IDEATION
Circularity with SPORT

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Circular design strategies in local and regional sport organizations / *IDEATION*

CONTEXT ANALYSIS

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1. Introduction

The significance of context analysis within the IDEATION project cannot be overstated. To effectively prepare the theoretical framework and practical toolkit for circular design (CD) strategy application in local and regional sport club organizations, it is imperative to understand the specific needs and requirements of the main target group at the national level. Without this insight, the development of strategies and tools may miss the mark, hindering the project's overall effectiveness. Additionally, the inclusion of good practices from EU and global levels is crucial, as it provides valuable insights and inspiration for implementing CD strategies in the sports sector, which is still relatively unexplored territory, particularly at the local and regional levels.

It is essential to emphasize that the context analysis will not only focus on environmental challenges but also address social aspects relevant to CD strategy implementation in sport organizations. This holistic approach acknowledges the interconnectedness of environmental and social sustainability and ensures that the project's outcomes contribute positively to both dimensions. By considering a broad spectrum of factors and perspectives, the context analysis lays the groundwork for informed decision-making and the development of tailored strategies and tools that are relevant, impactful, and sustainable in the long term.

2. Background of the study

2.1. Sustainability in European sport

Sustainability in European sport encompasses both environmental and social dimensions, reflecting a growing recognition of the interconnectedness between sports activities and broader societal and environmental challenges. On the environmental front, there is increasing awareness of the significant ecological footprint associated with sports events, facilities, and operations. This includes energy consumption, waste generation, water usage, and the carbon emissions resulting from travel and transportation. As a result, there is a growing emphasis on promoting eco-friendly practices and reducing the environmental impact of sports activities throughout Europe.

In parallel, the social aspect of sustainability in European sport focuses on fostering inclusivity, diversity, and accessibility within the sports sector. This involves ensuring equal opportunities for participation regardless of age, gender, ethnicity, or socioeconomic background. Efforts are also directed towards promoting health and well-being, enhancing community cohesion, and leveraging sports as a tool for social integration and empowerment. Initiatives aimed at addressing social issues such as inequality, discrimination, and exclusion are increasingly integrated into the agendas of sports organizations and governing bodies across Europe.

At the policy level, there is a growing recognition of the need to embed sustainability principles into the governance and management of sports organizations. European institutions, national governments, and sports federations are actively promoting sustainability through policy frameworks, guidelines, and funding programs. This includes initiatives to promote sustainable venue design and construction, encourage sustainable transportation options for sports events, and support grassroots sports initiatives that promote social inclusion and environmental stewardship.

Overall, sustainability in European sport represents a multifaceted approach that addresses both environmental and social concerns. By integrating sustainability principles into sports practices, policies, and initiatives, Europe is striving to create a more resilient, equitable, and environmentally responsible sports sector that benefits both present and future generations.

2.2. Sustainability shift to Circular economy in sport

The shift towards a circular economy (CE) in the European sport sector marks a significant transition aimed at minimizing waste, maximizing resource efficiency, and promoting sustainable consumption and production practices throughout the sports value chain. This shift is driven by the recognition of the environmental and social impacts associated with traditional linear economic models and the need to adopt more sustainable approaches to ensure the long-term viability of the sector.

In the context of the circular economy, the focus in the sport sector is on redesigning products, infrastructure, and business models to minimize waste generation and maximize the reuse, recycling, and repurposing of materials. This involves adopting innovative approaches to product design and manufacturing that prioritize durability, reparability,

and recyclability, as well as promoting the adoption of circular business models such as product-as-a-service and sharing platforms.

Key areas of focus for the circular economy transition in the European sport sector include sustainable venue design and construction, waste management and recycling initiatives, sustainable procurement practices, and the promotion of circular sports equipment and apparel. Initiatives such as the use of recycled materials in venue construction, the implementation of closed-loop waste management systems, and the development of take-back schemes for sports equipment are gaining traction as organizations seek to reduce their environmental footprint and promote resource efficiency.

Moreover, the shift towards a circular economy in the European sport sector is also driven by the growing recognition of the social benefits associated with sustainable practices, including improved community engagement, enhanced public health outcomes, and increased social inclusion. By embracing circularity, sports organizations have the opportunity to not only reduce their environmental impact but also to contribute positively to society and promote a more sustainable and resilient future for the sport sector and beyond.

2.3. Circular economy and circular design

The circular economy, as it relates to the principles of circular design, emphasizes a systemic approach to economic development that aims to minimize waste, keep products and materials in use for as long as possible, and regenerate natural systems. Circular design principles play a crucial role in achieving the goals of the circular economy by guiding the creation of products, services, and systems that are restorative and regenerative by design.

Circular design principles prioritize strategies such as designing for durability, reparability, and recyclability, as well as minimizing resource inputs and maximizing resource efficiency throughout the product lifecycle. By integrating these principles into the design process, products can be made to last longer, be easily repaired and upgraded, and ultimately be recycled or repurposed at the end of their life, thereby reducing waste and conserving valuable resources.

The importance of circular design principles lies in their ability to drive innovation, foster sustainable consumption and production patterns, and create economic opportunities while minimizing environmental impact. By adopting circular design principles, businesses can unlock new revenue streams through the development of circular business models such as product-as-a-service and sharing platforms, as well as through the creation of value-added services such as repair and remanufacturing.

Furthermore, circular design principles are essential for addressing pressing environmental challenges such as resource depletion, pollution, and climate change. By designing products and systems that are regenerative and resource-efficient, the circular economy offers a pathway towards achieving sustainable development goals and building a more resilient and inclusive economy.

In summary, the integration of circular design principles is crucial for advancing the transition to a circular economy, driving sustainable innovation, and creating positive social, environmental, and economic outcomes for present and future generations.

2.3.1. Circular design principles

Circular design principles in the context of sport emphasize the application of sustainable and regenerative practices throughout the lifecycle of sports products, facilities, and events. These principles aim to minimize waste, reduce environmental impact, and promote social responsibility within the sports industry. Some key circular design principles applicable to the sports sector include:

1. Durability and Longevity: Designing sports equipment, apparel, and infrastructure to be durable and long-lasting helps extend their lifespan, reducing the need for frequent replacements and minimizing waste.

2. Material Selection: Choosing materials that are renewable, recyclable, and biodegradable can reduce the environmental footprint of sports products. Using recycled materials or those sourced from sustainable suppliers further supports circularity.

3. Modular Design: Adopting a modular design approach allows sports products to be easily disassembled, repaired, and upgraded, extending their usability and reducing the need for new purchases.

4. Closed-Loop Systems: Implementing closed-loop systems for sports equipment and apparel involves collecting, refurbishing, and remanufacturing used items to create new products, thereby reducing the demand for virgin materials and minimizing waste.

5. Eco-Friendly Manufacturing: Incorporating eco-friendly manufacturing processes, such as using renewable energy, reducing water consumption, and minimizing emissions, contributes to the sustainability of sports products and facilities.

