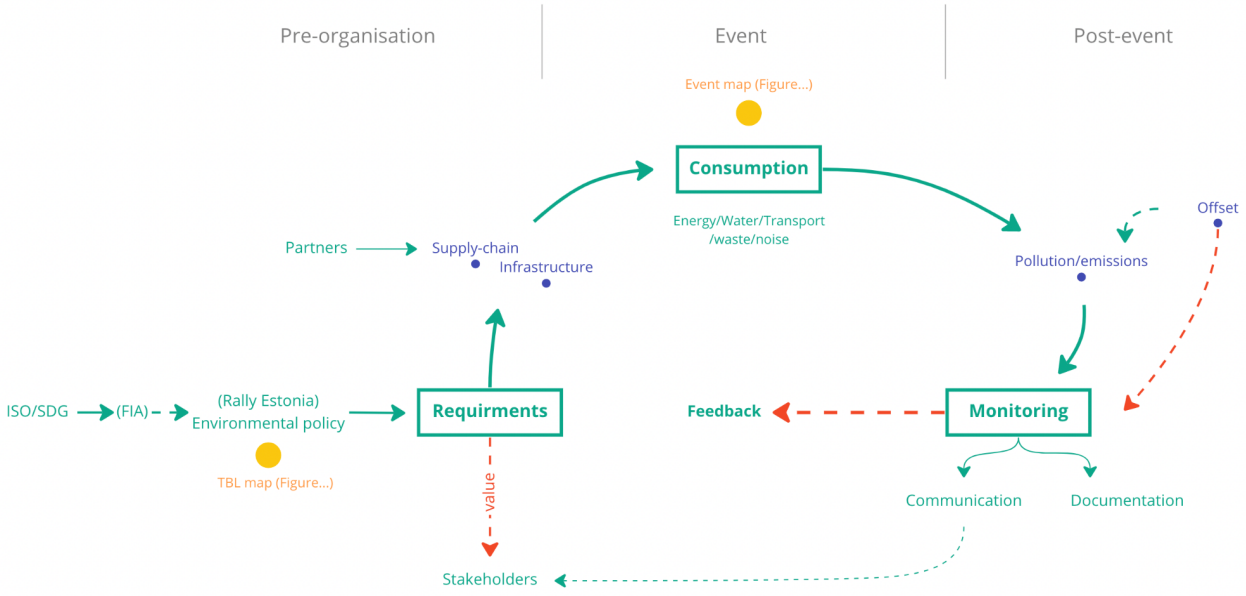

Figure 6. Environmental policy flow within the event. Made by the author

Figure 7 provides a closer look into the construction of the environmental policy map, indicated by a big circle under ''environmental policy'' in figure 6.

The main difference in planning for environmental versus economic and social sustainability is that the desired outcome is clearer and more tangible in the economic and social layers. Figure 7 illustrates the linear planning of frameworks. Furthermore, the methods of achieving the goals are known. Achievement of economic or social goals might come at the cost of environmental sustainability and vice versa. However, due to viewing the layers separately, especially ES, and the lack of systematic feedback, that would show actions' impact through all three layers. This and other issues with the Tripple Bottom Line (TBL), also known as the three pillars of sustainability will be discussed in the further chapters.

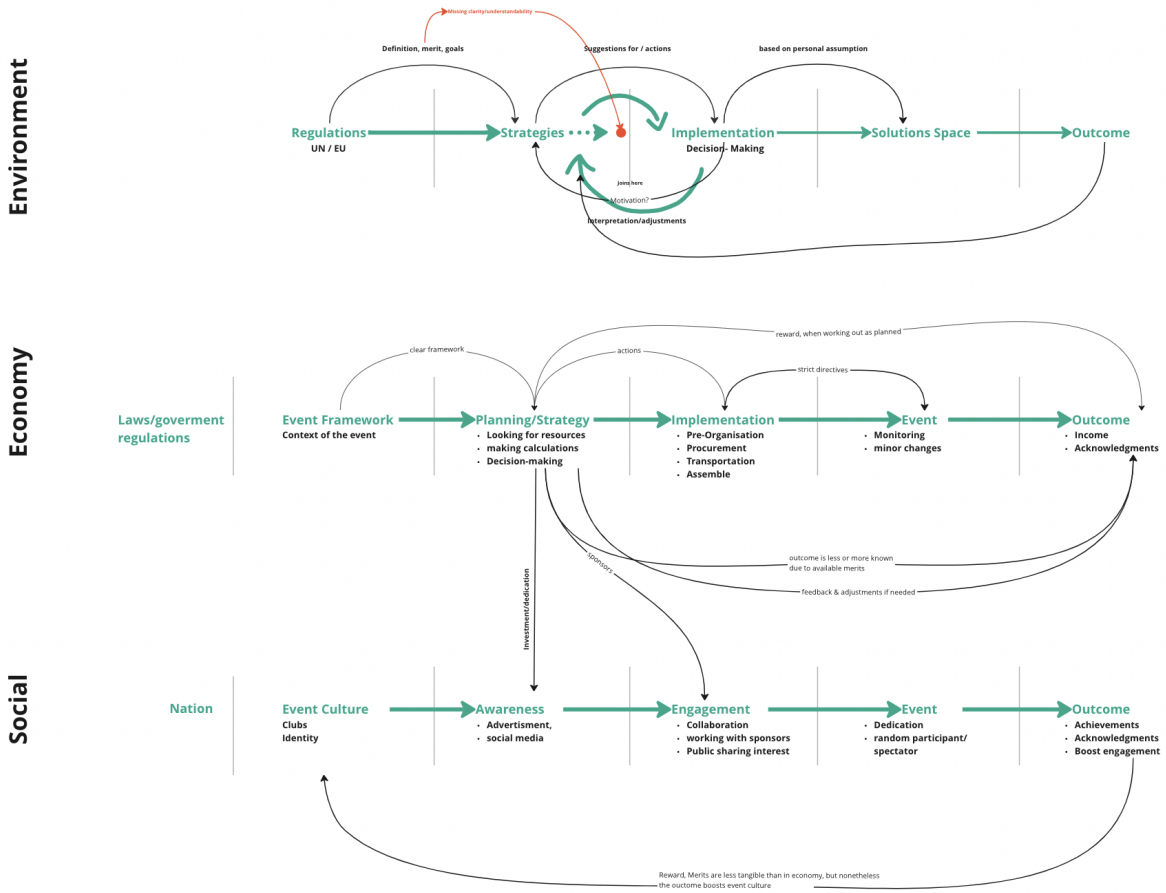

Figure 7. Planning and feedback flow of the TBL of the sporting event. Made by the author

There is an opportunity for exploring the implementation of a more systematic approach, in which the feedback of one layer would influence the decision-making in all three layers of sustainability. Figure 8, the red arrows show the potential desirable feedback flow in the system. Currently, the main gap appears in the development stage of the environmental policy and its implementation stage in the environmental layer, due to a lack of clarity in the initial definition and merits of sustainability, which will be discussed more broadly in a further chapter. There is a lot of room for interpretation. The managers of sports events should have the possibility to create their policies with the maximum relevantness to their event. Therefore, they require feedback on actions throughout the whole system to achieve the maximum sustainable result. Costs or advantages in one layer caused by decision-making in another should be perceptible.

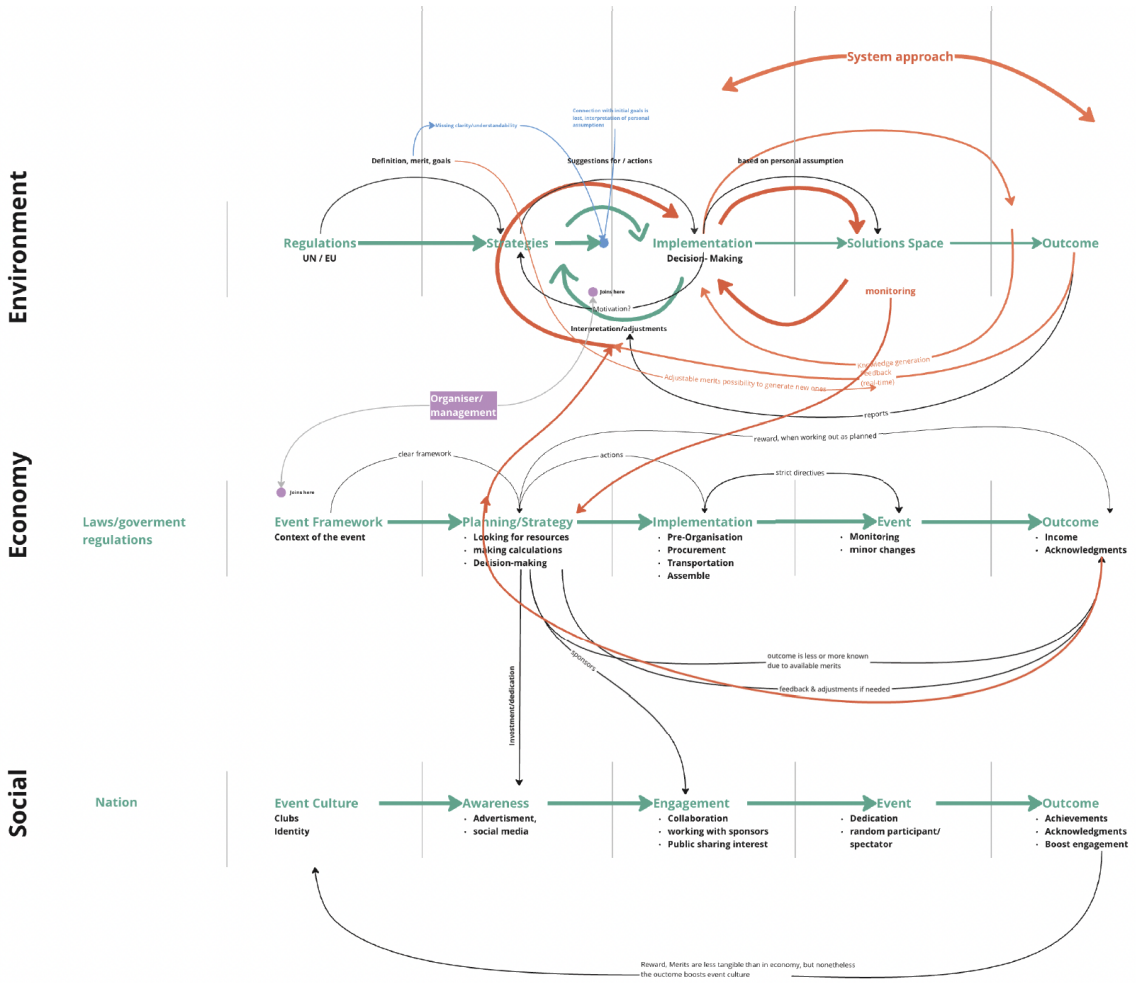

Figure 8. The desired feedback flow within the TBL of the event. Made by the author

The management of sports industries must understand the ES and its value to the organisation and the natural environment (McCullough & Kellison, 2017). This can be done by identifying the industry's organisational capacity and targeting strengthening strategies to build those capacities (Evans et al., 2014). The United Nations Development Program (UNDP) defined the term capacity building as the process of developing skills, abilities, processes and resources that organisations need to adapt and thrive in a fast-changing world (UNDP, 2015). Backer (2000) described the organisational capacity building as "strengthening nonprofits so they can better achieve their mission". Nonprofit infrastructure is the management systems and processes of the organisation. Evans et al. (2014) point out that the most impactful capacity-building activities include a comprehensive range of approaches. Therefore, the capacity and its effects should be explored and strengthened through all layers of the organisation. Strong Capacity building will increase the chance to investigate the best practices for sustainable performance of the sporting event.

4.4 Motivation Gap

The motivation gap is one of the main reasons that prevent people and organisations act in an environmentally sustainable way. Juvan and Dolnicar (2014) have systematised justifications for behaving in an environmentally unfriendly way in their process of research on the attitude-behaviour gap in sustainable tourism. People who participated did not report changing their behaviour, despite the fact of being highly aware of the negative environmental consequences of tourism. Instead, participants offered a wide range of justifications for their activities. During the research for this thesis, the studies of the motivation-behaviour gap in the context of environmentally sustainable sports events were not found. Tourism and sport are similar systems, both of the systems have exceptional circumstances in which people are not placed on a daily basis. Additionally, both are oriented towards emotional experience. Therefore, the findings of tourism studies could be potentially applied to sports events. Moreover, there are several types of sport tourism: tourism with sports-related content as a spectator, participation in sport event tourism and sports training tourism. (Gozalova et al., 2014).

According to Juvan and Dolnicar, the justifications can be divided into three segments. The *government blamers* show interest in environmental sustainability but deny their responsibility and ability to make a difference. The *struggling seeker* would not book a vacation if it was environmentally unfriendly, yet does not feel in control of reducing negative environmental impact. The *impact neglecters* deny the negative environmental consequences of tourism (Juvan & Dolnicar, 2014). Three different definitions of justification patterns signify that there has to be a different approach to each in order to reduce the motivation gap. (Nevertheless, considering the limitations of the mentioned study, it can be stated that there are more than just three justification patterns).

Based on the observations completed at the Rally Estonia Service Park, it can also be stated that providing environmentally friendly infrastructure does not guarantee behavioural change or an increase in motivation. The Service Park was equipped with a recycling and car wash area, smaller recycling bins for general, bio and plastic waste across the whole park and two smaller car part washing stations in the middle. The locations of the facilities can be seen on the map (Figure 11) that was included in the environmental regulation document, which was also sent out to all the rally teams for acquaintance. The map was also present physically across the area for rally teams to navigate.

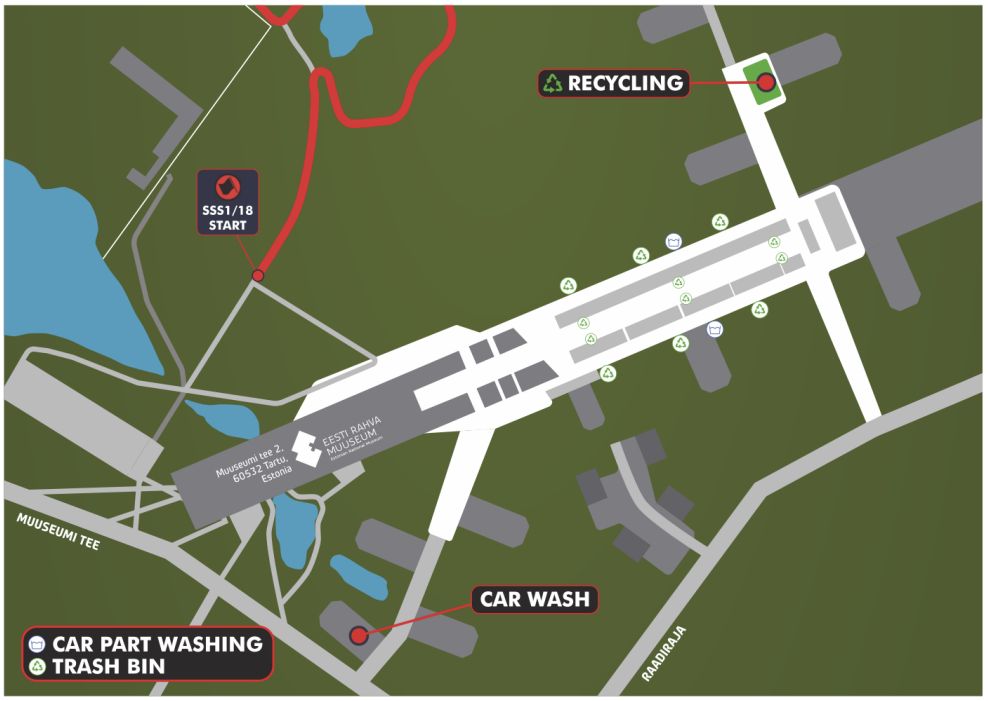

Figure 9. Service Park at ENM map (Rally Estonia 2022)

Despite the provided solutions, the possibility to recycle and collect sewage, there were several violations of the requirements provided in the environmental regulation document. The recycling area remained empty throughout the day as it was too far away from the main park area. (approx. 5 min walk one way from the closest team's parking station). Smaller recycling bins were constantly filled with inappropriate garbage, and car parts were washed on the open grounds. However, teams who had their own washing stations or the ones who were located close to the provided washing stations did indeed use them, and the sewage collection functioned as intended.