6. End-of-Life Management: Developing strategies for the responsible disposal or repurposing of sports equipment and facilities at the end of their life ensures that materials are diverted from landfills and can be reintegrated into the circular economy.

7. Community Engagement: Engaging with local communities to promote sustainable practices, support social initiatives, and enhance the well-being of stakeholders contributes to the social sustainability of the sports sector.

By integrating these circular design principles into the planning, design, production, and management of sports products, facilities, and events, the sports industry can minimize its environmental footprint, conserve resources, and contribute to the transition towards a more sustainable and circular economy.

2.3.2. Circular design strategies

Circular design strategies in sport encompass a range of approaches aimed at integrating sustainability principles into various aspects of the sports industry, from product design to event management. These strategies prioritize the reduction of waste, the efficient use

of resources, and the promotion of environmental and social responsibility. Some key circular design strategies in sport include:

1. Product Lifecycle Assessment: Conducting thorough assessments of the environmental impact of sports products throughout their lifecycle, from raw material extraction to end-of-life disposal, helps identify opportunities for improvement and informs design decisions.

2. Design for Disassembly: Designing sports equipment, apparel, and infrastructure with disassembly in mind facilitates easier repair, refurbishment, and recycling at the end of their useful life. Modular designs allow components to be separated and replaced, extending the lifespan of products and reducing waste.

3. Material Selection: Choosing sustainable materials with low environmental impact, such as recycled plastics, organic textiles, and renewable resources, promotes circularity in sports product manufacturing. Additionally, prioritizing materials that can be easily recycled or biodegraded at the end of their life supports a closed-loop system.

4. Extended Producer Responsibility (EPR): Implementing EPR programs requires sports manufacturers to take responsibility for the entire lifecycle of their products, including collection, recycling, and disposal. This encourages manufacturers to design products with durability, reparability, and recyclability in mind.

5. Collaborative Innovation: Collaborating with stakeholders across the sports industry, including manufacturers, designers, athletes, and consumers, fosters innovation and the development of sustainable solutions. Open innovation platforms and partnerships enable knowledge sharing and collective problem-solving.

6. Sustainable Event Management: Applying circular design principles to sports events involves minimizing waste generation, optimizing resource use, and promoting sustainable practices such as recycling, composting, and energy efficiency. Implementing measures such as reusable signage, water stations, and waste reduction strategies can significantly reduce the environmental footprint of sports events.

7. Education and Awareness: Educating athletes, coaches, fans, and other stakeholders about the importance of sustainability in sport and the benefits of circular design strategies encourages adoption and participation. Awareness campaigns, workshops, and training programs raise consciousness about environmental and social issues and empower individuals to make sustainable choices.

By embracing circular design strategies in sport, stakeholders can contribute to the development of a more sustainable and resilient sports industry that prioritizes environmental stewardship, resource efficiency, and social well-being. These strategies not only mitigate the environmental impact of sports activities but also foster innovation, collaboration, and community engagement.

2.3.3. Circular design models

Circular design models in sports encompass frameworks and methodologies that guide the integration of circular economy principles into various aspects of the sports industry. These models aim to optimize resource use, minimize waste generation, and promote

environmental and social sustainability. Some notable circular design models in sports include:

1. Cradle to Cradle (C2C): The Cradle to Cradle framework emphasizes the creation of products that are designed for continuous recovery and regeneration of materials. In the sports industry, C2C principles can guide the development of sports equipment, apparel, and infrastructure that are manufactured using non-toxic, recyclable materials and designed for disassembly and remanufacturing.

2. Biomimicry: Biomimicry draws inspiration from nature's designs and processes to solve human challenges sustainably. In sports, biomimetic design principles can lead to the development of innovative products and materials that mimic natural systems, such as lightweight and durable structures inspired by plant structures or aerodynamic designs inspired by animal adaptations.

3. Design Thinking: Design thinking is a human-centered approach to innovation that focuses on understanding user needs, ideating solutions, prototyping, and testing iteratively. In the context of sports, design thinking can be applied to develop user-centric and sustainable sports products, services, and experiences that meet the needs of athletes, fans, and other stakeholders.

4. Closed-Loop Systems: Closed-loop systems aim to minimize waste by keeping resources in circulation for as long as possible through recycling, remanufacturing, and reuse. In sports, closed-loop systems can be implemented in the design, production, and management of sports equipment, facilities, and events to reduce environmental impact and promote resource efficiency.

5. Performance Economy: The performance economy model focuses on delivering performance and value to users while minimizing resource consumption and waste generation. In the sports industry, a performance economy approach involves designing products and services that optimize athletic performance, durability, and user experience while minimizing environmental impact and resource use.

6. Circular Business Models: Circular business models are strategies that enable companies to create value from products and services in a circular manner, such as product-as-a-service, leasing, and sharing models. In sports, circular business models can involve initiatives like equipment leasing, subscription-based services, and take-back programs to extend product lifespan and promote resource efficiency.

By adopting circular design models in sports, stakeholders can transition towards a more sustainable and resilient sports industry that prioritizes environmental stewardship, innovation, and long-term value creation. These models offer frameworks for reimagining product design, production processes, and business models to align with the principles of the circular economy and contribute to a healthier planet and society.

3. Methodology of IDEATION context analysis

The SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis methodology has been chosen for the context analyses in the IDEATION project for several compelling reasons. Firstly, SWOT analysis provides a systematic and structured approach to evaluating the internal and external factors that can impact the development and usage of circular economy principles and circular design models. This method allows for a comprehensive examination of the current state of affairs in Spanish, Italian, and Lithuanian sport clubs, facilitating a deeper understanding of the challenges and opportunities they face.

Secondly, SWOT analysis enables a holistic assessment of both positive and negative factors influencing the adoption of circular practices. By identifying strengths and weaknesses within the sport clubs themselves, as well as opportunities and threats in the external environment, the analysis can provide valuable insights into areas of improvement and potential avenues for growth and innovation.

Moreover, SWOT analysis is a flexible and adaptable tool that can be tailored to suit the specific needs and objectives of the IDEATION project. It allows for the incorporation of qualitative and quantitative data, as well as the perspectives of multiple stakeholders, ensuring a comprehensive and nuanced understanding of the context in which circular economy principles are being applied in the sport sector.

Furthermore, SWOT analysis facilitates stakeholder engagement and collaboration by involving sport clubs, policymakers, and other relevant actors in the research process. By encouraging participation and input from key stakeholders, the analysis can generate valuable insights and recommendations that are grounded in the realities of the sport industry.

The SWOT analysis methodology is well-suited for the context analyses in the IDEATION project, as it offers a structured approach to examining the internal and external factors influencing the development and usage of circular economy principles and circular design models in Spanish, Italian, and Lithuanian sport clubs. Its flexibility, inclusivity, and ability to generate actionable insights make it a valuable tool for informing decision-making and driving positive change in the sport sector.

4. CE and CD in Europe

Circular economy principles and circular design models are being increasingly embraced across the European Union (EU), reflecting a collective commitment to sustainability, resource efficiency, and climate action. Landscape research conducted across EU member states reveals a diverse array of initiatives, policies, and innovative practices aimed at fostering circularity and driving the transition towards a more sustainable economy.

At the heart of the EU's circular economy agenda is the European Green Deal, a flagship initiative that outlines ambitious targets and policy measures to accelerate the transition to a circular economy. As part of this framework, the EU has adopted a Circular Economy Action Plan, which sets out key priorities and actions to promote circularity across sectors such as manufacturing, construction, textiles, and food. The Action Plan emphasizes the importance of eco-design, waste prevention, recycling, and the development of circular business models to achieve a more resource-efficient and resilient economy.

Furthermore, EU member states have been actively implementing national circular economy strategies and roadmaps to align with EU objectives and address specific regional challenges. Countries like the Netherlands, Finland, and Sweden have emerged as frontrunners in circularity, with comprehensive policy frameworks, investment incentives, and collaborative platforms to support circular innovation and entrepreneurship. These national strategies often involve partnerships between government, industry, academia, and civil society to drive systemic change and mainstream circular practices.

In addition to policy initiatives, European businesses are increasingly adopting circular design principles and practices to redesign products, services, and business models for sustainability. Leading companies across sectors are exploring concepts such as product-as-a-service, closed-loop supply chains, and material circularity to minimize waste, extend product lifecycles, and enhance resource efficiency. For example, companies like Philips, IKEA, and Unilever have implemented circular strategies focused on product refurbishment, remanufacturing, and material recycling to reduce environmental impact and create value from waste streams.

Moreover, the EU's research and innovation framework programmes, such as Horizon Europe, play a crucial role in advancing circular economy solutions through funding support, knowledge exchange, and collaborative projects. These programmes facilitate cross-sectoral cooperation, technology transfer, and the scaling up of innovative circular business models, driving progress towards EU-wide sustainability objectives and promoting circularity as a key pillar of the European economy.

The landscape of circular economy principles and circular design models in the European Union reflects a dynamic and evolving ecosystem of policies, initiatives, and practices aimed at fostering sustainable development, enhancing resource resilience, and mitigating climate change. By embracing circularity as a guiding principle, EU member states are poised to unlock new opportunities for economic growth, environmental stewardship, and social well-being in the transition towards a circular and regenerative economy.

4.1. CE and CD development challenges in Europe

In the European Union, the development and usage of circular economy principles and circular design models in various sectors, including the sport industry, face several challenges that impede their widespread adoption and implementation. These challenges arise from a combination of regulatory, economic, social, and technical factors that influence the transition towards a more circular economy.

One of the primary challenges is the lack of a comprehensive regulatory framework that provides clear guidance and incentives for businesses to adopt circular practices. While the EU has introduced legislation and initiatives to promote circularity, such as the Circular Economy Action Plan and the EU Green Deal, there is still a need for harmonized policies and standards across member states to support the transition.

Economic factors also pose significant challenges to the development and usage of circular economy principles and circular design models. High upfront costs and limited access to financing for circular projects can deter businesses from investing in sustainable practices. Additionally, the current linear economic model, which prioritizes short-term profit over long-term sustainability, creates barriers to the adoption of circular business models.

Social and cultural factors, including consumer behavior and awareness, play a crucial role in shaping the adoption of circular economy principles. Limited consumer demand for sustainable products and services, coupled with a lack of awareness about the benefits of circularity, can hinder market uptake. Moreover, societal norms and attitudes towards waste and consumption need to shift towards more sustainable practices to drive meaningful change.

From a technical perspective, there are challenges related to innovation, technology, and infrastructure that need to be addressed. Innovation is essential for developing new materials, processes, and technologies that enable circularity, but research and development efforts may be hindered by limited funding and expertise. Furthermore, existing infrastructure may not be suitable for accommodating circular systems, requiring investments in upgrading and adapting infrastructure to support circular practices.

Addressing these challenges requires a coordinated effort from policymakers, businesses, civil society, and other stakeholders to create an enabling environment for the development and usage of circular economy principles and circular design models. This includes strengthening regulatory frameworks, providing financial incentives and support mechanisms, raising awareness and fostering consumer demand for sustainable products, investing in research and innovation, and upgrading infrastructure to support circularity. By overcoming these challenges, the European Union can accelerate its transition towards a more sustainable and circular economy across all sectors, including the sport industry.

4.2. CE and CD in Spain

Circular economy principles and circular design models have gained increasing traction in Spain, reflecting a growing commitment to sustainability and resource efficiency across various sectors. The country's landscape research reveals a multifaceted approach to implementing circularity, with initiatives spanning from policy frameworks to innovative business practices and community engagement efforts.

At the policy level, Spain has taken significant strides towards promoting circular economy principles through legislation and strategic initiatives. In 2020, the Spanish government unveiled its Circular Economy Strategy 2030, which outlines a comprehensive roadmap for transitioning towards a circular economy model. This strategy emphasizes the importance of collaboration between public and private stakeholders, investment in eco-innovation, and the development of circular business models to drive sustainable economic growth.

In addition to national policies, regional governments in Spain have also prioritized circularity as a strategic objective. Regions like Catalonia and the Basque Country have implemented their own circular economy plans, fostering innovation hubs and supporting circular initiatives tailored to local contexts. These regional strategies complement national efforts and serve as catalysts for promoting circularity at the grassroots level.

Furthermore, Spanish businesses are increasingly embracing circular design principles as a means of reducing waste, enhancing product longevity, and minimizing environmental impact. Leading companies across industries such as fashion, automotive, and food have adopted circular business models, incorporating practices such as product refurbishment, remanufacturing, and waste valorization into their operations. For example, fashion brands like Ecoalf and Mango have launched sustainable clothing lines made from recycled materials, while automotive manufacturers like SEAT are exploring circular approaches to vehicle production and end-of-life management.

Moreover, Spain's vibrant startup ecosystem has become a hotbed of circular innovation, with emerging enterprises pioneering disruptive solutions to address sustainability challenges. Startups focused on circular packaging, renewable energy, urban mobility, and waste management are leveraging technologies such as blockchain, artificial intelligence, and the Internet of Things to drive systemic change and create new opportunities for circularity.

Spain's commitment to circular economy principles and circular design models underscores the country's proactive approach to environmental sustainability and economic resilience. By fostering collaboration, innovation, and policy coherence, Spain is poised to unlock the full potential of the circular economy and transition towards a more sustainable and regenerative future.

4.2.1. CE and CD in Spanish sport sector

In Spain, the integration of circular economy principles and circular design models within the sport sector is gaining momentum as part of broader sustainability initiatives aimed at reducing environmental impact and promoting resource efficiency. While still in the early stages of adoption, there are several notable examples of circular practices being implemented across various facets of the Spanish sport industry.