Figure 10. Illustrative violations of environmental policy. Left photo: car parts are washed in an inappropriate location. Right photo: car parts were placed in the general waste bins, although requirements demanded them to be taken to the big recycling area. Photos made by the author.

A small discussion with one of the rally's team members was conducted during his break. *''While I am on the break, I might walk the extra distance to throw this bottle into the correct waste bin, but when cars with pilots are here, then I have to do my job, and honestly, I would throw this bottle into the nearest garbage bin without even looking. My head is occupied with other thoughts. I can not care about recycling at the same time.''* - rally's team member (he was speaking while holding a water bottle in his hands). He also mentioned that the recycling area is indeed far away, and they simply do not have the time to take garbage there.

It is not enough to spread information and provide the necessary infrastructure for environmentally friendly behaviour and expect the desired outcome. A deeper understanding of the user's final interests and needs is required. "We must design for the way people behave, not for how we would wish them to behave." - Donald A. Norman (2011). People are not going to willingly contribute extra time and effort unless they benefit from it and will always look for the simplest way to act.

4.5 Interviews' analysis

Not environmentalists

People who are tackling the issue of environmental sustainability are not environmentalists. The Rally Estonia has a Green Team whose objective is to work on the development of sustainability. On the other hand, within the organisation of IRONMAN Tallinn, ES is upon the shoulders of the project manager, Aire Veskimäe. Similarly, Oliver

Kivimäe, the project manager of the Tartu Marathon Club, said that the implementation of sustainable practices was brought up in the discussion as a personal initiative of the team members. Most of the actions and solutions are coming from the people being enthusiastic enough. However, both Veskimäe and Kivimäe admitted that their knowledge of the ES is limited. A similar pattern appeared throughout all of the interviews: there is a lack of information provided by the government. The general guidelines with preferred goals are supplied, however, there is little understanding of how to implement these in the context of each event.

IRONMAN Tallinn and Tartu Marathon have not calculated their ecological footprint. Their representatives stated that it is not quite clear how to do it, and they have not seen an urgency in doing that, therefore they have not invested in it yet.

Some of the main concerns that were emphasised in each interview were:

- Garbage recycling in public areas.
- Putting into use the reusable dishes in public catering of the event.
- Reduction of other plastic (bags). Overproduction of dated T-shirts in the case of IRONMAN.
- Energy and water consumption.
- Transportation.

The analysis of the interviews showed that the general perception of ES is quite similar across the event organisers, but rather from a slender perspective. The problem that was always brought up first was recycling and garbage collection in public areas. However, rarely noted how garbage sorting is handled in the organisation stages of the event. It is presumable that the arrangement of the event generates more waste than the spectators at the event. The second biggest issue was an urgent need to get rid of plastic bags, disposable plastic dishes and any other plastic materials in the form of mechendasie or souvenirs given out/sold to spectators or athletes. Awareness of emissions generated by energy consumption and transportation was present. However, the most common statement to the late issue was that there is a need to motivate people to use more public transport. These steps and types of thinking are not particularly wrong and definitely not bad as the first steps taken towards ES. However, this approach lacks a holistic and coherent view of environmental sustainability.
Last but not least, the statement of lack of provided information and guidlines is questioned of its justification. The information is available and solutions for calculations, such as environmental tracking software are avaible for use. In spite of that, it seems that it is not enough to boost environmental sustainability performance. The project

managers can not be blamed for a lack of understanding of ES, as they can not dedicate resources to environmental research as environmentalists or scientists. It is necessary to find a balanced solution to ensure that environmental sustainability efforts are indeed sustainable.

Responsibility

In the discussion about the burden of environmental sustainability during the interview with Aire Veskimäe, project manager of IRONMAN Tallinn, she stated that it is definitely orginisers' responsibility to arrange and provide necessary infrastructure so the event would function in an environmentally sustainable way. She points out that it is definitely not the participants' responsibility to think about recycling while they are running or cycling on the track. On the other hand at some point a member of the IRONMAN team brought out an interesting observation, athletes consume snacks and drinks during the triathlon, which produce waste, whether a banana peel or a wrap of a protein bar. As the athletes are on the constant move on the track there are chances that they might miss the garbage bin when throwing the waste, so for some, it turns into a sort of little competition, will they get in the bin or not. Some athletes show great excitement when they successfully hit the target. It is an interesting game-like approach that changes the standard way of looking at recycling. Nonetheless, she also pointed out the significant role of the awareness of the individuals who in one or another role come to the event. However, there is a lack of relevant communication. Veskimäe said that there are no special messages that they try to spread among the individuals other than calling up to recycle the garbage and reduce the use of plastic bags. The reason is that they did not give it enough attention, not because they don't find it important, but rather lack of understanding how to execute this type of communication.

Data gathering and Calculation

The project managers can not be blamed for a lack of understanding of ES, as they can not dedicate resources to environmental research as environmentalists or scientists. It is necessary to find a balanced solution to ensure that environmental sustainability efforts are indeed sustainable. And therefore, there is a need for a deeper understanding and wider view of the ES in order to implement a more systematic approach to problem-solving as event organisers are the ones making the decisions.

One of the biggest challenges in ES is to measure the environmental footprint. Before we can talk about reducing the environmental impact, we have to know the actual footprint in numbers that is being produced. Several interviewees agreed on that part. Katre

Kahre, the sustainability manager of Jolos stated that is an extremely complex process to carry out for several reasons. Firstly, there are no ecological footprint calculators meant for the events that would simplify the task. The calculator requires concrete methods and algorithms in order to calculate the impact, and the tricky part is that each event has different needs. A universal calculator can not be applied to the specific context of each event. Creating algorithms for each event or business is an expensive and time taking procedure. Secondly, gaining the information needed for calculation is no less complex. Tracking and providing this information is extra work for subcontractors that does not result in the return on investment. Furthermore, it is not clear to what extent the information has to be gathered and in what form handed over to the organizer of the event. The interests of the event organiser and subcontractors do not match which causes miscommunication and lack of data which in turn results that calculated environmental impact does not correspond to reality.

Furthermore, Kahre stated that a general lack of data is caused by the absence of cooperation between stakeholders. Each business and event organiser calculates environmental impact with available methods to them. Completed documents that include valuable data are usually in the form of .pdf files or Excel tables that are kept in the archives within company computers. Only the most outstanding achievements are shared with the public. Some environmental reports are available for downloads in the form of presentations or .pdf files. Information that is available in the form of presentations or any other file is stiff, it is impossible to interact or cooperate with it, compare it to your own data and learn from it. This slows down the process of data generation and working on solutions to reduce environmental impact. Nonetheless, companies are not eager to share gathered information, explaining it by investing too much time and money into the project and claiming it to be their intellectual property.

Restricted accessibility and sharing of valuable data hinder the creation of a collaborative environment and impede the progress in developing unified approaches to sustainability.

Legal framework

Several documents, regulations and strategies have been released and are available for download to everyone. From the EU 17 SDG to Tartu 2024 environmental strategy, it seems that they have little impact on the real behaviour as long as they are not made mandatory to fulfil.

Katarina Papp, founder of RingKarp, stated that the biggest factor to change the behaviour gap and motivate people to act in an environmentally sustainable way is the law. RingKarp often communicates with restaurants and catering companies in order to find new clients to join their service system. However, in two years 70 caterers became their service providers, „could have been 700", said Papp. It came as a big surprise to her how many managers of restaurants and caterers neglect the issue." *They just do not care, or the managers say that as long as there is no law then why should we waste our time on reusable dishes? Additionally, we already have biodegradable boxes*" - Katarina Papp, In general, Papp pointed out that she is rather disappointed in the regulations that the government is implementing. Things move too slowly. It is often stated that the market that produces products and services related to environmental sustainability should be self-regulated, so people would have time to get used to and adapt to the changes. However, Papp brought an example of the tobacco industry, if it would be unregulated by the government we would still have people smoking inside public places, despite being aware that smoking is bad for your health. Actions toward environmental sustainability have to be regulated by the government.

Similar things stated by Gerttu Kaunismaa, from Ringo. She added that people do not want to leave their familiar comfort zone and are not planning to act differently until the law dictates so. Gerttu also pointed out that a long-term achievement is invisible to the final users. The disposable dish at the restaurant costs around 20 euros cents, while the Ringo dish is several times more expensive. A lot of people still prefer the 20 cents option, instead of the more expensive Ringo dish, despite the fact that they will get the money back upon returning the dish to the collection point. In the long-term, investment in Ringo dishes is more economically efficient. Coming back to salience reward bias, peoples' behaviour is justified by the invisibility of the long-term reward.

Interviews have shown that there is a lack of a unified, systematised approach to sustainability among event managers. Restricted accessibility and sharing of valuable data hinder the creation of a collaborative environment and impede the progress in developing a unified system. Unless frameworks are dictated by the law, the responsibility discord remains. The initiative comes from individual enthusiasts, however, they have to compromise their interests for company/business interests. There is a possibility to explore chances of increasing collaboration, motivation and creating a systematic approach to the management of sustainability.

4.6 Co-design workshop

One co-design workshop was conducted with the Baltic Parking OÜ management team. Baltic Parking provides parking services for private locations. While the company is relatively new, the management has experience in the parking organisation of mass events such as festivals and sporting events. (Unfortunately, due to the author's personal circumstances and time restrictions, it was impossible to include a representative of Rally Estonia in the workshop.) The workshop was planned with the help of IDEO's design toolkit for a human-centred design approach (IDEO.org, 2015).

The goal of the workshop was to include the stakeholder in the concept development and exploration of opportunities. For the first exercise, as the ice breaker, the participants were invited to create a mind map of sustainability to put their thoughts on the right track. Further, participants created a map of their company's system and relation to sporting events. The goal of the second exercise was to imagine a new future, approximately the year 2050. Participants proposed potential new laws, regulations from the government and new technologies, considering today's growing trends. As a next step, ideas of how their company will adapt to proposed future circumstances were explored. Later, ideas were organised in themes and patterns that led to the consideration of potential solution space.

During the concept development stage the concept was presented to the green team of Rally Estonia. Unfortunately, it was infeasible to carry out a workshop with them at the time and the discussion of the concept was more in the form of conversation. However, valuable insights and user needs were opened up and taken into consideration for further concept development.

5. SUSTAINABILITY DISCUSSIONS

5.1 Sustainability related issues

5.1.1 Vast of definitions

As it was already stated, the definition of environmental sustainability was introduced in the Brundtland Declaration of 1987. Nonetheless, there is a plethora of definitions of the concept of sustainability. According to Purvis et al. (2019) this is due to the fact that different specialists from different areas explore and work on the topic each from the perspective of their area of expertise. "Sustainability literature is so broad and confusing, as Kidd argues, it is deeply embedded in fundamentally different concepts. From the development specialists to the ecological economists and systems ecologists, various broadly distinct schools co-opt the language of 'sustainability' around the same time, leading to what has become such a heterogeneous discourse." (Purvis, et al. 2019) Furthermore, in the analysis of sustainable development goals it is mentioned that clearance in SDG is missing. "As Tukker contests for SDG 9, sustainable infrastructure, a crucial tenet of the goal, remains undefined. What implicit or explicit definitions there are advocate particular understandings of technology, innovation or sustainable development" (Krauss, 2022). Each further interpretation of the SDG or ES definition causes the effect of the broken phone.

While there is a lack of a certain set of frameworks, sporting event managers have to figure out the most sustainable practices through the analysis of their industry's system. Interviews have shown that this approach appeared to be common among sports industries. This kind of process is questionable of its adequacy as it has a high risk of potential greenwashing, as it is not supported by the evidence of clearly grounded goals and justified results.

5.1.2 Measuring the immeasurable

The 17 Sustainable Development Goals have 244 quantified indicators that are being measured (Stone, n.d.). An indicator refers to a variable or an aggregate of multiple related variables whose values can provide information about the conditions or trajectories of a system or phenomenon of interest (Wu, 2012). By selecting and measuring a finite set of quantified indicators that approximate the essential elements of a concept, experts can 'measure' an otherwise immeasurable entity (Mair, 2017). Indicators help to break a complex concept of sustainability into a simplified measuring

process. Clearly, it is not possible to measure all human experiences. (Simon Bell and Stephen Morse, 2008). According to Wu, too many indicators can create confusion rather than understanding. However, managing human-environmental systems would be impossible without any indicators. Wu argues that it is crucial to understand that sustainability indicators (SI) are not always objective or certain. In fact, many SIs and the whole process of developing SIs are, to some extent, subjective because of the nature of the indicators themselves. Some indicators might be closely related to human values and perceptions. Hence, indicators are an indispensable tool for formulating sustainability measures, but utilising them can have many pitfalls. (Wu 2012). Indicators are often assumed to be objective and complete descriptions of the concepts they measure, but in reality, they are often value-laden and incomplete (Mair, 2017). Indicators guide our decision-making process. This can lead to policies and strategies that focus on what is measurable rather than addressing less measurable issues, leaving the intangible problems aside.

Another issue is that SDGs are referred to as universal. However, for one nation, goals might be easily realisable, while for others purely aspirational. The indicator of a contested system should not be understood as a piece of information about a system but as a piece of information reflecting how an individual or group conceptualises that system (Mair, 2017).

5.1.3 Responsibility discord

According to Peeters (2015) a lot of people believe that addressing climate change is the job of others. This is argued by several reasons. Firstly, climate change fails to generate strong moral intuitions. Our moral judgement system does not recognise climate change as an important moral imperative because it does not match with a paradigm moral problem. The remoteness of the effects causes challenges to our moral judgement system and reduces the feeling of urgency. Many people in developed nations believe that climate change will negatively affect only individuals who live in faraway places or will live in future (Peeters et al., 2015). Secondly, Peeters at el. argue that climate change violates human rights protection of human rights is the responsibility of humanity. Hence, everyone is responsible for climate change. However, such undistributed duties, to which everyone is subject, are likely to be discharged by no one, unless they can be effectively allocated in some way (Peeters et al., 2015).