One area where circular economy principles are making headway is in the development of sustainable sports infrastructure. Sporting venues and facilities are increasingly designed and constructed with eco-friendly features such as energy-efficient lighting, renewable energy sources like solar panels, and water-saving technologies. These initiatives not only minimize environmental footprint but also contribute to cost savings and long-term operational efficiency.

Moreover, there is a growing emphasis on sustainable materials and product design within the Spanish sport industry. Sports equipment manufacturers are exploring alternative materials and production methods that prioritize durability, recyclability, and biodegradability. This includes the use of recycled plastics, eco-friendly textiles, and bio-based materials in the manufacturing of sports apparel, footwear, and equipment.

In addition to sustainable infrastructure and product design, circular practices are also being embraced in sports event management and operations. Initiatives focused on waste reduction, recycling, and responsible resource management are becoming increasingly common in sporting events across Spain. This includes efforts to minimize single-use plastics, promote reusable materials, and implement efficient waste management systems to divert materials from landfills.

Collaboration and partnerships play a crucial role in advancing circular economy initiatives within the Spanish sport sector. Stakeholders, including sports federations, clubs, event organizers, manufacturers, and governmental bodies, are working together to share knowledge, exchange best practices, and develop innovative solutions. Furthermore, engagement with research institutions, sustainability organizations, and public-private partnerships can drive continued progress towards a more sustainable and circular sport ecosystem in Spain.

4.2.2. SWAT analysis of CE and CD in Spanish sport sector

Strengths:

- Comprehensive Policy Framework: Spain has developed a robust Circular Economy Strategy 2030, providing a clear roadmap for transitioning towards circularity. This strategy emphasizes collaboration between stakeholders, investment in eco-innovation, and the development of circular business models.
- Regional Initiatives: Regional governments, such as Catalonia and the Basque Country, have implemented their own circular economy plans, fostering innovation hubs and supporting local circular initiatives tailored to regional contexts.
- Business Adoption: Leading Spanish companies across various industries have embraced circular design principles, incorporating practices such as product refurbishment, remanufacturing, and waste valorization into their operations.
- Vibrant Startup Ecosystem: Spain's startup ecosystem is vibrant and innovative, with emerging enterprises pioneering disruptive solutions to sustainability challenges. Startups focused on circular packaging, renewable energy, urban mobility, and waste management are leveraging technology to drive systemic change.

Weaknesses:

- Implementation Challenges: Despite the existence of supportive policies and initiatives, the actual implementation of circular economy principles may face challenges due to resource constraints, regulatory complexity, and limited awareness among businesses and consumers.

- Fragmentation: While regional circular economy plans complement national strategies, there may be fragmentation and lack of coordination between different levels of governance, hindering the coherent implementation of circular initiatives.
- Cultural Shift: Encouraging widespread adoption of circular design models may require a cultural shift in mindset and behavior among businesses, consumers, and policymakers, which could pose a significant challenge.

Opportunities:

- Innovation Potential: Spain's commitment to circularity presents significant opportunities for innovation and entrepreneurship, particularly in areas such as circular packaging, renewable energy, and waste management.
- Green Recovery: The post-pandemic recovery presents an opportunity to prioritize sustainable and resilient economic models, with circular economy principles playing a central role in building back better.
- EU Funding: Spain can leverage EU funding mechanisms, such as the European Green Deal and Horizon Europe, to support circular economy projects and initiatives, driving economic growth and environmental sustainability.

Threats:

- Economic Uncertainty: Economic downturns or disruptions could impact investment in circular economy projects and hinder the transition towards circularity.
- Regulatory Changes: Changes in regulations or trade policies at the national or EU level could affect the operating environment for circular economy initiatives and businesses.
- Global Competition: Competition from other countries or regions that prioritize circularity could challenge Spain's position as a leader in the circular economy, highlighting the need for continuous innovation and competitiveness.

4.3. CE and CD in Italy

In Italy, the adoption of circular economy principles and circular design models has gained significant momentum in recent years, reflecting the country's commitment to sustainability and environmental stewardship. A combination of legislative measures, innovative initiatives, and collaborative efforts across sectors is driving the transition towards a more circular economy.

At the legislative level, Italy has developed a comprehensive framework to promote sustainable development and address environmental challenges. The National Strategy for Sustainable Development and the National Waste Management Plan outline ambitious objectives for waste prevention, recycling, and resource efficiency. These policies align with European Union directives and initiatives aimed at promoting the circular economy.

Italy has made substantial progress in waste management, with a focus on increasing recycling rates and reducing reliance on landfills. The country has implemented separate collection systems for various waste streams, including paper, plastics, glass, and organic waste. Moreover, extended producer responsibility (EPR) schemes have been established

to incentivize producers to design products for recyclability and take responsibility for their end-of-life management.

Innovation and research play a crucial role in advancing circular economy practices in Italy. The country boasts a vibrant ecosystem of research institutions, universities, and innovative companies dedicated to developing eco-friendly materials, sustainable manufacturing processes, and circular business models. Collaborative projects and initiatives leverage the expertise of multiple stakeholders to drive technological advancements and promote the circular economy agenda.

In the fashion industry, which is a cornerstone of Italy's economy, many Italian fashion houses are embracing circular design principles. Companies are exploring sustainable materials, such as organic cotton and recycled fibers, and adopting eco-friendly production techniques to minimize waste and environmental impact throughout the supply chain. Circular business models, such as clothing rental and resale platforms, are gaining popularity as consumers increasingly prioritize sustainability in their purchasing decisions.

In the tourism sector, Italy is promoting circular economy principles to foster sustainable tourism practices and minimize the environmental footprint of the industry. Initiatives focus on responsible travel, conservation of natural resources, and the preservation of cultural heritage. Circular tourism models aim to create immersive experiences that benefit local communities while minimizing negative impacts on the environment.

Italian cities are also embracing circular economy strategies to promote urban sustainability. Circular procurement policies, green infrastructure development, and innovative waste management solutions are being implemented to create more resilient and resource-efficient urban environments. These initiatives reflect Italy's commitment to driving systemic change at the local level and contributing to the transition towards a circular economy.

Overall, Italy's landscape regarding circular economy principles and circular design models is characterized by a multifaceted approach involving government leadership, industry innovation, academic research, and community engagement. By harnessing the collective efforts of various stakeholders, Italy is making significant strides towards building a more sustainable and resilient economy for future generations.

4.3.1. CE and CD in Italian sport sector

In Italy, the integration of circular economy principles and circular design models within the sport sector is gaining traction as part of broader efforts to promote sustainability and environmental stewardship. While still in its nascent stages, the adoption of circular practices in sports reflects a growing recognition of the need to minimize waste, reduce carbon footprint, and foster resource efficiency across the sector.

One notable application of circular design in the Italian sport sector is the development of eco-friendly sports facilities and infrastructure. Sporting venues, including stadiums, arenas, and training centers, are increasingly incorporating sustainable features such as energy-efficient lighting, renewable energy sources like solar panels, and water-saving

technologies. These initiatives not only reduce environmental impact but also contribute to cost savings and operational efficiency over time.

Moreover, there is a growing emphasis on sustainable materials and product design within the Italian sport industry. Sports equipment manufacturers are exploring innovative materials and manufacturing processes that prioritize durability, recyclability, and biodegradability. For instance, the use of recycled plastics, eco-friendly textiles, and bio-based materials in the production of sports apparel and equipment is becoming more prevalent, aligning with circular economy principles.

Additionally, initiatives promoting the circular management of sports equipment and gear are emerging across Italy. Programs focused on equipment repair, refurbishment, and recycling help extend the lifespan of products and minimize waste. Sports clubs and organizations are also exploring equipment-sharing schemes and second-hand markets to promote the reuse of sporting goods, reducing the need for new production and consumption.

Collaboration between stakeholders in the Italian sport sector, including sports federations, clubs, manufacturers, and governmental bodies, is essential for advancing circular economy initiatives. By sharing knowledge, resources, and best practices, stakeholders can drive collective action towards a more sustainable sport ecosystem. Furthermore, partnerships with academic institutions, research centers, and sustainability organizations can foster innovation and support the development of circular solutions tailored to the unique challenges and opportunities within the Italian sport sector.

4.3.2. SWAT analysis of CE and CD in Italian sport sector

Strengths:

- Growing Awareness and Recognition: There is a growing recognition within the Italian sport sector of the importance of adopting circular economy principles and circular design models to promote sustainability and environmental stewardship.
- Sustainable Infrastructure Development: Sporting venues in Italy are increasingly integrating sustainable features such as energy-efficient lighting, renewable energy sources, and water-saving technologies, showcasing the potential for circular practices to reduce environmental impact and enhance operational efficiency.
- Emphasis on Sustainable Materials: Italian sports equipment manufacturers are exploring innovative materials and manufacturing processes that prioritize durability, recyclability, and biodegradability, aligning with circular economy principles and contributing to the development of more sustainable products.
- Emerging Circular Management Initiatives: Initiatives focused on equipment repair, refurbishment, and recycling are emerging across Italy, helping to extend the lifespan of sports equipment and minimize waste. Additionally, equipment-sharing schemes and second-hand markets are being explored to promote the reuse of sporting goods.

Weaknesses:

- Nascent Stage of Adoption: Despite growing awareness, the integration of circular economy principles and circular design models within the Italian sport sector is still in its early stages, indicating a need for greater education and awareness-building efforts.
- Limited Resources and Infrastructure: Some sports clubs and organizations in Italy may face challenges in implementing circular initiatives due to limited resources, infrastructure, and technical expertise, highlighting the importance of capacity-building and support mechanisms.
- Regulatory and Policy Constraints: Regulatory barriers and policy constraints may hinder the adoption of circular practices in the sport sector, necessitating alignment with national and EU-level policies to create an enabling environment for circular innovation.

Opportunities:

- Collaboration and Knowledge Sharing: Collaboration between stakeholders in the Italian sport sector, including sports federations, clubs, manufacturers, and governmental bodies, presents opportunities for collective action and knowledge sharing to drive sustainable practices and innovation.
- Partnership with Academic and Research Institutions: Partnerships with academic institutions, research centers, and sustainability organizations can foster innovation and support the development of tailored circular solutions for the sport sector, leveraging expertise and resources to address specific challenges.
- Market Demand for Sustainable Products: Increasing consumer demand for sustainable sports products and apparel presents opportunities for Italian manufacturers to capitalize on the growing market for eco-friendly and circular goods, driving innovation and market differentiation.

Threats:

- Economic Constraints: Economic challenges or disruptions could impact investment in circular economy initiatives within the sport sector, particularly for small and medium-sized enterprises (SMEs) with limited financial resources.
- Competitive Pressures: Competition from international markets and brands that prioritize sustainability could pose challenges for Italian sports manufacturers and retailers, highlighting the need for continuous innovation and differentiation.
- Technological and Supply Chain Risks: Risks related to technological advancements, supply chain disruptions, and material availability could impact the adoption of circular practices and the development of sustainable products within the Italian sport sector, necessitating resilience and adaptability.

4.4. CE and CD in Lithuania

In Lithuania, the adoption of circular economy principles and circular design models is gaining traction as the country seeks to address environmental challenges, promote sustainable development, and reduce its ecological footprint. A combination of policy initiatives, innovative projects, and collaborative efforts across sectors is driving the transition towards a more circular economy.

At the policy level, Lithuania has developed a strategic framework to advance the circular economy agenda and promote sustainable resource management. The National Circular Economy Strategy sets out ambitious objectives for waste prevention, resource efficiency, and the promotion of eco-innovation. This strategy aligns with European Union directives and initiatives aimed at promoting a more sustainable and circular economy across member states.

Lithuania has made significant progress in waste management and recycling, with efforts focused on increasing recycling rates and reducing landfilling. The country has implemented separate collection systems for various waste streams, including paper, plastics, glass, and organic waste. Moreover, extended producer responsibility (EPR) schemes have been established to encourage producers to take responsibility for the end-of-life management of their products.

Innovation and entrepreneurship play a vital role in driving circular economy practices in Lithuania. The country boasts a growing ecosystem of startups, research institutions, and innovative companies dedicated to developing sustainable solutions and circular business models. Collaborative projects and initiatives bring together stakeholders from academia, industry, and government to promote eco-innovation and advance the circular economy agenda.

In the manufacturing sector, Lithuanian companies are increasingly embracing circular design principles to minimize waste, optimize resource use, and reduce environmental impact. Many businesses are exploring innovative approaches to product design, materials sourcing, and manufacturing processes to create more sustainable and circular products. Circular business models, such as product-as-a-service and remanufacturing, are also gaining traction as companies seek to extend the lifespan of their products and materials.

Lithuania's circular economy landscape extends beyond traditional sectors to include innovative initiatives in areas such as circular construction, sustainable agriculture, and circular tourism. The country is investing in green infrastructure, renewable energy, and sustainable mobility to create a more resilient and resource-efficient economy. These efforts reflect Lithuania's commitment to driving systemic change and building a more sustainable future for its citizens.

4.4.1. CE and CD in Lithuanian sport sector

In Lithuania, the adoption of circular economy principles and circular design models within the sport sector is an emerging trend that aligns with broader efforts to promote sustainability and environmental responsibility. While the implementation of circular practices in sports is still in its early stages, there is growing recognition of the need to minimize waste, reduce environmental impact, and promote resource efficiency throughout the sector.

One notable example of circular design in the Lithuanian sport sector is the development of eco-friendly sports facilities and infrastructure. Sporting venues, such as stadiums and sports complexes, are increasingly incorporating sustainable features such as energy-efficient lighting, renewable energy sources, and rainwater harvesting systems. These

initiatives not only reduce environmental impact but also contribute to long-term cost savings and operational efficiency.