Political institutions act in the name of the citizens in order to solve problems that cannot

be handled at the individual level. Climate change is the problem of collectivity, whos representatives are political leaders. However, If the political leaders fail to effectivly delegate, then the responsibility falls back on the citisens and organisations. Citisens can try to solve the problems themselves or create new institutions to do the job (Peeters et al., 2015). A sporting industry has the capability of acting as one of the institutions that could address climate change.

According to Peeters et al. (2015), besides individual responsibilities, individual agents have second-order responsibilities, which include promoting and enforcing a fair collective scheme necessary to tackle climate change. This potentially can be done within the framework of the sporting event. Sports events enhance social and cultural life by bringing together individuals and communities. It can set the ground for dialogue, promote human rights, and share interests and values across the community (Council of Europe, 2016). Accordingly, sport events can set a framework for a collective responsibility scheme, through which awareness of ES and the possibility to act can be carried on beyond the sporting industry.

5.1.4. Triple Bottom Line

The Triple Bottom Line, also known as the sustainability triangle, is the concept that integrates economic, social and environmental factors for planning and decision-making. It illustrates the complexity and multidimensionality of the sustainability concept. Nevertheless, in contrast, it does not explain the connections between the environment, economy and society. Simply bringing three topics together in a polygon has not created sustainability.

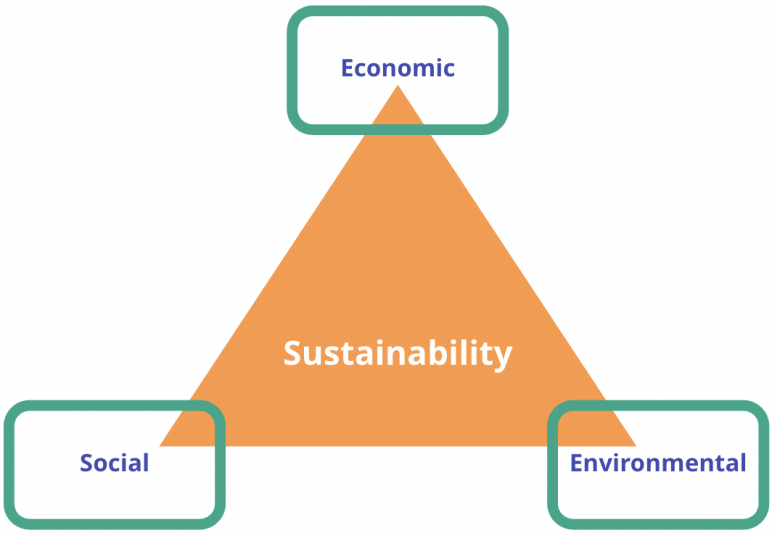

Figure 11. Sustainability triangle. Made by the author.

A historian Kathleen R. Smyth (2014) argues that By the 1980s, economists and policy-makers had largely disconnected economics from both its environmental and social foundations. Smyth points out that Our Common Future report, made by politicians and environmental experts from various countries and published in 1987, concludes that ending material poverty is the only way to ensure societal sustainability, while others have long been concerned that societal vulnerability is due as much if not more to investment in endless growth without concern for limits. They recognised that human activities, particularly ones associated with development, were destroying the environment but, at the same time, poorer peoples certainly deserved more development. In simple words, to achieve social sustainability, we need to provide the poor with the same access to resources and the possibility for development as richer people have, which leads to economic growth and causes the extraction of more and more of environmental resources. "Arndt suggests that the first prominent example of this was Seers 'The Meaning of Development' (1969), which argued that economic growth not only failed as a solution to social difficulties but often was the cause of them" Purvis (2019). This is a paradoxical situation. Sustainable development necessitates the establishment of a novel framework that allows societies to alleviate poverty while concurrently alleviating the strain on environmental resources, rather than exacerbating it.

5.1.5. Sustainability and development

It is important to distinguish two concepts: sustainability and sustainable development. Brundtland Report (1987) explains that sustainability is the goal, an ability to endure, whilst sustainable development is the strategy to achieve it.

Furthermore, it is important to differentiate sustainable development from sustainable growth. Herman Daly, the ecological economist, distinguishes development as "qualitative improvement" and growth as "quantitative physical increase". (Daly, 2008) In her critique of the sustainability article, Kathleen R. Smyth suggests that for Daly, sustainable development would mean "qualitative improvement in design, technology, efficiency, and ordering of priorities … without a quantitative increase in the entropic throughput from environmental sources to sinks" (Smyth, 2014).

5.1.6 Ethics of Environmental Sustainability

There are several philosophical approaches to understanding environmental sustainability, from light green, anthropocentric or human-centred perspective to dark green, eco-centric ethics, which offers a more holistic view of the ecosystem (McCullough & Kellison, 2017). A light green perspective means that any discussion about sustainability that includes non-human beings will always be prioritised by human-centred interests. The intermediate, mid-green ethics that fall in between recognise the value of each organism that makes up the natural ecosystem. The emphasis is that one species's interest should not be held over the other without good reason. However, only human beings can determine such, and this is already in conflict with its fundamentals. The eco-centric perspective emphasises the interconnections between the species, has no less conflicts. Giving privilege to ecosystems can create opposing values that, in conflict, allow non-human interests to prevail. "Encroaching on nature is mostly fueled by consumerism – the notion that human well-being is achieved by greater wealth and increased levels of consumption" (McCullough & Kellison, 2017). It seems that no matter what we, as humanity, do, we always prioritise our interests. This is a fundamental conflict in trying to compromise the three pillars of sustainability and achieve well-being of the environment, economic growth and improving quality of life.

5.2 Relationship with Nature

Production and consumption is not the only mechanism by which sustainability can be measured. As discussed in the previous paragraph on the example of the Triple Bottom Line, economics has been isolated from social and environmental foundations. However,

humanity relies on the environment and nature more than just as a raw material source that moves the economy. Smythe (2014) points out we relate to nature for material, intellectual, and spiritual reasons. Furthermore, Herman Daly (1973) illustrated the concept of sustainable development: "In the triangle, the economy is depicted as resting on the foundation provided by natural capital. Technology and economy serve just as intermediate means and ends on the way to the ultimate end, which is humanity's well-being." According to Smythe, we need a shift in the sustainability paradigm that will change thinking from policy for productivity alone to policy for meaningful work and meaningful engagement in which not just wages but also aesthetics, health and community welfare becomes important.

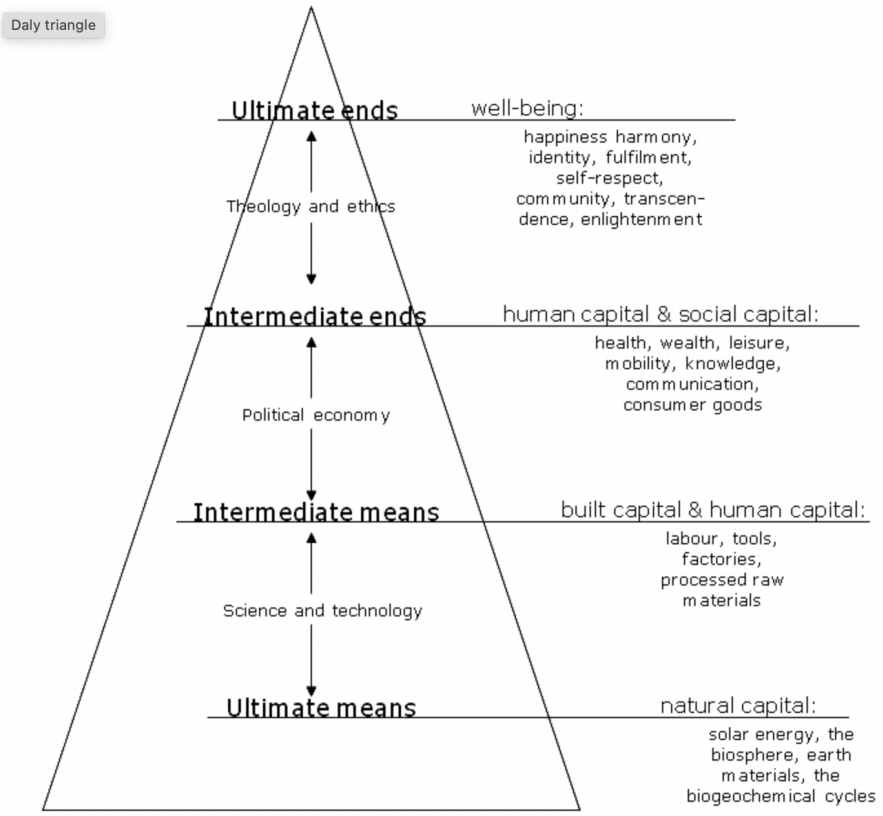

Figure 12. The Daly Triangle. TOSCA (2011)

Interviews, as well as academic articles, propound that the perception of environmental sustainability is remaining very narrow among the authorities responsible for decision-making. The prevailing conceptualisation of values comes from the economic field. Environmental value is mostly measured by the quantitative measurements of the ecological services that nature provides. This is due to current operation models of the

policies of businesses and society as a whole (Design Council, 2020). However, as nature provides intellectual worth, ecological services of nature should be distinct from environmental values. For example, the tree is valued as a resource of wood that it provides, and neglected for its contribution to the ecosystem while it is growing and living. It is easy to neglect the invisible and intangible values that are highly subjective and extremely hard to present in numbers. Applying the predominant economic conceptualisation of values to societies and the environment is raising a lot of questions. There is a notable call by academics, politicians and civil actors for a more pluralistic approach.

On the one hand, it seems inaccurate to assign quantitative numbers to environmental values. On the other hand, we can not leave them out just because of their abstractness and subjectiveness. As the perceptions of what we should value change, the tools to capture them have to be changed accordingly (Design Council, 2020).

5.3 The power of feedback

As mentioned in the previous paragraph, another problem that disturbs environmentally friendly behaviour is the remoteness of the effects. People or organisations do not see the effects that their actions cause. 'It is easier to harm others when their suffering is not visible and when injurious actions are physically and temporally remote from their effects' (Peeters et al., 2015). This effect is also called salience bias, where decision features are diffuse and difficult to quantify, leaving people to make suboptimal decisions (Tiefenbeck, 2009).

The fact that people simply do not see themselves to be the cause of the problem and therefore do not see behavioural change on their part to be part of the solution. (Juvan & Dolnicar, 2014). Juvan and Dolnicar suggest that pro-environmental behaviour can be achieved through the application of cognitive dissonance and feedback information. According to the cognitive dissonance theory, people feel uncomfortable when they experience cognitive dissonance and thus are motivated to retrieve an acceptable state (Vaidis, 2014).

Researchers from several European universities have found that real-time feedback of resource consumption can significantly affect users' behaviour (Tiefenbeck, 2019). They suggested that immediate reward bias dominates over the long-term cost of behaviour. As an example they brought, the benefits of energy and water use are immediate and

perceptible. At the same time, the negative consequences, such as costs and generated emissions, are generally intangible and difficult to gauge. In their experiment, they provided 697 households with smart shower meters. The devices provided real-time feedback on water and energy consumption. The devices were placed right under the handle of the showerhead, making it easily visible. The vital aspect of their experiment was that the feedback was provided during the decision-making process (during showering), showing real-time consumption. The real-time feedback is not based on past results such as regular home energy reports. Researchers have found that real-time feedback reduced resource consumption for the target behaviour by 22%. In contrast, they note that reports based on past consumption of household water use yield reductions in water consumption between 0% and 5%. "Thus, providing real-time feedback on a specific behaviour created an energy conservation effect that was five to six times larger than providing aggregate feedback about a broader measure of energy or electricity use to the same population." (Tiefenbeck, 2019).

Another example of successful feedback was carried out by Max Burgers of Sweden in their restaurants, which also received recognition and a Green award (Grant, 2020). They divided the menu into climate-friendly options and less climate-friendly options based on carbon ratings and also added more non-beef options like chicken, fish and veggie burgers. Carbon ratings were visible to the customers at the moment of purchase. Dividing the menu this way led to a 28% shift in purchasing towards more climate-friendly options.

Currently, there is no real-time feedback implemented in the context of sports event organisation. All the actions are measured during the event, calculated and later released in the form of the report after which they can be analysed and compared, like in case of RE, the report of the Rally Estonia 2022 is released a couple of months after the event. On the other hand, the sporting event is full of immediate rewards such as the achievements of the athletes, the number of spectators, and the engagement of the public in the overall sport culture.

Providing real-time feedback on the actions of the people can be a powerful tool towards behavioural change. Getting rid of the salience bias in the decision-making process for the environment is an important feature on the way to environmental sustainability.

5.4 Sport Culture

5.4.1 Community and emotions

Auto rally competitions leave an ecological footprint. However, cancelling the rally events because of their environmental unfriendliness is not an option. Alongside economic interests, sport is an important part of social and cultural lives. The accessibility of sports for participation and the availability of free broadcasting for consumption as entertainment sports can create a more inclusive and participatory society (Evens et al., 2013). Evens points out that there are several functions of the sport, such as: identification, individuals are provided with a possibility to identify with a group; integration, a feeling of belongingness to a certain group in society; leisure and pleasurable experience can give rise to a quality of life. Furthermore, the social control function means that sport provides a possibility for non-violent competition between individuals or nations and, in this way, keeps the public order. Moreover, sports celebrities can use their success and influence to tackle and bring attention to injustices, racism, gender bias and other social problems. All of the things mentioned above, such as quality of life and public order, are necessary for sustainable development. Rally Estonia is one of the biggest international sports events in the country and the biggest motorsport event in the Baltic countries, with 24 000 spectators in 2021 and participants from over 21 countries in 2022. Excluding RE will have a negative impact on Estonian social and economic spheres. According to FIA's worldwide study on the economic and social impact of motorsport the industry generates 160 billion euros of revenue and 1.5 million total paid jobs (FIA, 2021).

Unlike traditional businesses, a sporting event is focused on selling emotional experiences to the spectators. Therefore the product being sold is tremendously intangible (McCullough & Kellison, 2017). Event managers are focused on creating the experience of the event that spectators will enjoy regardless of the outcome of the competition. Activities that are carried out within the event are driven by the social need for drama by bringing emotions to the spectator. Each layer added to the pageantry of the event has its impact on the environment. Hence, the needs of society for leisure, pageantry, and identification are directly interconnected with environmental sustainability and should not be underlooked as individual segments.

5.4.2 Event and Social values

For environmentalists, politicians, event organisers and other stakeholders the perception of environmental and social values can mean different things. From tangible products to highly subjective values like cultural, aesthetic or spiritual.

A study by Menezes et. al. (2020) showed that a ServQual Model, usually used for the evaluation of service quality on five dimensions namely tangibility, assurance, reliability, responsiveness, and empathy can also be applied to event evaluation. Furthermore, they were able to apply an ES add-on to the model which helped evaluate the event's environmental sustainability dimension. The insertion of environmental sustainability highlights its importance as a value generator for the client (Menezes et al., 2020). This can serve as a base for further experimentation with the integration of social sustainability merits into sporting events with relation to ES.

Furthermore, sporting events' sustainability impacts go beyond the actual event. An offsetting process like planting trees and recycling metals creates job places and contributes to economic prosperity. The Sustainability Manager of WRC emphasized the importance of anchoring these generated values to the overall sustainability performance of the event. In this way, it is possible to create a more accurate picture of the extent to which a sporting event contributes to sustainable development in the long term.

5.5 Examples of existing sustainable strategies in sports

The International Olympic Committee (IOC) in 1992 led an upbringing across sports federations to encourage preserving the natural environment (McCullough & Kellison, 2017). This led to the establishment of several organisations across the world that develop environmental sustainability programs for the sports industry. Such organisations are Green Sports Alliance (North America), British Association for Sustainable Sport, Sports Environmental Alliance (Australia and New Zealand), and Sport and Sustainability International. The movement for environmental sustainability across sports is global, and further below, some approaches of different sports disciplines to environmental sustainability are brought up as an example.

The national football league:

American Football is a representative of team-based athletics. Football games require facilities such as football fields and stadiums. Notably, the efforts for greening were mainly brought up by stadium owners by renovating the facilities and applying for green

building certification, implementing clean energy usage and waste management. The interest is noted to emerge from profit on investments in green technologies. The US government provides high subsidies, particularly for investments in solar projects. Hence, the motivation comes from the higher economic profit rather than the direct return of investments into energy projects. McCullough and Kellison (2017) also note that interest in football teams can come from the possibility of attracting new fans, as some environmental surveys propound that female, younger, and wealthier people care about the environment.

NASCAR:

The automobile racing competition NASCAR launched their green program in 2008. It focuses on minimising the impact caused by fossil fuels by switching to ethanol blends to waste management on event days. With several surveys, NASCAR has found that their fans are environmentally aware and that transition to alternative fuels has rather clear social benefits, such as fan awareness, involvement, and adoption beyond spectators of the sport rather than a direct private return of investors.

Tennis:

Tennis is an individual sport in which athletes compete, succeed and fail individually and also obtain sponsorships individually. However, the decision-making on behalf of the sport is happening at the league level. The host for the U.S. Open, USTA, is engaged in recycling and composting programs and encourages event attendees to use public transport and fans to lessen their impact on the environment. Furthermore, USTA invests in carbon-offset programs. The Australian Open has LEED Gold certification of all buildings at Melbourne Park, where the competitions take place. Moreover, the French Open displays a promotional video featuring the top tennis players encouraging fans to recycle waste correctly.

Golf:

Just like tennis, golf is an individual discipline. Golf depends a lot on the aesthetics of the landscape, and therefore it has fallen under criticism for excessive water and fertiliser use and for not adhering to the local environmental needs. On the other hand, golf is a sport of quite wealthy fans and participants. The Professional Golfers' Association (PGA) announced that they support more than 3,000 charities with total donations of $133 million in 2014. The donations get distributed among headlines such as youth, health institutions, military, disaster relief, and the environment. McCullough and Kellison (2017) add that companies who sell grass fertiliser to golf managements are promoting

their products as environmentally friendly, realising the trend for environmental sustainability as a layer of the business model.

These examples illustrate very different approaches to contributing to environmental sustainability. Stakeholders see the economic benefit outside of direct sports activities, also due to significant government intervention. Managers recognise the importance of educating the sports fans and communicating with them, and a side interest can also come from attracting new fans. Managers can organise the events in account with direct environmental factors such as recycling, water and energy consumption. And furthermore, sports events can invest in carbon-offset programs. There is no one straightforward solution to solve environment-related issues. Moreover, considering the unclarity and plethora of definitions, no one has the right, at the moment, to judge what is the right or wrong thing to do. Environmental sustainability requires a systematic approach in order to achieve a balanced result. An important note was made during the organisation of the London Olympics 2012. The significant commitments to emissions reductions were met through a portfolio of carbon-saving and reduction projects rather than from a specific technology (McCullough & Kellison, 2017). A portfolio of environmental sustainability commitments and results can be a powerful tool for the systematic approach in the decision-making process.

5.6 Tracking Environmental Performance

The problems accompanied by tracking the ecological footprint and impact on the environment have come out many times throughout the research. The interviewees claim that the calculation of environmental performance is the hardest part of getting started. The hard part comes from data collection corresponding with reality and adequate analysis and evaluation. The concerns sound reasonable, as knowing your performance in values should serve as a base for further action planning. Several softwares for tracking environmental performance are available on the market. Such software, for example, are: Persefoni, Normative, Plan A, Planetly, Watershed, Emitwise etc. These products provide algorithms that track environmental performance based on filled-in data. Some of them provide a possibility for offsetting carbon emissions by investing in planting trees or establishing solar parks. However, if the supplier will not provide their part of the data, the calculations will be inaccurate. Furthermore, the role of the tracking software ends with presenting the calculated result, and it can not provide suggestions for actions for specific sporting event contexts. Therefore, the plan for minimising the footprint and possibilities for the most advantageous actions remains vague.

Even though tracking environmental performance software has its benefits and unconditionally makes it easier for businesses and organisations to work their way towards environmental sustainability, the software does not solve the issue of environmental sustainability being perceived as a separate problem that requires investments of extra resources and time. Data that is being collected, analysed and organised, through the environmental sustainability performance lens remains disconnected from the societal and weakly connected to the economic perspective. There is a gap in understanding the performance's actual impact on the whole system.

5.7 Carbon Credits

The recognition of the importance of tracking environmental impact is growing, and with it comes the demand for the carbon credit market. Carbon credits are meant to maintain the balance between produced greenhouse gases and their offset. This is especially meant to help to stop global warming, as was declared in the Paris Agreement to maintain the temperature rise below 2 degrees Celcius and further limit increase to 1.5 degrees Celsius above the pre-industrial level (UNFCCC, 2015).

Carbon credits allow companies or organisations to continue producing GHG up to a certain limit, especially the ones who can not eliminate or minimise their emissions as quickly as they would like to. Companies or organisations who can not offset their GHG themselves can purchase the credits. Accordingly, companies that have unneeded credits or whose business is oriented towards offsetting carbon dioxide can sell them. McKinsey estimates that the market for carbon credits could be worth upward of $50 billion in 2030 (Blaufelder et al., 2021). Carbon credits are based on the cap-and-trade model as an alternative to the carbon tax system. Nonetheless, it has received high criticism due to allowed emissions levels being set too high; It increases the final prices for delivered products and services; There is no global consistency in the system, and there are possibilities to cheat the system (Kenton, 2020).

Despite some flaws and criticism, the carbon credits system has shown its effectiveness as the demand is rising (Blaufelder et al., 2021). On the other hand, the system is limited to one specific target: keeping the emissions of GHG under control. As the advantage of such a system is present, there is a potential to apply a similar approach to societal aspects and explore the way to interconnect all three sustainability pillars. As Smyth (2014) suggests, we need a shift in the sustainability paradigm, and it can be assumed there will be a need for a similar sort of sustainability credit.

5.8 Research Conclusion

A sporting event is a significant contributor to the economy, social life and the environment. A sporting event is a business that sells emotions to people, but the intangible product has tangible actions that have an ecological footprint. Sporting events' scope extends beyond the event itself by creating community, job places and economic prosperity. Therefore such paradoxical cases as rally events being sustainable should be viewed through a wide lens of sustainability.

One of the most important points is the awareness and understanding of sustainability. The research led to the realisation that due to varying levels of understanding of environmental sustainability, certain aspects of it remain underlooked among the event management. There is a lack of knowledge among people responsible for decision-making as very often their area of expertise lies in a different field, rather than sustainability. The lack of unified definitions and merits of sustainability contributes to the complexity of the organisation of events in an environmentally sustainable way. Additionally there is a lack of approach that would enable one to zoom out and see the holistic sustainability scope of the event. Raising awareness and improving the understanding of sustainability crucial for ensuring that all aspects of environmental sustainability are adequately addressed.

Research has also shown that the problem of sustainability is isolated. It was pointed out by several interviewees that they come across the problem, that there is a lack of inclusiveness among stakeholders. Stakeholders do not understand the point of providing necessary information and getting involved as the values gained from it by event do not extend to them. Salience bias is one of the main reasons that causes the lack of motivation to act in an environmentally sustainable way, not only of stakeholders but also of members within the organisational team. The motivation gap among stakeholders causes responsibility discord. There is a need to close the motivation gap and increase inclusiveness among stakeholders and team members.

There is a need for a systematic approach to managing sustainability. Management of sporting events is not technically well prepared to fulfil the dynamic guidelines of the provided frameworks. Information management requires regular updates and monitoring with accurate feedback to ensure that environmental actions are indeed sustainable. There is a need for a supporting structure that would provide a holistic view of the system and help build a sustainability portfolio. Even though there are several tools, like tracking the environmental performance software, available to simplify measurements and calculations, they are locked in the current system. The system in which sustainable

economic development dominates the decision-making and leads to environmental unsustainability. Tracking sports events' performance alone does not lead to changing organisational approach. Therefore, there is a need for a shift in the system that will add a new value and meaning to sustainability in the sporting event context.

Achieving sustainability in sporting events requires increasing awareness and understanding of sustainability among stakeholders and event managers, increasing inclusiveness, bridging the motivation gap, and implementation of a systematic approach to management.

To sum up, the following key finding from the research are:

- Lack of systematic approach to sustainability through three pillars: economic, social and environmental.
- Vague perception of environmental sustainability.
- Poor real-time tracking of the impact.
- Lack of holistic view on the sustainability impact and easy operating portfolio.
- Significant salience bias of sustainability rewards/benefits.
- Leaving the intangible problems aside. (ex. community welfare)

6. DESIGN BRIEF

The design brief concludes the research and identifies the scope and framework, as well as the goals and desired outcome of the following concept development. It gives an overview of the problem space and narrows down the possible solution space.

6.1 Problem space

Sustainability is a wide topic. The research has shown that the sustainability framework of a sporting event is immense, with miscellaneous nuances that require a system thinking approach in order to tackle as a whole. One design project's scope is not enough to solve all of the problems. However, during research, several weaker points stood out with the possibility of intervention.

In the current system, environmental sustainability is separated from economic and social sustainability perspectives. This leads to neglecting the overall impact of environmental actions on the whole of sustainability. The feedback of the actions is either missing completely or is based on past results and can affect only the upcoming decision-making process, trial and error approach. Hence, the current approach does not guarantee that carried-out actions are, in fact, sustainable and that they cause more good than harm. There is a need to develop a systematic approach which will consider the impacts on all three sustainability pillars and provide a holistic view of sustainability actions.

Environmental sustainability is perceived and handled as a separate problem that requires an investment of extra time and resources. The Green Team of Rally Estonia can and should remain the driving force behind the development and implementation of environmental policy. However, the possibilities for integration of environmental sustainability through the whole organisational stages in a more smooth and natural way should be explored. Approaching ES and thinking of greener solutions should not be considered an extra burden for the management. Instead, it should be considered as an inseparable layer of ordinary organisational processes within all departments of the management. Hence, a system that would support communication between departments, determine understandable goals and merits justifiable within the organisation and simplify the reporting process should be contemplated.

The current approach to sporting event organisation leads to environmental unsustainability rather than the opposite. The currently proposed solutions towards ecological sustainability are isolated in the old system and do not change the approach of

how these problems appear in the first place. Instead of solving the old problems caused by the old system, we should look beyond the current issues and try to create circumstances for a new system to emerge. (Design Council & The Point People, 2021) With the increasing tracking of environmental performance and growing demand for carbon offset markets, it can be assumed that a shift towards the new paradigm is a matter of time. To support the shift, we need a new type of thinking that will support the dynamics of the transformation toward the not existing yet paradigm. The solution to support the new system should not be seen as a final solution but rather as a creative tool for seeing new possibilities (Design Council & The Point People, 2021).

Summing up the problem space, it can be assumed that creating a systematic approach to problem-solving of environmental issues will change the behaviour-attitude of sustainability towards striving for more efficient performance. Increasing transparency of environmental policy among the stakeholders by including feedback on environmental actions on three pillars of sustainability will expand the definition of environmental sustainability among the management of the sporting event, which in turn will open up an exploration of possibilities for the sustainable sporting event. This leads to formulating the thesis's final hypothesis, which serves as a base for building the further design concept: **A system that provides a more dynamic and systematic approach to sustainability will build the capacity for the sporting event to operate in a more environmentally sustainable way.**

6.2 Guiding foundation for the design concept

Feedback - The proposed system should provide sustainability feedback on the performed actions within the whole sports event. Feedback helps to fight salience bias by making visible short- as well as long-term rewards, whether it is an economic or environmental benefit. Without feedback, one can not analyse the real impact of the actions. An analysis, in turn, can help to make an assessment of actions performed for the sake of the environment and their impact on economic and social sustainability. Actions sustainability performance should be judged through three pillars of sustainability instead of locking them inside one or another. Whenever possible, real-time feedback should influence the decision-making process to increase efficiency and avoid a trial-and-error approach that potentially can cause more harm than good.

Inclusiveness - The proposed solution should increase the transparency of event functions in terms of sustainability. The information on the event's environmental policy

should be available through all of the departments and make clear how their work influences the implementation of the policy. Limited access to the system should also be available to the stakeholders so their contribution is accounted for in the overall event's report and the value for their commitment made clear. This should help fight the motivation gap and responsibility discord among the stakeholders.

Exploration - Gathered information about sustainable performance should contribute to generating new knowledge. The proposed system should serve as a creative tool for the exploration of new ideas and possibilities. Furthermore, the system should play a part in the analysis of the data to ensure the coping with the complexity and dynamics of the data, which normalwise can be overlooked due to human factors.

Automatisation - The system should automatise the work with a sustainability framework as much as possible. The layer of sustainability should be integrated into everyday work. Considering sustainability in decision-making should not be distracting from the main work and neither seen as an additional burden for the management. Automatisation should help to deal with the perception that environmental sustainability is a new and separate topic to be tackled.

6.3 Brief

The sports industry needs a change in the management of sustainability. There is a need for a tool that will integrate a layer of sustainability into every department of the organisation. The tool should not distract the management from their primary work but rather encourage and inspire them to strive towards sustainability within their competence. The overall process of sustainable discussion should feel natural, as an inevitable part of the process. Besides the involvement of other departments, stakeholders outside of the sports organisation should have access to the tool. Transparency of the process brings meaning and comprehension to the required extra data or actions that stakeholders might be asked to provide. Furthermore, transparency and involvement embrace communication. The tool should create a new meaning for stakeholders. A tool that empowers system thinking should change how sport event organisers approach sustainability now and how they can better prepare for future paradigms. Furthermore, the tool needs to gather and analyse data on the event performance in order to have a real understanding of the ecological impact event produces and how it affects sustainability as a whole. The collected data has to produce new knowledge to help the users identify the most advantageous path for action. Hence, the proposed concept should serve as a tool for idea exploration that keeps up with the dynamics of sports events.