Another area where circular economy principles are being applied is in the management of sports equipment and materials. Initiatives promoting the reuse, repair, and recycling of sports equipment help to extend the lifespan of resources and minimize waste. For example, sports clubs and organizations may implement equipment sharing programs, refurbish old equipment, or partner with recycling facilities to ensure responsible disposal of materials.

Additionally, there is growing interest in promoting sustainable practices among athletes, coaches, and sports enthusiasts. Awareness campaigns, educational programs, and training initiatives aim to raise awareness about the environmental impact of sports activities and encourage individuals to adopt more sustainable behaviors. This includes initiatives such as promoting eco-friendly transportation options for traveling to sporting events, reducing single-use plastics, and adopting eco-friendly training methods.

Collaboration between stakeholders in the sport sector, including sports clubs, federations, government agencies, and environmental organizations, is essential for driving the adoption of circular economy principles. By working together, stakeholders can share best practices, develop innovative solutions, and implement collective action to promote sustainability throughout the sport sector. Furthermore, partnerships with industry leaders and innovators can help accelerate the transition towards a more circular and sustainable sport ecosystem in Lithuania.

4.4.2. SWAT analysis of CE and CD in Lithuanian sport sector

Strengths:

- Emerging Trend towards Sustainability: There is a growing recognition within the Lithuanian sport sector of the importance of adopting circular economy principles and circular design models to promote sustainability and environmental responsibility.
- Integration of Sustainable Features in Infrastructure: Sporting venues in Lithuania are increasingly incorporating sustainable features such as energy-efficient lighting, renewable energy sources, and rainwater harvesting systems, demonstrating a commitment to reducing environmental impact and promoting resource efficiency.
- Promotion of Circular Practices in Equipment Management: Initiatives promoting the reuse, repair, and recycling of sports equipment help extend the lifespan of resources and minimize waste, showcasing efforts to implement circular economy principles in the management of sports materials.
- Awareness and Education Initiatives: Awareness campaigns, educational programs, and training initiatives aimed at athletes, coaches, and sports enthusiasts raise awareness about the environmental impact of sports activities and encourage the adoption of more sustainable behaviors.

Weaknesses:

- Early Stage of Adoption: Despite growing recognition, the implementation of circular practices in the Lithuanian sport sector is still in its early stages, indicating a need for greater education, capacity-building, and support mechanisms.
- Limited Resources and Expertise: Some sports clubs and organizations may face challenges in implementing circular initiatives due to limited resources, technical expertise, and awareness of circular economy principles, highlighting the importance of capacity-building efforts.
- Regulatory and Policy Constraints: Regulatory barriers and policy constraints may hinder the adoption of circular practices in the sport sector, necessitating alignment with national and EU-level policies to create an enabling environment for circular innovation.

Opportunities:

- Collaboration and Knowledge Sharing: Collaboration between stakeholders in the Lithuanian sport sector, including sports clubs, federations, government agencies, and environmental organizations, presents opportunities for collective action and knowledge sharing to drive sustainable practices and innovation.
- Promotion of Sustainable Behaviors: Initiatives aimed at promoting sustainable behaviors among athletes, coaches, and sports enthusiasts create opportunities to raise awareness, foster behavior change, and integrate sustainability into sporting culture.
- Partnership with Industry Leaders: Partnerships with industry leaders and innovators can help accelerate the transition towards a more circular and sustainable sport ecosystem in Lithuania, leveraging expertise, resources, and best practices.

Threats:

- Economic Constraints: Economic challenges or disruptions could impact investment in circular economy initiatives within the sport sector, particularly for small and medium-sized sports clubs with limited financial resources.
- Competitive Pressures: Competition from international markets and brands that prioritize sustainability could pose challenges for Lithuanian sports clubs and manufacturers, highlighting the need for continuous innovation and differentiation.
- Technological and Supply Chain Risks: Risks related to technological advancements, supply chain disruptions, and material availability could impact the adoption of circular practices and the development of sustainable products within the Lithuanian sport sector, necessitating resilience and adaptability.

5. Circular design in sport – best practises

5.1. Circular design models in sport industry

The transition towards a more sustainable future in the sports industry is gaining momentum, with leading sportswear brands and organizations embracing circular design models and initiatives to drive positive environmental impact. These case studies provide compelling examples of how innovative approaches to product design, material sourcing, and business practices are reshaping the landscape of sports, demonstrating the feasibility and benefits of embracing circularity.

By reimagining the way sports equipment and apparel are designed, manufactured, and consumed, these companies are not only minimizing waste but also promoting resource efficiency and environmental sustainability. Through the adoption of circular design principles, such as closed-loop systems and recyclable materials, they are transforming traditional linear production models into more circular and regenerative ones.

From pioneering initiatives like Adidas Futurecraft Loop, which introduces fully recyclable running shoes made from thermoplastic polyurethane (TPU), to innovative material sourcing strategies that prioritize recycled and renewable materials, these case studies showcase the diverse approaches that sportswear brands and organizations are taking to reduce their environmental footprint.

Moreover, these initiatives are not only driving environmental benefits but also generating positive social and economic impacts. By promoting transparency, accountability, and collaboration across the value chain, these companies are fostering a culture of sustainability and responsible consumption within the sports industry, inspiring other stakeholders to join the movement towards a more circular economy.

5.1.1. Adidas Futurecraft Loop

The Adidas Futurecraft Loop represents a groundbreaking innovation in the footwear industry, showcasing the potential of circular design principles to revolutionize product lifecycle management. Unlike traditional shoes that end up in landfills after use, the Futurecraft Loop is designed with sustainability in mind from the outset. By utilizing thermoplastic polyurethane (TPU) as the primary material, Adidas has created a shoe that can be easily ground down and fully recycled at the end of its life cycle.

What sets the Futurecraft Loop apart is its closed-loop system, which enables the materials from old shoes to be repurposed and reincorporated into the production of new ones. This innovative approach eliminates the need for virgin materials and reduces the environmental footprint associated with shoe manufacturing. By closing the loop on waste and enabling continuous recycling, Adidas is pioneering a more sustainable model for footwear production that minimizes resource consumption and waste generation.

In addition to its environmental benefits, the Futurecraft Loop also represents a shift towards greater transparency and accountability in the fashion industry. Adidas has committed to providing full visibility into the materials and manufacturing processes used in the production of the Futurecraft Loop, allowing consumers to make informed choices about their purchases and encouraging greater industry-wide transparency.

The Adidas Futurecraft Loop serves as a powerful example of how circular design principles can drive innovation and sustainability in the footwear industry. By reimagining the way shoes are made and consumed, Adidas is leading the charge towards a more circular economy where waste is minimized, resources are conserved, and products are designed with longevity and recyclability in mind.