7. DESIGN CONCEPT

Based on the design brief the proposed concept is a digital platform BIND. BIND represents a new approach to managing sustainability. The main goal of the platform is to integrate a layer of environmental sustainability into the everyday work of event organisers to ensure that everyone in the team is aware of the environmental policy, is working together towards a common goal and managing environmental sustainability is a systematic process of the whole organisation and not a task of the Green Team alone.

The platform is available in desktop and mobile versions and is installed to devices that members use during their work such as personal computers, tablets or personal smartphones. The installed add-on of the platform brings maximum automatisation so the platform causes as little distraction from priority jobs as possible.

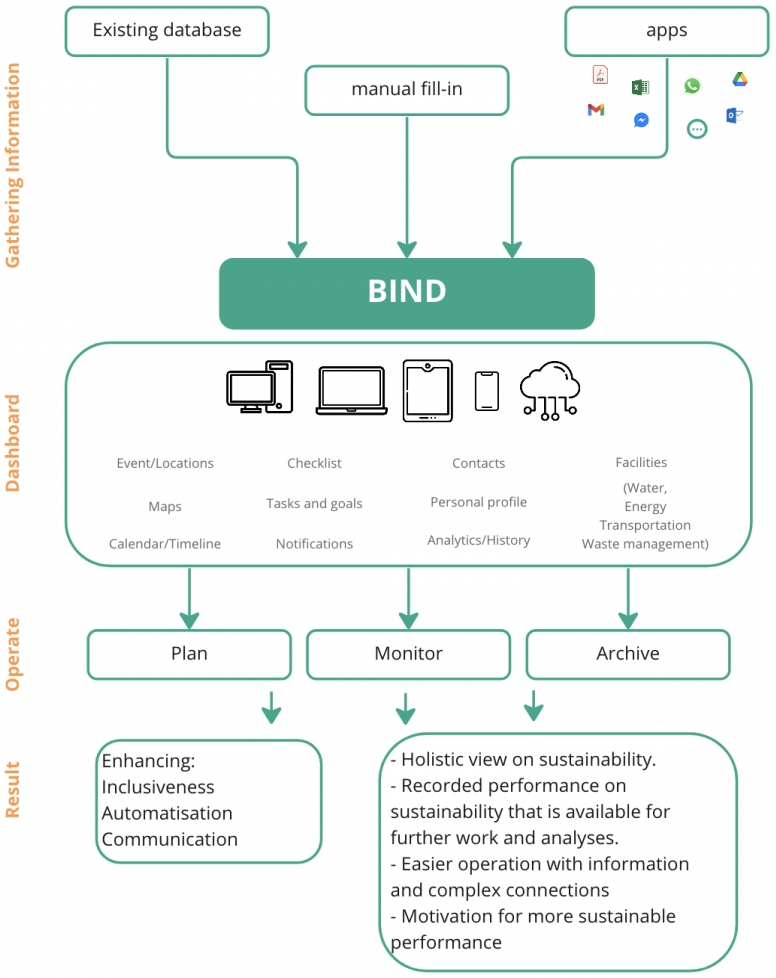

Figure 13. BIND's simplifies operation model. Made by the author

The proposed concept serves as a digitalised wireframe of the event, which includes all the information about the event. It is a background tool, that is always activated for data collection. It is meant to create a seamless experience between different tools and apps that are used by the team members in the organisation of the event. Learning capabilities of the BIND enable it to become an assistant to the sustainability manager. Altogether the proposed concept can be viewed as a sustainability portfolio.

Figure 14. Concept's visual look. Made by the author.

7.1 Functions

The three main functions of the platform are planning, monitoring and archiving. The event planning functions together with the environmental tracking function create an opportunity for a new pattern in structuring the information and serve as a sustainability portfolio of the event. BIND creates a comprehensive and integrated system for event organisers that allows them to incorporate sustainability considerations into the core of event planning and management. By combining event planning functions with environmental tracking, BIND enables event organisers to monitor and analyze their environmental impact in real-time and take immediate action to reduce their carbon

footprint and improve their sustainability performance. Information about the event is gathered and organised for easy accessibility and interaction, which gives an overview of the current sustainability performance. It enables communication between the team members for instant connection and reporting. Furthermore, it increases the transparency of the cause-effect relationship in sustainability performance which acts as a motivational feature to influence the decision-making process towards more sustainable performance. The purpose of these functions is to enhance:

- **Inclusiveness**. To enhance engagement, so as many people in the team as possible participated in the process and are aware of sustainability tasks and goals.
- **Automatisation**. The operation of sustainability should cause as little additional workload as possible, should feel natural and be integrated into everyday jobs. The platform also is meant to help with the complex tasks of the operation, as an assistant.
- **Communication**. To enhance communication within the team and between partners, especially on the sustainability topic.

The name Bind comes from the idea of gathering and connecting information with people, which is also a synonym word to unite and join.

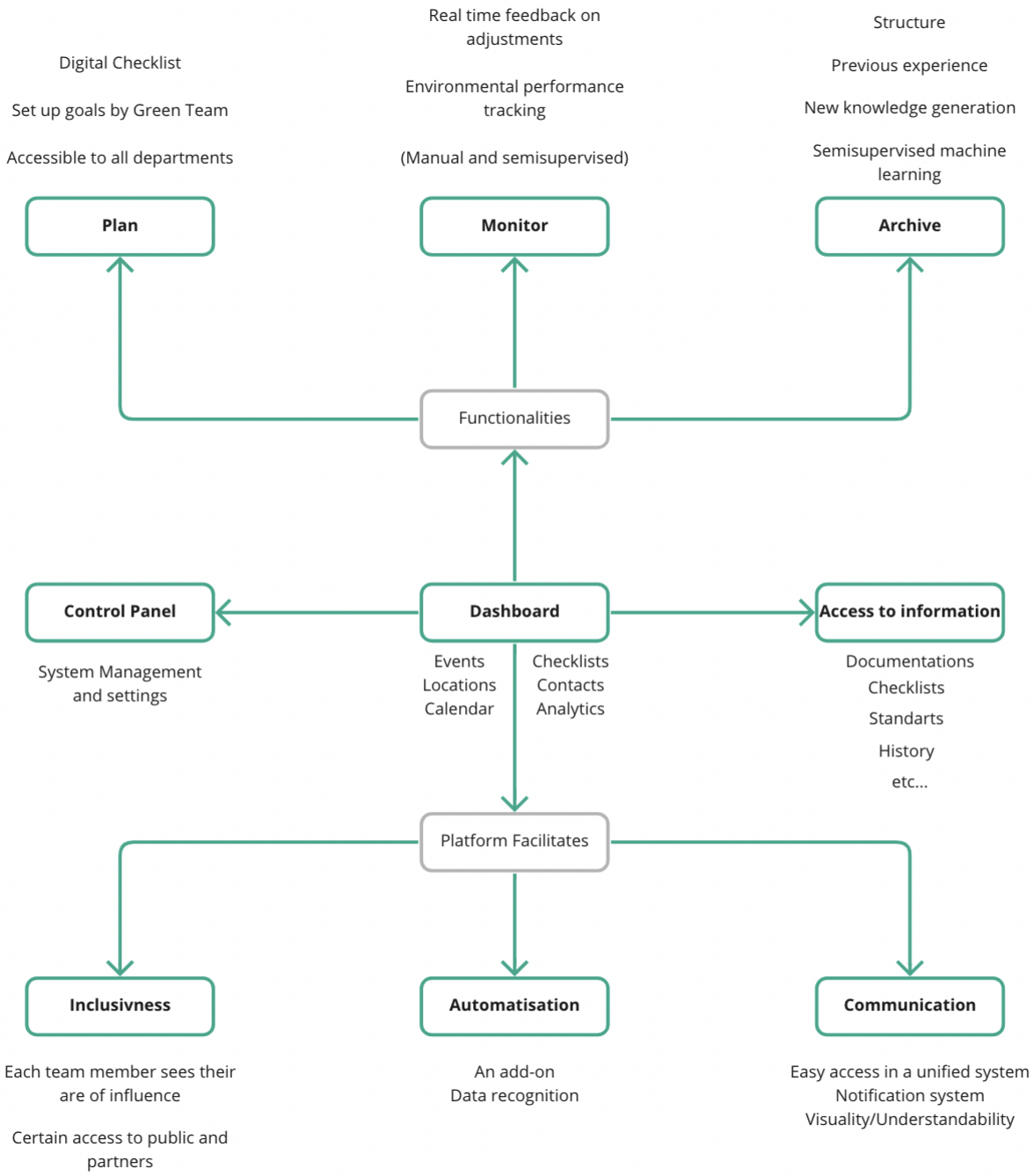

Figure 15. Main functions and facilitations. Made by the author

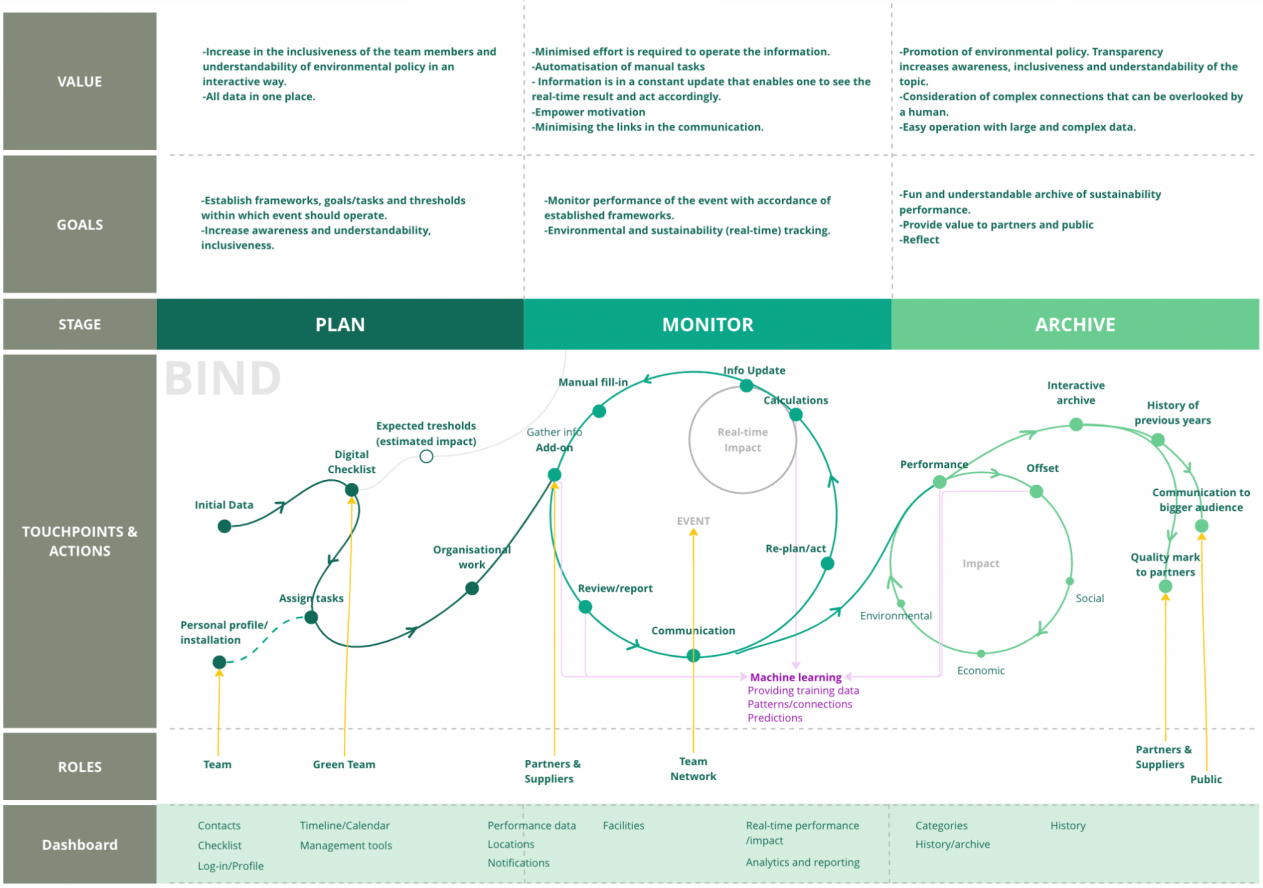

Figure 16. Operation model of the platform with main touchpoints with functions of different stakeholders. Made by the author

Operation model

The operation model of the BIND app ensures that environmental sustainability is a central consideration throughout the event management process. Interaction with BIND begins in the pre-event stage at which initial prerequisites necessary for operation are set in the app. The sustainability manager determines relevant equations, and emission factors, creates a checklist and assigns tasks. All the information about the event that is available is filled in into the platform manually or in a semi-supervised way. The monitor stage is divided into two segments. Pre-event monitoring makes calculations with available data and determines approximate thresholds and expected environmental footprint. At this stage sustainability manager and the team can see which positions cause the biggest sustainability impact and can bring the topic to discussion if these can be somehow minimised. During the event information is in constant update which enables to see real-time feedback to refine decisions and adjust taken actions accordingly. The archive can be accessed at any time pre and during the event. But its

main value is in the post-event analysis and view of the dynamics and comparison with previous years.

Tasks to be Performed

Further below main functions of BIND divided into smaller tasks.

Set up and plan:

- Enables creating a checklist and determining the event's expected thresholds and footprint.
- Helps to choose the appropriate dataset of equations and emission factors for the specific categories and participants.
- Assign tasks to individuals and teams.
- Set up personal accounts.

Gather data:

- Gather information from various sources.
- Input appropriate data into predetermined calculation models and archive.
- Keep data updated in real-time.

Monitor performance:

- Make calculations based on gathered information.
- Track fulfilment of the checklist and monitor thresholds.
- Serve as a tool for reporting and communication between the team members.
- Unleash complex interconnections between the nodes in the system.

Archive:

- Structure complex data in an interactive and understandable way.
- Review dynamics and history of previous years.
- Provide a new meaning to partners by keeping a record of their performance.

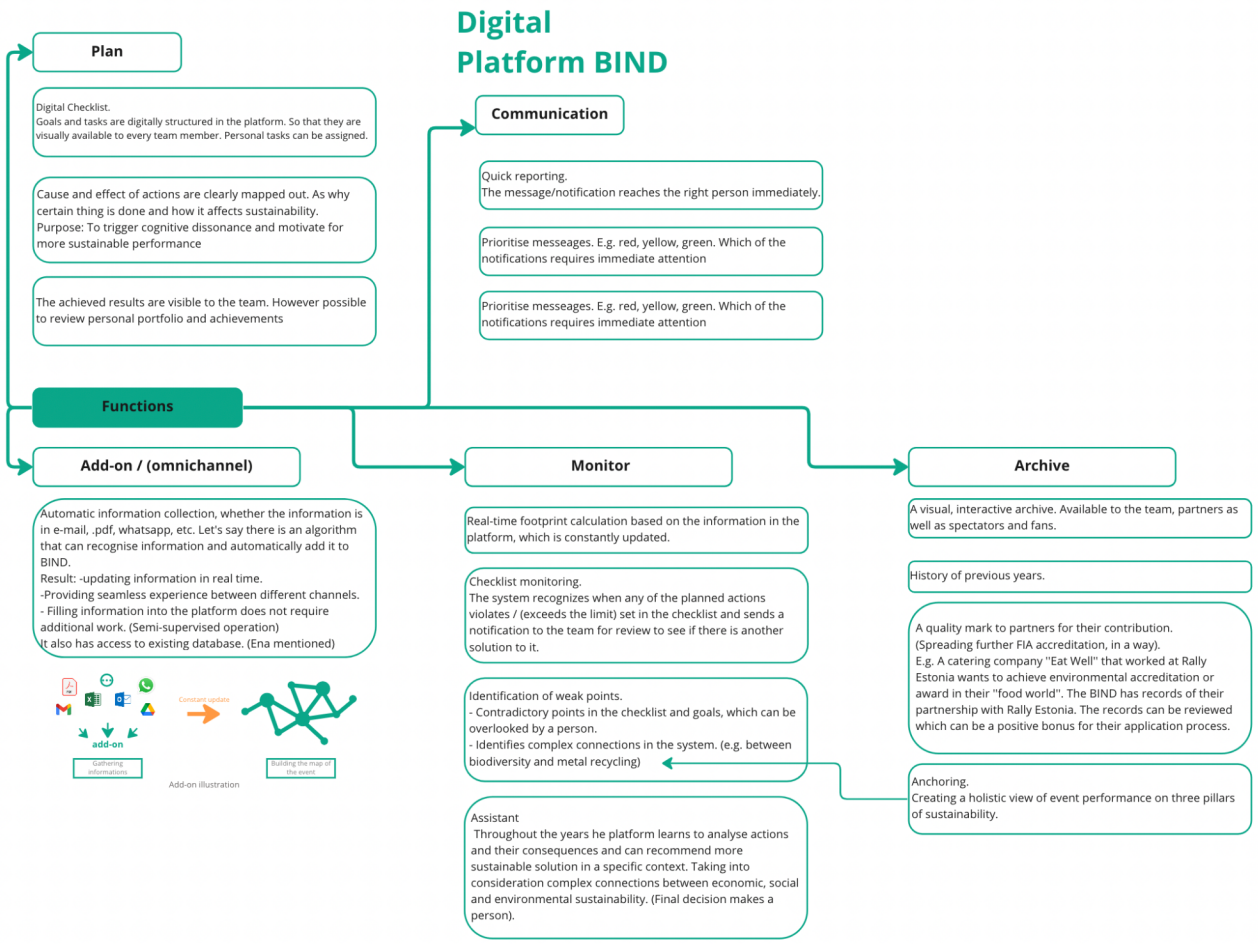

Figure 17. Overview of the tasks and goals of the main functions. Made by the author

7.1.1. Initial Dataset

At the basis of the platform is the initial dataset that sets BIND's sustainability assessment framework which provides a structured approach to measuring and reporting on an event's sustainability performance. The BIND is based on internationally recognised standards and guidelines to ensure that its sustainability assessment is robust and credible. Therefore, the main framework that lays down principles of economic, social and environmental sustainability are United Nations 17 Sustainable Development Goals.

Another framework that provides a set of indicators and metrics that is used to assess sustainability performance is Global Reporting Initiative (GRI) (GRI, 2022). The GRI Standards is a modular system of interconnected standards divided into three main categories: universal, sector and topic standards. In Estonia, the BIND uses calculation

model of greenhouse gas (GHG) footprint (estonian: KHG Jalajäle hindamise juhend) that was developed by the Stockholm Environmental Institute (SEI) in Tallinn on the order of the Ministry of the Environment (Keskkonnaministeerium, 2022). The guide is based on the most widely used international methodologies and standards for GHG accounting and reporting, especially such as Greenhouse Gas Protocol. However, more deep research is required as to which framework is the most applicable and appropriate to the context of a sport event.

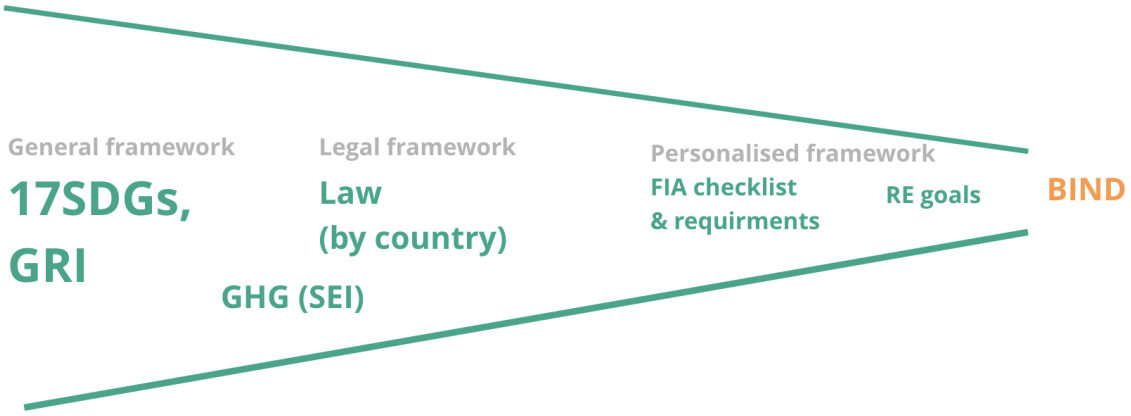

Figure 18. Priority of the frameworks. Made by the author

After the general framework is set the BIND adapts the legal framework of the specific country in which the event is being held. Different countries have different laws and regulations related to environmental sustainability, social responsibility, and economic impact. Leaving the legal framework adjustable makes BIND flexible to be implemented in different countries.

The BIND enables a set of personalised frameworks relevant to the specific sporting event. Such frameworks are FIA's necessary requirements for environmental accreditation and Rally Estonia's green checklist. These frameworks are meant to be prioritised in the organisation of the event. However, organisation's personal goals and thresholds should not contradict initial general and legal frameworks. BIND detects such contradictions and sends the request to the team for review.

7.1.2. Information gathering

An add-on of BIND is a plug-in that is working on each device where the platform is installed. The feature of the add-on is to recognise and gather information related to the event that is needed for the operation of BIND. It is a semi-supervised process.

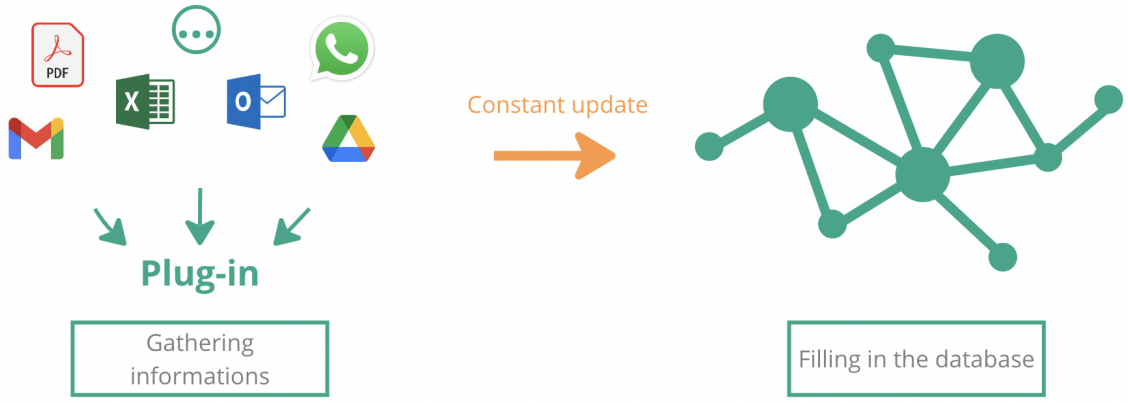

Figure 19. Information gathering principle. Made by the author

Setting Criteria

The Green Team sets the criteria of information that is meant to be gathered from partners and other team members, such as the number of vehicles used, types of vehicles, covered kilometres etc. BIND recognises, selects and archives data accordingly that aligns with the set criteria. DATA IN TABLES. The BIND recognises information in different text sources, whether it is an e-mail correspondence, a conversation in a Whatsapp chat or a .pdf document. Before adding any information recognised by BIND the human has to confirm its relevance, which also contributes to the machine learning experience described in an upcoming paragraph.

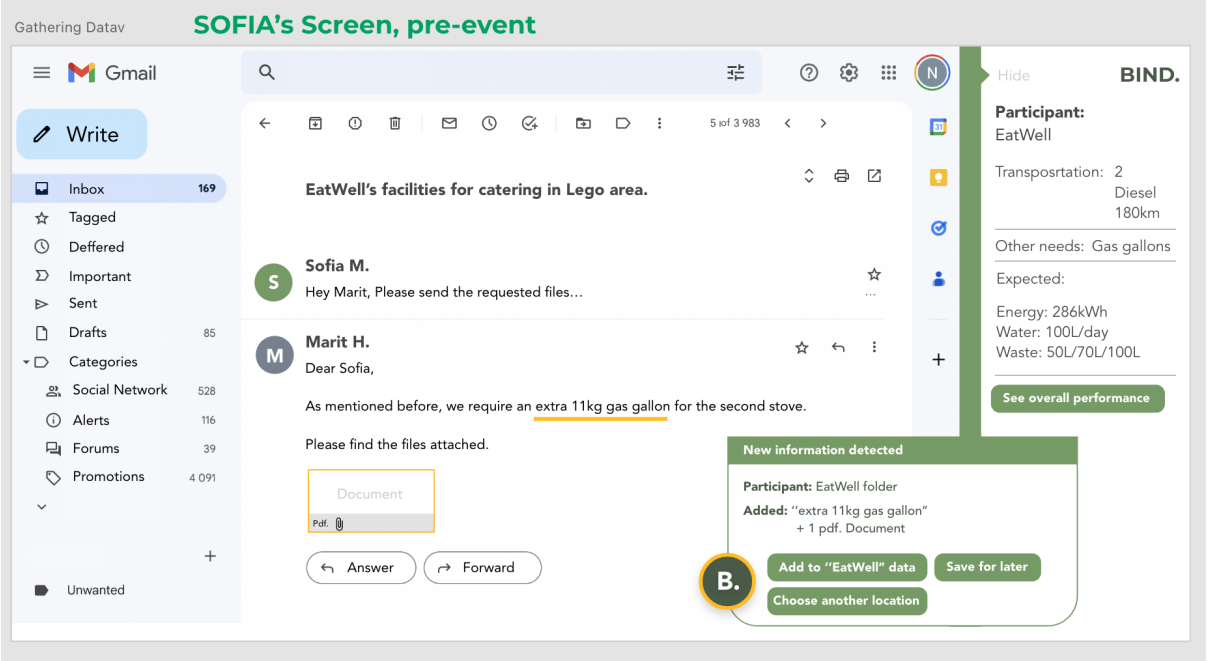

Figure 20. Add-on illustration as a pop-up window. Made by the author

The add-on enables real-time updates of the information. When information is changed or a new one appears already during the event then BIND adds it into the system and updates/recalculates relevant data accordingly. With real-time updates, event organisers can make informed decisions about how to improve sustainability performance on the spot. The BIND also enables manual fill-in of information.

Reporting scenario:
Liisi, the green volunteer, sees the checklist in her BIND profile and reviews the tasks assigned directly to her and her team. One of her tasks is to monitor physical waste management at the service park. At one point Sofia detects that biowaste is *being improperly discarded on the ground. She reports the violation in the BIND app. She takes a picture of the waste and submits it along with the exact location of the incident and marks the issue with yellow status, indicating a moderate level of urgency.*

Sofia, along with the other team members assigned to the area, receive a notification. However, she is currently busy and can not react. Meanwhile, Kaspar, the area manager, also receives the notification and heads to check up on the issue. Kaspar also notes, with the help of BIND, that another area has two extra, unused biowaste bins that could be moved to Service Park. Kaspar cleans up, resolves the problem and marks the report as complete in BIND.

The issue is solved by operative communication between the team members, while the head of the green team can focus on the more important task but still receive notification and report and relevant data is updated in the system right away.

7.1.3. Planning the event

The BIND has a functionality of an event planning tool, which includes utensils for project management of several different modules that allow event organisers to manage different aspects of the event. Such modules are schedule management, venue and logistics management, sponsorship and partner management, analytics and performance, participants and performance management, attendee and ticketing management. However, the main purpose of the BIND is to inform about how the event's overall performance corresponds with the pre-established sustainability policy.

Setting up the Green Checklist

The planning begins with the Green Team creating the checklist that includes requirements for fulfilment to teams and partners, goals/thresholds, and tasks. The tasks can be assigned either to the whole team or individually. Goals are agrumented and the cause and effect of actions are clearly mapped out, such as why a certain thing is done, what is its connection to the environment and how it affects sustainability as a whole.

Alongside the information on specific tasks of environmental importance, information is added about their relevance to social and economic sustainability to provide a holistic view. Special sections enable one to manually write information/comments on its relevance to economic or social sustainability and connect it to other nodes of checklist points. Each node can be viewed separately to view all comments and points that belong there. This process creates a sort of mapping which can be zoomed out to see interconnections of the. BIND takes these links and connections to learn and analyse patterns of the nodes to be able to connect them automatically with more experience.

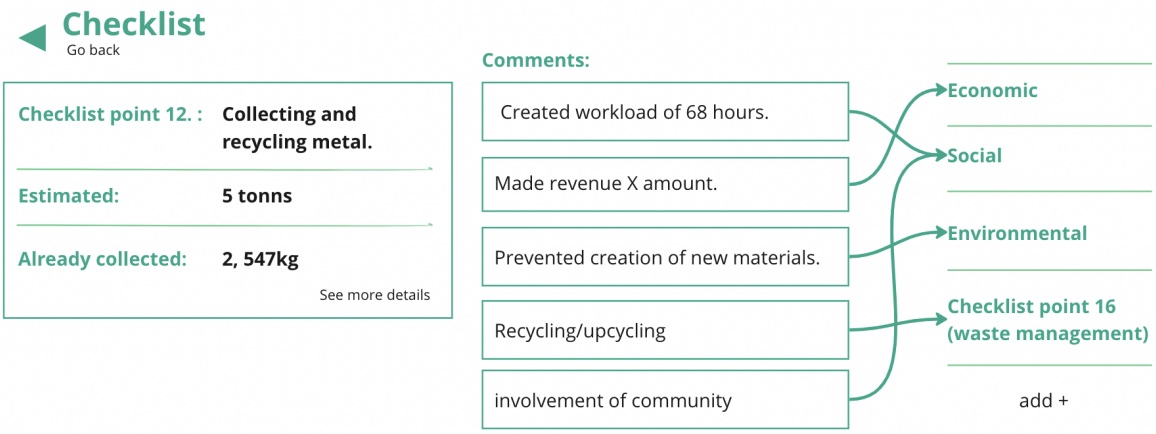

Figure 21. Comments and details of a checklist point. Made by the author

Personal Profiles

Each member of the organisation has a personal profile in BIND which allows them to receive assigned tasks, monitor and report on the fulfilment of the checklist, and access necessary chats.