5.1.2. Nike Grind

Nike Grind is an innovative sustainability program pioneered by Nike, aimed at reimagining the lifecycle of athletic products through circular design principles. At its core, Nike Grind involves the collection and recycling of post-consumer athletic shoes, manufacturing waste, and plastic bottles to create high-quality, eco-friendly materials for new athletic products. By repurposing these materials, Nike is able to minimize waste, reduce its environmental footprint, and promote resource conservation across its supply chain.

One of the key components of Nike Grind is its utilization of recycled materials in the production of a wide range of athletic products. These recycled materials, derived from old shoes and other sources, undergo a rigorous process of transformation to create new, high-performance materials that meet Nike's stringent quality standards. These materials are then incorporated into various Nike products, including footwear, apparel, and sports surfaces, demonstrating the versatility and effectiveness of circular design in product development.

Beyond its environmental benefits, Nike Grind also serves as a testament to the company's commitment to innovation and sustainability. By investing in research and development, Nike has been able to pioneer new technologies and manufacturing processes that enable the widespread adoption of circular design practices. Through initiatives like Nike Grind, the company is not only reducing its reliance on virgin materials but also inspiring consumers and industry peers to embrace more sustainable approaches to product design and consumption.

Nike Grind exemplifies the transformative potential of circular design in the sports industry, offering a compelling example of how companies can create value while simultaneously minimizing their environmental impact. By closing the loop on materials and reimagining the traditional linear model of production and consumption, Nike is leading the way towards a more sustainable future for athletic products and the planet as a whole.

5.1.3. Patagonia Worn Wear

Patagonia's Worn Wear initiative represents a pioneering effort in promoting sustainable consumption and circular design principles within the outdoor apparel industry. At the heart of the program is the ethos of repair, reuse, and recycling, aimed at extending the lifespan of outdoor clothing and gear while minimizing environmental impact. Through a network of repair centers staffed by skilled technicians, Patagonia offers customers the opportunity to mend and restore their well-loved garments, ensuring that they can continue to serve their purpose for years to come.

In addition to repair services, Patagonia's Worn Wear initiative includes an online marketplace where customers can buy and sell used outdoor gear, fostering a community-driven approach to resource conservation and waste reduction. By facilitating the resale of pre-owned products, Patagonia not only diverts items from landfill but also encourages a shift towards more conscious consumption habits among its customer base. Furthermore, the company provides a platform for individuals to share stories and experiences associated with their gear, reinforcing the value of durability, longevity, and emotional attachment in the context of sustainability.

Beyond repair and resale, Patagonia actively promotes recycling as a means of closing the loop on materials and reducing the environmental footprint of its products. Through its partnership with the Renewal Workshop and other recycling programs, the company ensures that garments beyond repair are responsibly disassembled and transformed into new materials or products. By embracing a circular approach to production and consumption, Patagonia's Worn Wear initiative exemplifies the company's commitment to environmental stewardship and serves as a beacon of sustainability within the outdoor industry.

In summary, Patagonia's Worn Wear initiative represents a holistic approach to promoting sustainability and circularity in the outdoor apparel sector. By empowering customers to repair, reuse, and recycle their clothing and gear, Patagonia not only extends the lifespan of its products but also fosters a culture of conscious consumption and environmental responsibility. Through innovative initiatives like Worn Wear, Patagonia continues to lead by example, demonstrating that business success and environmental stewardship can go hand in hand.

5.1.4. The World Surf League

The World Surf League (WSL) has emerged as a frontrunner in promoting ocean health and sustainability within the professional surfing community through a series of impactful initiatives. Central to these efforts are beach clean-up campaigns organized in conjunction with WSL events worldwide. These clean-up efforts not only serve to remove marine debris from coastal environments but also raise awareness among surfers, spectators, and local communities about the importance of preserving ocean ecosystems.

In addition to beach clean-ups, the WSL has implemented measures to reduce plastic usage and promote eco-friendly practices during its surfing events. Through its "plastic-free" event initiatives, the WSL aims to minimize the environmental footprint of competitions by eliminating single-use plastics such as water bottles, straws, and packaging materials. By prioritizing sustainable alternatives and encouraging the use of reusable products, the WSL sets a precedent for responsible event management within the surfing industry.

Furthermore, the WSL collaborates with environmental organizations and advocacy groups to amplify its impact and support broader ocean conservation efforts. Through strategic partnerships with NGOs, such as Surfrider Foundation and Ocean Conservancy, the WSL leverages its platform to advocate for policy changes, raise public awareness, and implement innovative solutions to address plastic pollution and other threats to ocean health. By mobilizing the global surfing community around shared environmental values,

the WSL demonstrates the potential for sports organizations to drive positive change and inspire collective action for the protection of our oceans.

The World Surf League's ocean health initiatives exemplify a proactive approach to sustainability within the sport of surfing. By integrating environmental stewardship into its events and leveraging its influence to advocate for ocean conservation, the WSL demonstrates the powerful role that sports organizations can play in addressing pressing environmental challenges. Through collaborative efforts and a commitment to sustainability, the WSL sets a precedent for responsible stewardship of our planet's precious marine resources.

5.2. Circular design models used sport clubs

Circular design models are increasingly being adopted by sports clubs to minimize waste, promote sustainability, and enhance resource efficiency. Several case studies exemplify how these clubs are integrating circular principles into their operations, facilities, and practices, driving positive environmental impact while also achieving economic benefits.

One notable example is the Amsterdam ArenA, home to AFC Ajax, which has implemented various circular initiatives to reduce its ecological footprint. The stadium incorporates sustainable features such as rainwater harvesting systems, solar panels, and energy-efficient lighting, demonstrating how sporting venues can embrace circularity in their design and construction.

Another compelling case study is the Forest Green Rovers Football Club in the UK, renowned for its commitment to sustainability. The club's eco-conscious approach extends beyond the pitch, with initiatives such as serving plant-based food to fans, installing solar panels and electric vehicle charging stations at the stadium, and even using a robotic lawnmower to maintain the playing surface, all contributing to a more circular and environmentally friendly operation.

Furthermore, FC Barcelona's Espai Barça project serves as a prime example of circular design principles applied to sports infrastructure. The ambitious redevelopment plan aims to transform the club's facilities into a sustainable and energy-efficient sports district, incorporating features such as green roofs, rainwater management systems, and renewable energy sources, showcasing how large-scale sports complexes can embrace circularity.

These case studies underscore the diverse approaches that sports clubs are taking to integrate circular design models into their operations and infrastructure, demonstrating the potential for the sports industry to lead the way towards a more sustainable future. Through innovative initiatives and strategic partnerships, these clubs are not only reducing their environmental impact but also inspiring fans, stakeholders, and other clubs to join the circularity movement in sports.

5.2.1. The Amsterdam ArenA

The Amsterdam ArenA, renowned as the home ground for AFC Ajax, stands out as a prime example of circular design implementation within sporting venues. Through a series of innovative initiatives, the stadium has significantly reduced its ecological

footprint while setting new standards for sustainability in sports infrastructure. One of the key features of the Amsterdam ArenA's circular approach is its utilization of rainwater harvesting systems, which capture and store rainwater for various purposes such as irrigation, toilet flushing, and cooling systems. By harnessing this natural resource, the stadium minimizes its reliance on potable water supplies and reduces overall water consumption, contributing to water conservation efforts in the region.