Additionally, team members can establish their own personal checklist of goals they want to achieve or contribute to personally. For example, the goal may be to "minimise air pollution" or "increase recycling". The BIND provides a report of the event achievements with correspondence of chosen goals to show how certain people contributed to a more sustainable future in a larger scope of rally event. This approach creates a sort of gamification that increases personal importance in achieving goals as a team.

The purpose of personal portfolios is to trigger cognitive dissonance and motivate more sustainable performance. Feedback on an individual or team's particular actions influences the chances of more conscious and sustainable behaviour.

7.1.4. Monitoring sustainability performance

The BIND tracks and monitors the sustainability checklist by comparing the event's practices to a pre-determined set of objectives and thresholds. Real-time data collection through the add-on and the manual fill-in enables BIND to keep information in a constant update. make instant calculations of environmental footprint. The information inputs are analysed using calculation models based on GHG Protocol frameworks.

Calculating impact

Active figures within the event system are provided with a specific set of data tables related to their activities that are required to be filled in. Once the data is filled in, the system automatically calculates the total impact of each category and adds it to the overall impact of the event. By tracking the performance of each active figure separately and later summing it up, BIND ensures that no information is accounted for double, and the calculation is accurate. Data structure is described in the archive paragraph.

Monitoring the thresholds

During the planning stage and creation of the green checklist, consumption thresholds are established for different categories. These thresholds are based on the estimated consumption during the event and are carefully calculated to ensure that they are realistic and achievable. With the help of an add-on that constantly gathers information about the event, the gathered data is placed into calculation models and the results are compared to the established thresholds. BIND monitors the consumption levels to ensure that the estimated thresholds are not exceeded. Whenever the consumption levels approach or exceed the thresholds, BIND sends a notification to the team to review the issue and find a more sustainable solution if possible. In some cases, BIND can even suggest solutions to help the team stay within the established thresholds and reduce the event's environmental impact. This real-time monitoring ensures that the team is always aware of their environmental impact and can take immediate action to reduce their footprint and stay committed to initial goals.

Manual Reports and communication

BIND offers a manual report and communication function that enables users to report issues and communicate with other team members in real-time. Users can report issues such as violations of the sustainability checklist, incidents, or any other relevant information to the head of the green team, stage marshall or other team members. The report function together with the chat allows team members to discuss and solve issues collaboratively, making sure everyone is on the same page. This function ensures that the team can quickly and effectively respond to any sustainability-related issues during the event.

Checklist violation report, use case:

Liisi, the green volunteer at the rally event, notices that biowaste is being improperly discarded on the ground in the Service Park area. She quickly opens the BIND app on

her phone and reports the violation of the sustainability checklist. She takes a picture of the waste and submits it along with the exact location of the incident.

Sofia, the head of the green team, along with the other team members assigned to the area, receive a notification. Sofia sees that the issue has been marked with a yellow status, indicating a moderate level of urgency. However, she is currently dealing with a more pressing issue that has been marked as red, and she cannot attend to the biowaste problem immediately.

Meanwhile, Kaspar, the area manager, sees the notification and heads to check up on the issue. Kaspar also notes, with the help of BIND, that another area has two extra, unused biowaste bins that could be moved to Service Park. Kaspar cleans up, resolves the problem and marks the report as complete in BIND.

The issue is solved by operative communication between the team members, while the head of the green team can focus on the more important task but still receive notification and report about the situation.

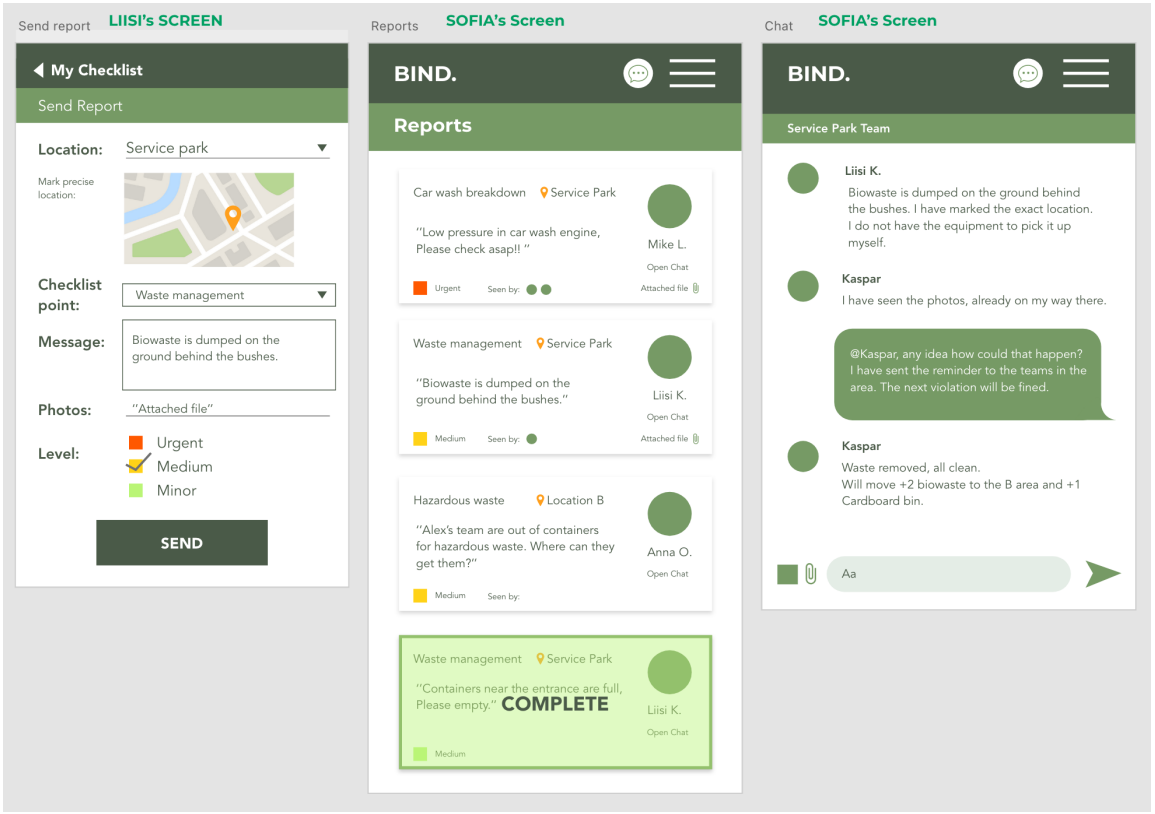

Figure 22. Report of the checklist violation. Made by the author

Monitoring Offset

Additionally to the consumption and generation of footprint BIND monitors the activities of offsetting, such as planting trees and upcycling metal. For instance, relevant data such as the type and amount of trees, planting density, carbon absorption ratio, expected tree lifespan, and others are entered into predetermined data tables within BIND. Additionally, the amount of recycled metal can be used to offset the carbon emissions linked to the production of new metal. By monitoring and summing up the carbon offsetting activities, BIND is capable of offering a more precise and comprehensive environmental footprint of the event.

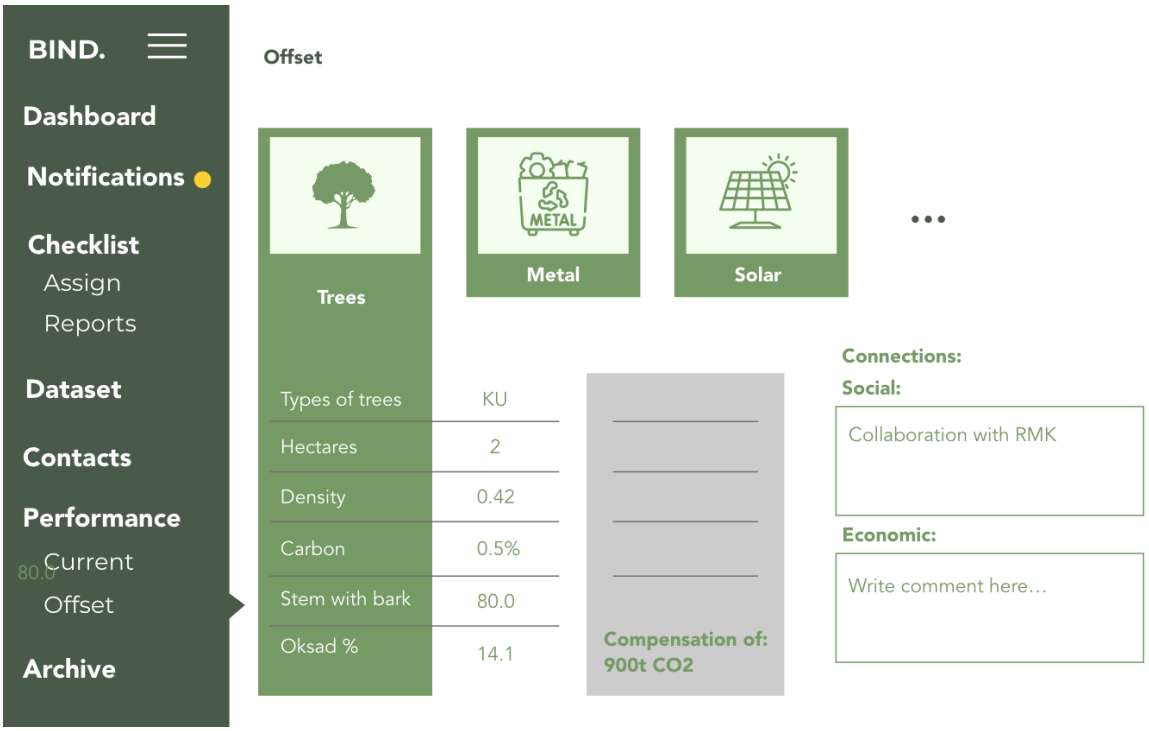

Figure 23. Offset dashboard example. Made by the author

7.1.5. Archiving collected data

The BIND data archive is designed to store data from previously held events which enable users to see changes throughout the years and their dynamics. The sustainability history of past events is available for review and analyse to the team, partner and public (to a certain extent). Access to structured data of past events allows one to recognise the patterns and have a better understanding of the causes and effects of the actions as well as connections between the topics.

The archive is meant to concentrate on the ecological impact of the event. Each participant in the system has their own personal database that tracks their sustainability performance across different categories, such as water and energy consumption. This performance is tied to the specific location where the participant is present. Facilities that cannot be assigned to specific participants, such as car wash stations, are assessed as individual participants in their own right. If a participant moves between different locations, their performance results are tracked and summed up separately for the overall performance (See figure 24). Tracking the performance of each category by each participant enables one to review the archive from a general view of the whole event to individual participants/partners and isolated categories. Furthermore, the archive can be sorted by the years, BIND allows one to compare current and past performances in an interactive way. Within this archive, BIND can gain a comprehensive understanding of the event's environmental impact and identify areas where sustainability can be improved.

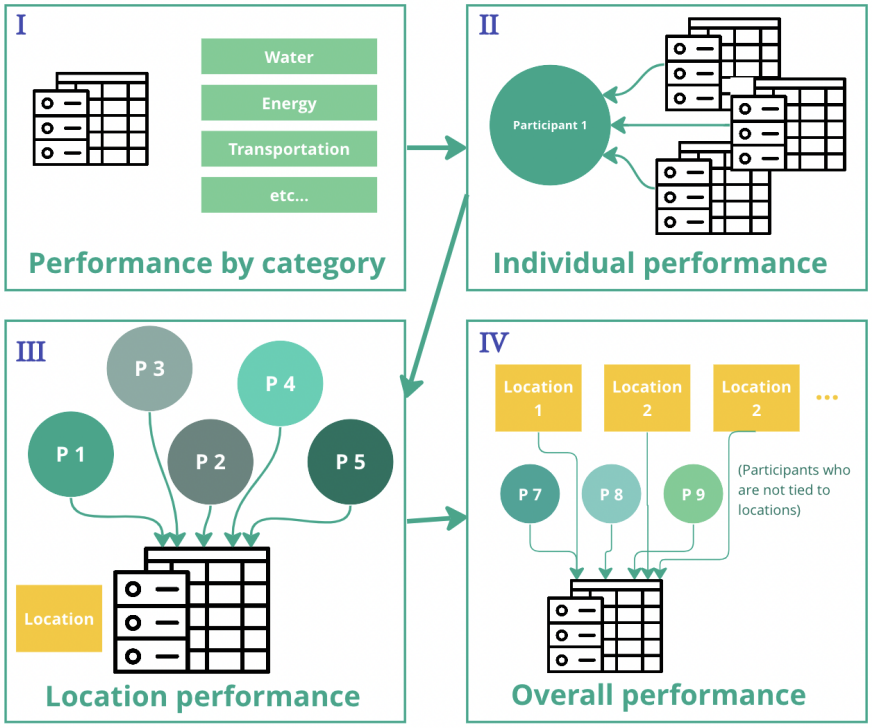

Figure 24. Archive structure. Made by the author

The main categories of the archive are: energy consumption, water usage, waste management, transportation/fuel consumption, procurement, biodiversity and compensation/offset. Each of the categories has subcategories relevant to the event. For example, subcategories of transportation are: mode of transportation and types of

vehicles, travelled distance, type of fuel and its consumption, routes and logistics (public transport, parking). Subcategories interconnect with each other and should not be looked at in isolation. BIND enables to unleash such interconnections and quickly operate between them. The learning capabilities of BIND are described in the upcoming paragraph.

BIND's availability of the archive is meant to bring valuable insights to partners and suppliers. A new meaning is brought by records of each participant's performance that enable partners to review their activity and identify areas of improvement. Additionally, records can be communicated to third parties and benefit in establishing a green reputation for the company, which is a positive bonus for their contribution to making sustainable events.

The use case of EatWell:

EatWell is a catering company based in Estonia that provides healthy and sustainable food options for events and corporate clients. In the summer of 2021, EatWell was a partner of the Rally Estonia event, providing food and beverage services for the participants and spectators. Rally Estonia was awarded the FIA environmental accreditation award, recognizing its efforts towards sustainability. However, the FIA's award does not extend to partners and suppliers of the event. EatWell wanted to apply for environmental accreditation in the gastronomy industry, which would not only be a recognition of their sustainability efforts but also a valuable marketing tool.

EatWell is at the beginning of its sustainability journey and does not have a sustainability portfolio. This is where BIND came into play. The archive contained detailed information about the sustainability practices of all the partners and suppliers of the event, including EatWell. By reviewing the sustainability performance of EatWell at the event, the company was able to identify areas of improvement and ensure that its approach and fulfillment of environmental policies were up to par. Thanks to the transparency and accountability provided by BIND, the process of application for environmental accreditation of EatWell was quicker and smoother.

Moreover, EatWell was able to use the data from BIND to showcase its sustainability credentials to other clients and partners, further enhancing its reputation as a sustainable company. The transparency and traceability provided by BIND served as a positive bonus to EatWell's reputation and helped them stand out in a competitive market.

7.2. Learning capabilities of BIND

The purpose of a sustainability portfolio is to create the circumstances for machine learning that can learn from real-life experience and later optimise the event organisation in the most sustainable way possible. As BIND already possesses data from real-life events this data can then be used to create a machine learning model to teach it to recognise patterns and make predictions on how to optimise sustainable practices.

The goal of machine learning is to bring data collection to full automatisation to ensure accurate calculations and minimise the risk of human errors. Additionally, BIND would be able to analyse hidden interconnections between the nodes that are hard to notice and explore new ways to bring the most sustainable practices. This allows for the optimisation of economic sustainability without compromising social and environmental pillars and vice versa.

It should be noted, however, that this thesis does not delve into the specifics of machine learning algorithms and their applications, which warrants further research in the field.

7.3. Use Case Scenarios

Further table below brings out some of the real examples of issues that appear in the everyday job of the RE team and how the BIND is meant to change the approach to the same issues.

Current journey:	New Journey:	Created value:
Sofia, head of the green team, asks RE's partners to provide her with information about their environmental performance to calculate the total environmental footprint of RE. - Not all partners keep track of their performance and are not sure how to provide such information. - Some partners forget or find it unnecessary to provide requested information. -Information comes in	2.Sofia, head of the green team, sets the requirements into BIND as which information is required to be gathered. -BIND's add-on is installed to all corporate and personal devices that are used in the organisation of RE. -BIND's add-on gathers information in a semi-supervised way from different apps, files and e-mails. -BIND makes the calculations.	-Minimised effort is required to operate the information. -Automatisation of manual tasks - Information is in a constant update that enables one to see the real-time result and act accordingly.

different formats. Some in e-mails, .pdf files, Whatsapp chat etc. -Some information, due to poor structuring, gets accounted twice. -Sofia manually inserts data into Excel to make the calculations. - As a result, some calculations might be inaccurate.	-Sofia monitors BIND's work to see if there is any lack of information and if BIND completes the tasks as required.	
The green team builds a checklist and presents it in the form of a slideshow to the other team leaders of RE. Team leaders are responsible to spread it further and explaining it to the rest of the crew.	1.Sofia, sets up a digital checklist into the BIND. The checklist consists of tasks and goals. Goals include merits that are not to be exceeded. These can be assigned to a specific team as well as individuals. Any team member can access BIND to check on teams and individual performance. Completion of the checklist is monitored, updated and is accompanied by a notification system.	Increase in the inclusiveness of the team members and understandability of environmental policy in an interactive way.
Calculations of the environmental footprint are made at the end of the event. Results do not influence real-time actions.	3.BIND's add-on enables information in the platform to be in constant update. If BIND detects that some actions exceed the merits then it sends a notification to the Sofia and related team for an overview to see if there is any solution to the problem.	Real-time feedback empowers motivation to adjust performance towards a more sustainable way.
Final results a presented in an Excel or .pdf document format and later stored away in a folder on the computer.	BIND provides a visually interactive database that is available to teams, partners and the public (to some extent) for a review at any time. It enables to view the performance of previous years and see the dynamic of changes.	Promotion of environmental policy. Transparency increases awareness, inclusiveness and understandability of the topic.
Liisi, a green team volunteer, detects a checklist violation at the service park. One of the rally teams disposed of the used coffee filters in an appropriate way. Liisi sends a message to Sofia. Sofia in turn tries to reach a manager of the area by phone. By the time the manager arrives the coffee filters were already	4. Liisi reports the violation of the checklist/requirements in BIND. Sofia and team members assigned to the area receive notification along with exact location and photos. Liisi sets a yellow mark that signifies the second level of urgency (total of three). Sofia is currently busy with another issue marked as red and can	Minimising the links in the communication. The initial message goes straight to the right person to find a solution as soon as possible.

gone. It remains unclear as what exactly happened, who saw what and who is responsible. (High risk of a broken phone effect and the problem remains unsolved).	not react immediately. However, the area manager who also received a notification sends the closest member available to the ''crime scene'' to check up on the issue described in Liisi's report.	
Problems that appear during the event are solved by the team members, often relying on partly missing or unclear information.	The BIND through learning experience can suggest a possibly more sustainable solution. E.g. Optimise garbage bin locations. A real person needs to approve it.	Consideration of complex connections that can be overlooked by a human.
Partners are thanked at the end of the event for their contribution with a thank you plaque. RE has been awarded FIA three-star environmental accreditation, however, it does not spread on to partners.	5.A catering company Eat Well, who was partnering with RE is in the process of applying for environmental accreditation in the catering sector. FIA environmental accreditation, The BIND enables review of the performance of Eat Well at RE which serves as a positive bonus in their application process and building their own sustainability portfolio.	Records of partners and their contribution are put together into a meaningful sign of quality to partners for their role in RE.
Footprint offsetting such as planting trees, upcycling smartphones and collecting old metal are seen isolated in the perspective of environmental sustainability.	The BIND enables to see offset in a broader context on three pillars of sustainability. E.g. The offset process contributes to social sustainability by creating job places.	Unleashing the complexity in connections between three pillars of sustainability.

7.4. Being one step ahead

Preparing for the future

The BIND app can help create the circumstances for a new system to emerge. As proposed by the Design Council & The Point People (2021), we cannot achieve a new system in one day. However, implementing into use the sustainability portfolio like BIND takes us one step closer towards establishing new practices that will bring a more sustainable experience.

In today's rapidly changing world, taking small steps towards being better prepared for the future is important. New laws regarding environmental impact are expected to emerge along with the wider implementation of sustainability credits and taxes. BIND can serve as a platform for facilitating communication between legal representatives and organisations such as Rally Estonia. A structured approach to sustainability will help organisations to argue and tie actions to specific legal frameworks.

Expected behavioural change

BIND is designed to trigger cognitive dissonance in event organisers. By providing real-time feedback on the sustainability impact of their actions, BIND can motivate event organisers to strive for more sustainable performance. Transparency and accessibility of data and feedback serve as a powerful tool for creating a sense of responsibility and accountability among organisers, as they can see the direct consequences of their decisions on the environment. Therefore, BIND is expected to increase awareness of the topic and change the approach of sustainability practices in event organisations.

8. CONCEPT EVALUATION

The concept evaluation of the designed solution was presented to the current head of the Green Team of Rally Estonia, Ena Poltimäe and the sustainability manager at World Rally Championship Santiago Peña Gómez. Both discussions were carried out over a video call.

The head of the Green Team provided positive feedback on the concept, confirming that the developed solution could be very practical and useful, especially during the event days and that the platform would make environmental officer's job easier. She was especially elevated by the idea of the add-on function of BIND for information gathering. Such kind of automatisation would take a big part of her job away, so the environmental officer can focus on other tasks in managing sustainability rather than constantly sending reminders to partners for information and collecting it from different sources into one database.

WRC's Sustainability manager's main comment was that the overall concept is on the right track with the WRC's environmental policy and that the digital platform is indeed needed for sustainability operations. He pointed out that the most necessary function that is required today is the communication and reporting for teams tool, especially at the service parks. The area marshall should have a holistic view of the situation in the area and have the immediate possibility to contact other team members. However, the main concern appeared to be how to make the concept universal enough so different rallies use the same system for reporting, but at the same time flexible enough so it can be implemented in different countries.

Another comment was that the concept has the potential of becoming a good starting point for the events that only begin to develop their sustainability policy. It was brought up in the discussion that often organisations might postpone their sustainability tracking or developing the policy due to a lack of knowledge, and defend this statement by arguing that they do not have funding for hiring environmental experts. However, another real problem is that you need to provide the hired expert with information to begin with. Even if not used to its full capacity, the concept of a sustainability portfolio can provide information about the organisation to the environmental experts that serve as a base for further development.

8.1 Further development

The scope of one master thesis is not enough to fully describe the structure of complex

applications. However, the main starting points were unleashed that can serve as a basis for further technical development.

Further development of the concept definitely requires research on how it can be adapted in other countries, for example by Mexico or South Africa Rallies. Additionally, how this concept can be adapted by other sports other than rallies. By adapting the concept by other countries and sports, it would be possible to create a more standardised approach to sustainability and increase collaboration between different events, making it easier for organisers to communicate and expanding the chances for more sustainable practices.

An area for possible further development would be to make the platform an official tool that is recognised by legal authorities. Collaboration with the government is necessary for making it acceptable for official reporting. Reports on sustainability could be created directly in the BIND in its final form and presented to legal authorities for further investigation. This could simplify the work on both sides of representative parties.

The thesis did not explore the legal frameworks of sporting event as well as stakeholders. Some of the information might need to remain confidential and how this might affect the overall functioning of the platform and communication between the stakeholders. Furthermore, it has to be investigated how the government's policy and laws can be integrated into the platform to avoid any controversies.

Last but not least, the current concept did not explore the role of the spectator and sports fans in it. Another functionality of the concept could be communication with the sports community. The concept collects and organises valuable data that should be used to increase awareness and promote sustainability. Additional research and prototyping is required to find the most suitable form of communication.

8.2 Conclusion of Design concept

The proposed solution is oriented to tackle the main problems that stood out during the research. Portfolio's main objective is to transform the perception of ES by changing the approach to working with it. Before looking for a solution to a concrete problem, the overall management of sustainability within the sports industry has to be structured. An

understanding of the whole system can ensure that the applied solution will actually cause sustainable performance.

The portfolio is meant to build the capacity of sporting event management to tackle sustainability-related issues in the organisational phase of the event. The concept of BIND illustrates a new approach to managing sustainability by combining established practices with available technologies. The platform has three main functions: planning, monitoring and archiving. The platform acts as a background programme which constantly monitors data in other applications that are used by the team members. It selects and gathers data in a semi-supervised way.

After the information is gathered and analysed, the platform provides an exploration tool to look for the most sustainable solution to ensure that potential action is not performed at the sustainability cost of any other nodes in the system and that any potential harm is examined and possibly avoided. However, the final decision is always up to the management. Last but not least, the platform is meant to boost communication among departments and with stakeholders of a sporting event. BIND enables manual reporting between the team members of physical situations at the location and updates the information accordingly in the platform. The precise monitoring of sustainability and the results that have a base for justification to boost communication on a sustainability topic. The transparency of policies will add a layer of new meaning to sustainability performance.

The proposed solution itself does not solve problems causing unsustainability but rather creates a ground framework for operating sustainability within the sporting industry. With the assistance of the platform, sporting event managers can explore possibilities and analyse their decision-making through a sustainability lens and create an action plan most suitable to their event. The platform helps to cope with the dynamics of sporting events, requirements for fulfilment and sustainability’s complexity.

SUMMARY

This thesis explored approaches to sustainability among sporting event management with a focus on improving their practices. Rally events seeking sustainability might sound paradoxical at first. However, sustainable practices are possible within the rally event, some are implemented already today, such as switching to electrical vehicles, calculating environmental footprint, offsetting carbon emissions, collaborating with partners for upcycling metals etc. However, room for improvement of current and implementation of new practices remains.

The research has shown that there is a lack of coherency in sustainability practices. There are several environmental policies and strategies that provide definitions and desirable goals. However, when it comes to real practice on how to achieve these goals it is up to event managers to create an action plan. Management of sustainability is often assigned to project managers, who might lack the necessary training and relevant experience in their area of expertise. There are tools and training programs carried out by different parties, from city governments to private agencies, that are oriented to help organisations to manage their sustainability. But that only adds to the main problem of the thesis which is the isolation of sustainability. The perception of sustainability as an isolated concern can hinder its seamless incorporation into core business practices and decision-making processes. Sustainability is perceived as a separate problem, that requires investment of extra time and resources, someone needs to be assigned, trained or even hired to manage sustainability. It was clear that there is a need for assistance and the possibility to intervene to make the management of sustainability easy, understandable and coherent.

The proposed design concept is a sustainability portfolio BIND, that describes how the process of managing sustainability can be reshaped in the organisation of sporting events. BIND is a digital platform that creates a comprehensive and integrated approach for planning, monitoring and archiving data related to event sustainability performance. Through real-time data gathering and feedback, BIND is meant to provide a holistic view of an event’s performance and influence the decision-making process towards more sustainable practices.
The proposed concept should not be seen as a final solution on a way to make a sporting event that is truly sustainable, but rather as a system for enhancing capacity and serve as a tool for increasing the ability to operate sustainability, so managers can decide themselves on a further action plan on how they will increase the sustainability.

EESTIKEELNE KOKKUVÕTE

Käesolevas lõputöös käsitletakse jätkusuutlikke lähenemisviise spordiürituste korraldamisel, keskendudes nende tavade täiustamisele. Jätkusuutlikkust taotlev ralliüritus võib kõlada paradoksaalselt, kuid ka ralli raames on võimalik kasutada jätkusuutlikke praktikaid, millest osad on juba täna rakendatud. Näiteks elektrisõidukitele üleminek, keskkonnajalajälje arvutamine, süsinikdioksiidi heitkoguste kompenseerimine, koostöö partneritega metallide ümbertöötlemisel jne. Siiski jääb ruumi praeguste tavade täiustamiseks ja uute rakendamiseks.

Uurimistöö on näidanud, et jätkusuutlikkuse praktikates puudub sidusus. Mitmed erinevad keskkonnapoliitikad ja -strateegiad esitavad definitsioone ja eesmärke, kuid nende rakendamine ja tegevuskava koostamine jääb ürituste korraldajate ülesandeks. Jätkusuutlikkuse juhtimine on sageli määratud projektijuhtidele, kellel võib puududa vajalik koolitus ja asjakohane kogemus oma erialal. On olemas tööriistu ja koolitusprogramme, mis on mõeldud organisatsioone aitama oma jätkusuutlikkust juhtida. Kuid see ainult lisab põhiprobleemile, milleks on jätkusuutlikkuse eraldatus. Jätkusuutlikkuse tajumine eraldiseisva probleemina võib takistada selle sujuvat integreerimist põhitegevuse tavadesse ja otsustusprotsessidesse. Jätkusuutlikkust tajutakse probleemina, mis nõuab lisaaja- ja lisaressursside investeeringut ning selle juhtimiseks tuleb keegi määrata, koolitada või palgata. Oli selge, et on vaja abi ja sekkumisvõimalust, et muuta jätkusuutlikkuse juhtimine lihtsamaks, arusaadavaks ja suurendada sidusust.

Lõputöö pakub disainkontseptsiooniks jätkusuutlikkuse portfooliot, BIND, mis kirjeldab, kuidas jätkusuutlikkuse juhtimise protsessi saab spordiürituste korraldamisel ümber kujundada. BIND on digitaalne platvorm, mis loob tervikliku ja integreeritud lähenemisviisi jätkusuutlikkuse planeerimiseks, jälgimiseks ja arhiveerimiseks. Reaalajas andmete kogumise ja tagasiside kaudu esitab BIND tervikliku ülevaate üritusest ja selle andmetest ning on mõeldud suunava otsustusprotsessi jätkusuutlikkumate tavade suunas.

Pakutud kontseptsiooni ei soovita vaadata kui lõplikku lahendust jätkusuutlikuks spordiürituseks, vaid pigem süsteemina, mis suurendab võimekust tegutseda ja toimib tööriistana jätkusuutlikkuse uurimiseks, et juhtkond saaks ise edasise tegevuse luua ja planeerida, kuidas nad ürituse jätkusuutlikku jõudlust suurendavad.

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