In addition to rainwater harvesting, the Amsterdam ArenA boasts a comprehensive array of solar panels installed across its rooftops and facade. These solar panels generate renewable energy on-site, helping to power the stadium's operations and reduce its dependence on conventional electricity sources. By tapping into solar energy resources, the stadium not only lowers its carbon emissions but also demonstrates the viability of renewable energy solutions in large-scale sports facilities. Furthermore, the integration of energy-efficient lighting systems throughout the venue further enhances its sustainability credentials, reducing energy consumption and operating costs while maintaining optimal visibility for sporting events and other activities.

Beyond its technological advancements, the Amsterdam ArenA embraces circularity in its design and construction practices, prioritizing materials that are durable, recyclable, and low-impact. Through careful selection of construction materials and waste management strategies, the stadium minimizes waste generation and maximizes resource efficiency throughout its lifecycle. By adopting a holistic approach to circular design, the Amsterdam ArenA sets a precedent for sports clubs and venues worldwide, demonstrating that sustainability and high-performance facilities can go hand in hand. Through continuous innovation and collaboration, the stadium remains at the forefront of the circular economy movement in the sports industry, inspiring others to follow suit in their pursuit of environmental stewardship and resilience.

5.2.2. Forest Green Rovers Football Club

Forest Green Rovers Football Club, located in the UK, has garnered widespread acclaim for its unwavering dedication to sustainability both on and off the field. This commitment to environmental stewardship is evident in the club's holistic approach to circular design, which encompasses a range of innovative initiatives aimed at reducing its ecological footprint and promoting sustainable practices. One notable aspect of Forest Green Rovers' circular model is its emphasis on plant-based cuisine, with the club offering an array of vegan and vegetarian food options to fans attending matches. By prioritizing plant-based menus, the club not only promotes animal welfare but also reduces its environmental impact by minimizing the carbon footprint associated with food production and consumption.

Furthermore, Forest Green Rovers has implemented various renewable energy solutions within its stadium infrastructure, including the installation of solar panels and electric vehicle charging stations. These initiatives not only demonstrate the club's commitment to reducing its reliance on fossil fuels but also contribute to the broader transition towards clean, renewable energy sources in the sports industry. By harnessing solar power and providing infrastructure to support electric vehicles, Forest Green Rovers sets a powerful

example for other sports clubs seeking to adopt more sustainable practices and embrace circular design principles.

In addition to its sustainability efforts in energy and food, Forest Green Rovers has pioneered innovative approaches to stadium maintenance, including the use of a robotic lawnmower to manage the playing surface. This innovative technology not only reduces the club's reliance on traditional, fossil fuel-powered equipment but also minimizes noise pollution and chemical usage associated with conventional lawn care methods. Through these forward-thinking initiatives, Forest Green Rovers exemplifies the potential of circular design in sports clubs, proving that sustainability can be integrated into every aspect of operations to create a more resilient and environmentally conscious sporting ecosystem.

5.2.3. FC Barcelona's Espai Barça project

FC Barcelona's Espai Barça project represents a groundbreaking endeavor in the realm of circular design within the sports industry. This ambitious redevelopment initiative seeks to not only modernize FC Barcelona's facilities but also to establish a sustainable and energy-efficient sports district that serves as a beacon of environmental stewardship. At the heart of the Espai Barça project are circular design principles aimed at minimizing resource consumption, maximizing efficiency, and reducing environmental impact across all facets of the development.

One key aspect of the Espai Barça project is the incorporation of green infrastructure features designed to enhance sustainability and resilience. This includes the implementation of green roofs, which help to mitigate stormwater runoff, reduce heat island effects, and provide habitat for local wildlife. Additionally, rainwater management systems are being integrated to capture and reuse precipitation for irrigation and other non-potable uses, further conserving water resources and reducing reliance on traditional water sources.

Furthermore, the Espai Barça project emphasizes the adoption of renewable energy sources to power the sports district's operations. By harnessing solar power and other renewable technologies, FC Barcelona aims to minimize its carbon footprint and transition towards a more sustainable energy model. These renewable energy initiatives not only contribute to environmental conservation but also position FC Barcelona as a leader in the global effort to combat climate change through the widespread adoption of clean energy solutions.

Overall, FC Barcelona's Espai Barça project exemplifies the transformative potential of circular design in the realm of sports infrastructure. By prioritizing sustainability, resource efficiency, and environmental responsibility, FC Barcelona is setting a new standard for large-scale sports developments and inspiring other organizations to follow suit in embracing circularity as a fundamental principle of operation.

6. Recommendations

Based on the landscape research and SWOT analysis conducted in the Italian, Spanish, and Lithuanian sport club sectors and best practices found, several recommendations can be made for the integration of circular economy principles and circular design models in the development of a theoretical framework and practical toolkit for local and regional sport organizations:

1) Tailored Guidance and Training: Provide targeted guidance and training resources to sport clubs and organizations in Italy, Spain, and Lithuania on the implementation of circular economy principles and circular design models. This includes workshops, webinars, and educational materials that address the specific needs and challenges faced by sport clubs in each country.
2) Knowledge Sharing and Collaboration: Facilitate knowledge sharing and collaboration among sport clubs, federations, government agencies, and sustainability organizations across Italy, Spain, and Lithuania. Encourage the exchange of best practices, case studies, and lessons learned to accelerate the adoption of circular practices and foster innovation within the sport sector.
3) Policy Alignment and Advocacy: Advocate for policy alignment and support at the national and EU levels to create an enabling environment for circular economy initiatives in the sport sector. Engage with policymakers, legislators, and regulatory bodies to advocate for incentives, funding opportunities, and policy frameworks that promote sustainability and circularity in sports.
4) Resource Efficiency and Waste Reduction: Emphasize resource efficiency and waste reduction strategies in sport club operations and infrastructure development. Encourage the use of sustainable materials, energy-efficient technologies, and waste management practices to minimize environmental impact and promote circularity throughout the sport lifecycle.
5) Circular Product Design and Innovation: Encourage innovation in circular product design and manufacturing processes within the sport sector. Support research and development initiatives that explore alternative materials, recycling technologies, and circular business models to create more sustainable sports equipment, apparel, and facilities.
6) Community Engagement and Awareness: Foster community engagement and raise awareness about the benefits of circular economy principles in sports. Launch public awareness campaigns, educational programs, and community initiatives to educate athletes, fans, and stakeholders about the importance of sustainability and encourage active participation in circular initiatives.

By implementing these recommendations, local and regional sport organizations in Italy, Spain, and Lithuania can effectively integrate circular economy principles and circular design models into their operations, contributing to the development of a more sustainable and resilient sport sector.

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